

**AIR TRAFFIC AND NAVIGATION SERVICES SOC. LTD
REPUBLIC OF SOUTH AFRICA**



REQUEST FOR PROPOSALS: ATNS/TPQ/RFP049/FY23.24/ATFM REPLACEMENT SYSTEM

APPOINTMENT OF A SERVICE PROVIDER FOR THE SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF AN AIR TRAFFIC FLOW MANAGEMENT (ATFM) SYSTEM TO BE DEPLOYED IN THE MAIN ATC CENTRE AT THE O. R. TAMBO INTERNATIONAL AIRPORT (JOHANNESBURG). THE PROJECT WILL FURTHERMORE ESTABLISH A DISASTER RECOVERY PLATFORM (TO BE DEPLOYED IN THE FAOR SSS BUILDING) AND A TRAINING SIMULATION PLATFORM (AT THE ATNS ATA (ATNS AVIATION TRAINING ACADEMY).

Volume 2

TECHNICAL SPECIFICATIONS

FEBRUARY 2024

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ABSTRACT

The document herein contains the technical specifications for the replacement of the current Air Traffic Flow Management System (ATFM) deployed at O. R. Tambo International Airport (FAOR). The new ATFM System shall make provision for CDM, ACDM and Multi-nodal Regional and Long-Range ATFM systems interfacing. In addition, an ATFM training system shall be deployed at the ATNS Aviation Training Academy (ATA) and a Disaster Recovery (DR) system in the ATNS SSS Building.

The ATFM DR System will comprise of a functional replica of the ATFM Main System, while the ATFM ATA Training System will comprise of a simulated replica of the ATFM Main System.

For the ATFM Regional/Multi-nodal system three main aspects shall apply; ATFM System access, Basic User Requirements, Multi-Nodal ATFM Systems' Interfacing.

- A) ATFM System Access – Interaction with the ATFM System shall be established via various available means such as web portals, e-mails, SMS and AMHS (e.g., SAM, SRM, SLC) messages and AIM.
- B) Basic User Requirements – User requirements should ensure data accessibility for the Demonstration of Flight Data and Restricted Operational Service activities as well as for the end state.
- C) Regional and Long-Range Multi-Nodal ATFM Systems Interfacing – The “end state” refers to a network of interconnected systems with shared data between all ATFM Nodes. It will allow the ATFM Node of every participating ANSP to support Cross Border ATFM data exchange by coordinating the interfaces between regional participants, while providing flexibility for future expansion to more participants. This approach also supports the requirement identified by the ANSPs to reduce the need for a centralized component for the Distributed Multi-Nodal ATFM Network. The ATFM System shall support the full functionality required by each end user. ANSPs will have the freedom to use any ATFM System and hosted web-portal suitable for their needs and still be able to be integrated into the multi-nodal concept for Cross Border ATFM.

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ABBREVIATIONS

AAC	Airline Administrative Control
AAR	Aerodrome Arrival Rate
ACARS	Aircraft Communication Addressing and Reporting System
ACC	Area Control Centre
ACDM/A-CDM	Airport Collaborative Decision Making
ACID	Aircraft Identifier
ACISP	ACDM Information Sharing Platform
ACSA	Airports Company of South Africa
ADEP	Departure Airport
ADEXP	Eurocontrol Air Traffic Services Data Exchange Presentation
ADEXP	ATS Data Exchange Presentation
ADL	Aggregate Demand List
ADOPS	Aerodrome Operations
ADR	Aerodrome Departure Rate
ADS	Automatic Dependent Surveillance
AFIR	Arrival FIR
AFKRT	AFT KPI Reporting Tool
AFP	Airspace Flow Program
AFT	Airport Flow Tool
AFTN	Aeronautical Fixed Services Telecommunications Network
AIP	Aeronautical Information Publication
AIREPS	Air Report
AIRMET	Air Meteorological Information Report
AIOPS	AIR Operations
AIOPS	Airspace User Operations
AIOPS	Airspace user Operations
AIS	Aeronautical Information System
AMKRT	AMT KPI Reporting Tool
AO	Aircraft Operator
API	Application Programming Interface
ARFOR	Area Forecast
ARR	Flight Plan Arrival Message
ASBU	Aviation System Block Upgrades
ASCII	American Standard Code for Information Interchange / Exchange
ASHTAM	Volcano ash information or warning to Airmen – AFTN message
A-SMGCS	Advanced Surface Movements Guidance Control Systems

ASTERIX	All Purpose STructured Eurocontrol SuRveillance Information EXchange
ATA	ATNS- Aviation Training Academy
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATMSD	ATM Service Delivery
ATMSD	ATM Service Delivery management
ATNS	Air Traffic and Navigation Services Company
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zone
BADA	Base of Aircraft Data
BIRDTAM	Bird-strike information or warning to Airmen – AFTN message
CAMU	Central Airspace Management Unit
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CFMU	Central Flow Management Unit
CLD	Clearance Delivery
CLDT	Calculated Landing Time
CNG	Change Message
CNL	Cancellation Message
CNS/ATM	Communication Navigation Surveillance/Air Traffic Management
COBT	Calculated Off Block Time
COFT	Calculated Over Fix Time
COTS	Commercially-of-the-Shelf
CPDLC	Controller Pilot Data Link Communications
CPL	Current Flight Plan Message
CRM	Computation Redundancy Mode
CSAU	Controller System Administrators Users
CSCI	Computer Software Configuration Item
CT	Cape Town
CTA	Control/led Area
CTA	Calculated Time of Arrival
CTD	Controlled Time of Departure
CTOA	Calculated Time of Arrival
CTOT	Calculated Take-off Time
CTR	Control Zone
CWS	Controller Workstation
DAP	Daily Airspace Plan

DBMS	Database Management System
DCB	Demand Capacity Balancing
DCL	Data-link Communication Clearance used with CPDLC
DEP	Flight Plan Departure Message
DES	De-Suspension
DFIR	Departure FIR
DLA	Flight Plan Delay Message
DMZ	Demilitarised Zone or Screened Sub-network
DR	Disaster Recovery
EDCT	Estimated/Expected Departure Clearance Time
EELDT	Earliest Estimated Landing Time
EETOT	Earliest Estimated Take Off Time
EIBT	Estimated in Block Time
EOBT	Estimated Off Block Time
EST	Coordination Estimate (AIDC message)
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
ETFMS	Enhanced Tactical Flow Management System
ETO	Estimated Time Over
FAA	Federal Aviation Administration
FACT	Cape Town International Airport (ICAO Designator)
FAM	Flight Activation Monitoring
FANS	Future Air Navigation Systems
FAOR	OR Tambo International Airport (ICAO Designator)
FDR	Flight Data Record
FF-ICE	Flight and Flow Information for a Collaborative Environment
FIR	Flight Information Region
FLARM	FLight and AlaRM
FLS	Flight Suspension
FMP	Flow Management Position
FPCA	Flight Plan Conflict Area
FPCF	Flight Plan Conflict Function
FPCI	Flight Plan Conflict Inhibition
FPL	Flight Plan
FPMW	Flight Plan Management Workstation
FSM	Flight Schedule Monitor
ft	Feet-measurement unit
FTT	Flexible Taxi-Time
FUA	Flexible Use of Airspace

GAAP	General Aviation Airport Program
GANP	Global Air Navigation Plan – ICAO
GASP	Global Aviation Safety Plan – ICAO
GATMOC	Global Air Traffic Management Operational Concept – ICAO
GCU	General Controller User
GDG	Generic Data Gateway
GDP	Ground Delay Program
GMT	Greenwich Mean Time
GRIB	Gridded Binary
GS	Ground Stop program
GUI	Graphical User Interface
HDCP	High-bandwidth Digital Content Protection
HTML	Hyper Text Mark-up Language
HTTPS	Hyper-Text Transfer Protocol Secure
IACH	EUROCONTROL ATC Change Message
IAFP	EUROCONTROL ATC Flight Plan Proposal Message
IAPL	IFPS APL Message
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IFPL	IFPS Filed Flight Plan
IFPS	Initial Flight Plan Processing System
IFR	Instrument Flight Rules
IGTA	Initial Gate Time of Arrival
IGTD	Initial Gate Time of Departure
IOSA	IATA Operational Safety Audit
IPSec	Internet Protocol Security
ISO	International Standards Organisation
ISP	Information Security and Privacy OR Internet Service Provider
KPI	Key Performance Indicator
LAM	Logical Acknowledgement Message
LAN	Local Area Network
LCD	Liquid Crystal Display
LR-ATFM	Long-Range ATFM
MAN	Metropolitan Area Network
MCKRT	MCS KPI Reporting Tool
MCS	Monitoring and Control System
MDV	Meteorological Data Volume
MET	Meteorological
METARS	Meteorological Aerodrome Report

NEMA	National Environmental Management Act
NEXTGEN	Next Generation Air Transportation System
NKRT	Network KPI Reporting Tool
NM	Nautical Miles-measurement unit
NMMS	Network Monitoring and Management Software Tool
NOTAM	Notice to Airmen
OAG	Official Airline Guide
OGU	Operational General Users
OS	Operating System
OSAU	Operational System Administration Users
PC	Personal Computer
PDC	Pre-Clearance Delivery
PSAA	Pre-Sequence Action Area
PSAB	Pre-Sequence Action Boundary
PSTB	Pre-Sequence Target Boundary
PSTT	Pre-Sequence Target Times
RAID	Redundant Array of Inexpensive Disks
RAM	Random Access Memory
RAS	Reliability, Availability, and Serviceability
RBS	Ration by Schedule
REPT	Replay Tool
RFI	Request for Improvement
RNAV	Route Navigation
RPL	Repetitive Flight Plan
SAM	Slot Allocation Message
SAN	Storage Area Network
SANS	South African National Standards
SAP	Segregated Airspace Probe
SAT	System/Site Acceptance Test
SCR	Schedule Clearance Request/Reply
SESAR	Single European Sky ATM Research
SFTP	Secure File Transfer Protocol
SG	Security Group
SID	Standard Instrument Departure Route
SIR	Schedule Information Request/Reply
SITA	Société Internationale de Télécommunications Aéronautiques
SLC	Slot Requirement Cancellation Message
SMART	Specific, Measurable, Achievable, Relevant, and Timely
SMM	Slot Missed Message

SNOWTAM	Snow information or warning to Airmen – AFTN message
SPA	Slot Proposal Acceptance
SPECI	Aviation Selected Special Weather Report
SRJ	Slot Rejection
SRM	Slot Revision Message
SSH	Secure Shell
SSL	Secure Sockets Layer
SSR	Secondary Surveillance Radar
SSS	System Support Suite
SWIM	System Wide Information Management
TCP/IP	Transmission Control Protocol/Internet Protocol
TDA	Temporary Danger Area
TDLS	Tower Data Link System
TDM	Track Designation Message
TGU	Technical General Users
TITAN	Thunderstorm Identification, Tracking, Analysis and Nowcasting
TLS	Transport Layer Security
TMA	Terminal Control Area
TMH	Time Management Handler
TOBT	Target Off-Block-Time
TopSky-ATC	THALES Air Traffic Control and Display System
TSA	Temporary Segregated Area
TSAT	Target Start-up Approval Time
TSAU	Technical System Administration Users
TT	Taxi-Time
TTOT	Target Take-Off-Time
UAS	Unmanned Aircraft System
USB	Universal Serial Bus
UTC	Coordinated Universal Time
UTFM	Unmanned Traffic Flow Management
UTM	UAS Traffic Management
UTM	Unmanned Traffic Management
VGA	Video Graphics Array
VIL	Vertically Integrated Liquid
VLAN	Virtual Local Area Network
VM	Virtual Machine
VPN	Virtual Private Network
VTT	Variable Taxi Time
W3C	World Wide Web Consortium

WAKRT	Web Application KPI Reporting Tool
WAN	Wide Area Network
WXXM	Weather Information Exchange Model
XGA	Extended Graphics Array
XMAN	Extended-AMAN or Exit separation MANagement
XML	eXtensible Markup Language

DEFINITIONS

Within this document:

Collective Word/s	Meaning of the collective word/s
ADEXP	Data format specified by EUROCONTROL for use in on-line message exchanges between computers and over switched messaging networks.
ATFM System	Refers to the system, consisting of the ATFM Main System, a ATFM DR System and a ATFM ATA Training System that will reside in three different locations and shall replace the current ATFM System.
ATFM Main System	Refers to the component of the ATFM System that serves the operational and functional needs as a replacement of the current ATFM system and that will reside at the FAOR Main ATC Centre.
ATFM DR System	Refers to the component of the ATFM System that serves the disaster and recovery needs, consisting of a mini replica of the ATFM Main System as the DR Operational System, a DR Test and Evaluation System and a DR Training Simulation System (3 logical platforms) and will reside in a separate building.
ATFM ATA Training System	Refers to the component of the ATFM System that servers the training needs, consisting of a mini replica of the ATFM Main System and that will reside in the ATA-building complex.
ATFM Controllers	Refers to the ATFM System CWS operators who manages Air Traffic Flow services and operations.
Centralised Database	Refers to data stored in a Centralised logical or Virtualised Dynamic or Common Database that is accessible by external or remote users or systems from different locations (e.g. ATFM Web application, Regional ATFM).
Cloud Database	This type of database shall be the same as a Dynamic Database, but shall either be hosted on the infrastructure of a service provider on the internet or shall be hosted by ATNS to whom the cross-border ATFM ANSPs shall subscribe to.
Common Database	Refers to a dynamic data storage space/location that shall be shared between application software versions without the requirement to copy it from one software version to another after software upgrades and shall therefore be independent of which software version is running. (e.g. ATFM CWS screen recorded events).
Dynamic Database	Refers to the continuously amended storage spaces for online and live system data that can automatically or manually be altered, updated, changed, collected, pulled, for functional, tactical and/or historical data

Collective Word/s	Meaning of the collective word/s
	manipulation purposes which is accessed and populated by a single source or multiple sources. Seen as a SAN data storage method and is associated to block-based data stored from multiple servers. (e.g. ATFM GDG database).
Halt	In context, it is the same as Shutdown but without switching the computer/computers power off.
Monitoring	In context, it refers to collecting, reviewing, detecting faults, determine statuses of events and data associated with the various System-Components of any of the ATFM System.
Multi-nodal ATFM system	Refers to a network of interconnected systems with shared data between all ATFM Nodes. It will allow for Cross Border ATFM data exchange by coordinating the interfaces between regional participants.
Operational Database	Refers to a temporarily local (to server or computer) storage space of dynamic data generated by the system or a user. (e.g. commands executed per user per computer, etc.).
Operational General Users	Refers to the user privilege level allowing for all general operational ATFM controller activities.
Operational System Administration Users	Refers to the user privilege level allowing for all administrative ATFM operational activities.
Reboot	In context, it refers to the action whereby the running state of an operating system on a computer is manually or automatically terminated by toggling it through a Halt state and then manually or automatically toggled to come up to a running state again. Context example: The Email server was rebooted.
Restart	In context, it refers to the action whereby the running state of a functional software application or CSCI on a computer is manually or automatically toggled through a Stop state and either automatically or manually toggled to a running state again. Context example: The Web application was restarted, or a restart was performed on the CSCI called xyz, or the computer was restarted (meaning its functional application was restarted).
Shutdown	In context, it refers to the action whereby the operating system of a computer is manually or automatically toggled to a Halt state and then left in that state.
Stakeholder	In the context of the ATFM replacement project it shall refer to and include all relevant technical and operational ATNS ATFM users, and ATNS non-ATFM users, and also refers to relevant subscribed airlines, aerodromes, airports, remote workstations, Regional and Long-Range

Collective Word/s	Meaning of the collective word/s
	ATFM users to whom and from whom ATFM services shall and will be provided and received, respectively.
Stakeholder Users	Refers to subscribed users from airlines, aerodromes, airports, remote workstations, Regional and Long-Range locations, etc.
Static Database	Refers to the storage space of pre-defined system behavioural offline configuration and parameter data files used to define default ATFM functional and operational system components for behavioural and start-up configurations and initialisations, all related to the ATFM System's environmental setup and customisation/adaptation. Seen as a NAS storage method associated with one or more file servers storing files. (e.g. ATFM System environmental and adaptation offline files). It also includes system APIs software configuration and parameter files.
Stop	In context, it is the same as for a Restart, but without starting the functional application/s or CSCI of the computer again.
System-Components	System-Components refer to all system software and hardware elements and sub-set elements such as applications, physical and logical, resources, virtualised components and sub-components, devices and interfaces of the relevant ATFM systems and shall further include, but shall not be limited to; all physical and virtual hardware devices per computer; all physical interfaces of the relevant ATFM system; all physical internal and external interfaces per computer; all functional operational logical internal and external interfaces per computer; all main functional applications per computer; all OS functional components per computer; all logical; physical and functional virtualised devices; applications and interfaces per system and per computer; all services per system and per computer; all event logs; all databases; all physical and logical connections; all databases, storage and SSD storage spaces; user access, user actions and events, system events; all which can digitally be monitored, managed, supervised or controlled, all-inclusive where applicable. System-Components shall concern and apply to all ATNS ATFM Systems (of this project) and shall also include all virtualised systems and their associated relevant System-Components and sub-set components.
Technical General Users	Refers to the user privilege level allowing for all technical preventive and corrective maintenance activities.
Technical System Administrator Users	Refers to the user privilege level allowing for all superuser and root user (all and full privileges) activities on the ATFM System including, but not limited to, all system related technical and operational administration and maintenance (including virtualisation related

Collective Word/s	Meaning of the collective word/s
	administration), database administration, operational administration, configuration administration, hardware and system applications setups, and system, computer, application backups, restoring, etc.
User-Friendly	Is defined as easy to use, not difficult to learn and the user is assisted and guided by the system. It refers specifically to the characteristics of a GUI tool and relates greatly to the following design aspects: user-centred approach, usability, navigability, responsiveness, consistency, visual hierarchy, responsivity, accessibility, credibility and conventionality, all aspects that were followed in the development of the GUI.

ATFM REPLACEMENT

1 GENERAL INSTRUCTIONS TO BIDDERS

The Bidder shall submit all responses, diagrams, documentation and drawings according to the GENERAL INFORMATION AND INSTRUCTIONS TO BIDDER'S document and in the English language.

To assist Bidders only, each paragraph or article has been appended throughout with the letters "(M)", "(D)", "(O)" or "(I)", to indicate whether the requirement is **M**andatory, **D**esirable, **O**ptional or for **I**nformation only.

ALL RESPONSES TO THE REQUIREMENTS IN THIS DOCUMENT SHALL BE PROVIDED AS FOLLOWS:

BIDDERS SHALL RESPOND IN FULL TO EACH ITEM IN THE FORMAT PROVIDED AND REFERENCES (CHAPTER, SECTION, PAGE NUMBER, PARAGRAPH NUMBER) TO DOCUMENTS AND RELEVANT INFORMATION SUPPORTING THE RESPONSES SHALL BE INDICATED IN THE SPACE PROVIDED. THIS INFORMATION WILL BE THE **ONLY RESPONSE USED FOR THE EVALUATION AND ASSESSMENT**.

Responses, provided in the space allowed, that are not clear or inadequate or the lack thereof shall be interpreted as **"Not Compliant"** even though the compliance column is declared as "Comply" and/or the Bidder's offer meets the requirement. Bidders shall ensure that each response correctly addresses the requirement stated. Responses not addressing the requirement of the specific paragraph shall be interpreted as **"Not Compliant"**.

Bidders shall declare compliance to each and every paragraph of this document, based on the paragraph classification, in the response block provided opposite the column labelled "Compliance". Bids will be evaluated as follows:

C: fully compliant = 2 points:

PC: partly compliant = 1 point;

NC: not compliant = 0 points.

Noted: Noted and accepted (applicable to paragraphs marked as "I", not containing requirements)

Bidders shall, for paragraphs declared "PC" or "NC", include a statement as to the nature of the variation and may supply additional supporting information in the space provided to demonstrate how the proposal may still meet the needs of ATNS.

Paragraphs marked "(M)", indicates that the requirement is mandatory and Bidders that do not comply with the requirement **shall** be disqualified for further evaluation.

Paragraphs marked "(D)", indicates that the requirement is desirable, and the Bidder is expected to declare their level of compliance, provide a formal response and reference supporting documents.

Paragraphs marked "(I)", indicates that the requirement is for information, however the Bidder is still expected to respond and provide information if requested. Any information gathered herein may form part of the contractual terms.

Paragraphs marked "(O)", indicates that the requirement is optional, and the Bidder may decide how to respond.

2 REFERENCES

- A) The reference list, as provided in Table 1, is not intended to be comprehensive but shall be used by the Bidder to comply and conform to requirements and/or recommendations stipulated within these referenced documents for relevant aspects of the replacement Multi-nodal ATFM system components. The conformance and compliance shall especially be in respect to ICAO Standards and Recommended Practices (SARPs), the IATA Operational Safety Audit, and the IOSA Standards and Recommended Practices (ISARP). The Bidder shall provide a list of all specifications, recommendations and practices that the system design is based on, and that the system complies with to indicate their conformance and compliance. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B) Where references have been omitted but have relevance to industry standards and requirements or recommendations, the Bidder shall comply and conform to those as well. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- C) The Bidder shall always use the latest version of all relevant and applicable references, as well as for those as depicted in Table 1 below. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

Table 1 : Industry References

ICAO Doc.4444, Procedures for Air Navigation Services — Air Traffic Management
ICAO Doc.10066, Procedures for Air Navigation Services — Aeronautical Information Management
ICAO Doc. 9971, Manual on Collaborative Air Traffic Flow Management
ICAO Doc. 9705 Sub-Volume VIII security, framework, PKI, cryptographic algorithms
ICAO Doc. 9880 Part IV-B ACARS Message Security (AMS) based on ATN/OSI security.
ICAO Doc. 9750, Global Air Navigation Plan (GANP) ASBU Framework,
ICAO Doc. 9854, Global Air Traffic Management Operational Concept (GATMOC)
ICAO Doc. 9882, Management System Requirements
ICAO Doc. 9965, Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE)
ICAO Doc. 9830 AN/452, Advanced Surface Movement Guidance and Control Systems (A-SMGCS)
ICAO Doc. 9476, Manual of Surface Movement Guidance and Control Systems (SMGCS)
ICAO Doc 8168), Volume I — Flight Procedures
ICAO Doc 7910, Location Indicators

ICAO Doc 10039, Manual on System Wide Information Management (SWIM)
ISO 8601-2:2019, Date and time — Representations for information interchange — Part 2: Extensions
Eurocontrol ACI, IATA (2010) Airport CDM Implementation Manual
Eurocontrol Standard 000-1-92. Directives for the Uniform Drafting and Presentation of Eurocontrol Standard Documents.
Eurocontrol Standard SUR.ET1.ST05.2000-STD-01-01. All Purpose Structured Eurocontrol Radar Information Exchange - ASTERIX
Eurocontrol Specification for ATS Data Exchange Presentation (ADEXP) v3.3
CAT062 - EUROCONTROL Specification for Surveillance Data Exchange ASTERIX Part 9 Category 062
ARINC Specification 823, Datalink Security
Air Transport Association (ATA) Specification 42, Aviation Industry Standards for Digital Information Security.
AIXM - Aeronautical Information Exchange Model
FIXM - Flight Information Exchange Model
WXXM - Weather Information Exchange Model
IWXXM - ICAO Meteorological Information Exchange Model
AIDX - Aviation Information Data Exchange
World Wide Web Consortium (W3C) specifications
Unified Modelling Language (UML) (Unified Modelling Language (UML)) and the standards for network layer exchanges.

3 INTRODUCTION

3.1 Scope of Work Overview

- A. The scope of the project encompasses the procurement, supply, delivery, installation, commissioning, maintenance and support of an operational ATFM Main System at FAOR, as a replacement for the existing system, with an associated ATFM DR System at the ATNS SSS Building and an ATFM ATA Training System at the ATNS-Aviation Training Academy (ATA). The Bidder shall confirm that all components of the scope as indicated are covered by their proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The project scope shall further include, however shall not be limited to: (D)
- The delivery and installation of an ATFM Main System in the FAOR Main ATC Centre.
 - The delivery and installation of an ATFM Training Simulation Platform in the ATA Centre.
 - The delivery and installation of an ATFM DR Platform in the FAOR SSS Building.
 - The interfacing with other systems such as A-SMGCS, TopSky-ATC ATM systems (at FAOR and FACT), AFTN/AMHS, AIM, AMAN, DMAN, ACDM, and Regional ATFM systems in SADC countries, and LR-ATFM, etc.
 - Catering for future SWIM and other ASBU requirements, SESAR/ICAO/NEXTGEN master plans, and catering for the relevant and latest future industry requirements.
 - Post event Statistics and Report Writing Functionalities – including graphs and data sheets;
 - The associated electrical and general works required for the project.
 - The provision and installation of furniture, equipment racks and other related works.

The Bidder shall confirm that all components indicated above are covered by their proposal with a clear indication of where their proposal do not cover the required components.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.2 Intended Use Overview

The Air-Traffic Flow Management (ATFM) project will establish an ATFM System that will provide an efficient and cost-effective service to airspace users and that will effectively utilize the available airspace and airport to maximum capacity, including the following: (I)

- Reduce ground and en-route delays;
- Maximise capacity and optimise the flow of air traffic;

- C. Provide an informed choice between departure delay, re-routing and/or flight level selection;
- D. Alleviate unplanned in-flight re-routing;
- E. Assist ATS units in planning for and managing of future workload in the light of forecasted increased traffic flows within South Africa;
- F. Assessing the impact of Flexible Use Airspace (FUA) and Temporary Segregated Airspace (TSA) on the ATM system;
- G. Provide improved solutions around predicted severe weather;
- H. Balance the demand against capacity of ATS sectors, air routes and aerodromes;
- I. Determine the necessity for an airspace/ground delay program and other Traffic Management Initiatives (TMIs) and to enforce them,
- J. Enabling aircraft operators to operate as close to their preferred trajectories,
- K. Interface with Regional ATFM systems,
- L. Interface with selected airports and other clients (subscribed/agreement) via virtualisation and ACDM/CDM,
- M. Provide LR-ATFM to subscribed neighbouring countries,
- N. Delivery of a virtualised Disaster Recovery and Testing system,
- O. Delivery of a virtualised Training system.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

3.3 Basic ATFM System Elements

The ATFM System shall consist of at least the following elements and functional components:

(D)

- A. Airport Flow Tool (AFT)
- B. Departure and Arrival Slots Management
- C. Generic Data Gateway (GDG)
- D. Flight Data Processor (FDP)
- E. Airspace Management Tool (AMT)
- F. Flight Plan Conflict (FPC)
- G. Strategic Processing (STR)
- H. Tactical Processing (TAC)
- I. Web-based application
- J. CPDLC (ACARS) services
- K. Reporting
- L. Communication interfaces to/from all relevant Stakeholders' systems for the purpose of CDM, ACDM, LR-ATFM, Regional Multi-Nodal ATFM (SWIM)
- M. View only AFT/AMT remote clients.
- N. Regional ATFM information exchanges.
- O. LR-ATFM slot co-ordination and information exchanges.

P. Surveillance flight tracking and updates

The Bidder shall confirm that all elements and functional components indicated above are covered by their proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4 Project Overview

3.4.1 Purpose

- a) The ATFM Replacement project shall entail a complete replacement of the existing Air Traffic Flow Management (ATFM) system, called the CAMU system, to be deployed at the FAOR Area Control Centre (ACC) operational complex with a fit for purpose system that will support SWIM and ASBU initiatives, improve and establish CDM and ACDM with all relevant and applicable stakeholders, as well as regional and long range ATFM services. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- b) The replacement ATFM System shall comply with ICAO, IATA, Eurocontrol and FAA recommendations and standards, and shall be aligned with the ASBU Blocks 0-2, SWIM, SESAR, NEXTGEN, GANP and GASP industry initiatives and plans. The Bidder shall indicate to what extent the ATFM System comply with the requirements stipulated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The project shall ensure that the ATFM System is interfaced with existing ATNS systems, in particular the Air Traffic Management (ATM) systems at FAOR and FACT, A-SMGCS, AFTN/AMHS, AIM systems, AMAN/DMAN as well as CDM/ACDM with Airline Operations, Airport operational systems and other support systems, including Regional ATFM systems from SADC countries and LR-ATFM. The Bidder shall confirm that the interfaces as required are catered for in their proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM System shall consist of an air traffic flow management suite of hardware and software tools whereby each software tool provides specific flow management functionality. This shall be achieved through data and message exchanges to/from existing CNS/ATM/AIM and other systems. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- e) The latest ASBU building blocks and enablers, SESAR, NEXTGEN, ASBU, SWIM, GANP and SANP initiatives and plans as applicable, shall dictate changes and amendments to the current system architecture diagram shown in Figure 10 as well as the hardware and software component diagram shown in

- f) Figure 13. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- g) The hardware shall be equipped with enough resources to ensure that there are no limitations experienced during the lifespan of the system such as performance, storage space, RAM availability, VRAM, CPU and GPU processing capabilities, firmware upgrades, driver upgrades, OS patches and upgrades, Java version upgrades, and so forth. The Bidder shall confirm that the ATFM System hardware resources shall support the requirement as stipulated and has been catered for in the system design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Redundancy in all required aspects of the system shall be implemented to ensure continuous operation throughout the lifespan of the system. The Bidder shall confirm that system redundancy has been incorporated in the system design and shall indicate where redundancy has been included in the ATFM System. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) Adequate hardware spares shall be supplied to cater for all equipment (even after warranties have expired) and to ensure that the system can be maintained in such a manner that it remains operational 24/7 throughout the lifespan of the system. The Bidder

shall confirm that hardware spares have been included in the offer, costed in Volume 1C (Price Schedules) and detailed in Volume 4. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The Replacement ATFM system shall improve ATNS' and Stakeholder airspace utilisation, aerodrome capacity and sector productivity by balancing load and capacity, reducing delays, improve flight efficiency, managing impacts of FUA's and SUA's, FCAs, managing other constraints impacting on departure, en-route and arrival flights, and reducing costs. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- k) In order to achieve the most beneficial utilisation and management of airspace and air traffic control resources, the planning of the airspace use must take place in accordance with the three components following below: (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

3.4.1.1 Strategic Component

The strategic component encompasses the long-term planning (beyond 7-days) of aircraft operations, such as scheduled planning, large-scale military exercises and/or special events, as well as slot (strategic) reservations.

At the strategic component stage, demand and capacity balancing will respond to the fluctuations in schedules and demands, including the increasing globalisation of traffic patterns, as well as the seasonal changes of weather and major weather phenomena. Through collaborative decision-making, assets will be optimised to maximise throughput, thus providing a basis for predictable scheduling.

3.4.1.2 Pre-Tactical Component

The pre-tactical component encompasses the short-term planning (2-days to 7-days ahead of time) of aircraft operations, such as scheduled planning, military exercises and/or special events, as well as slot (strategic) reservations, in which applicants for the use of airspace are required to confirm strategic service requests at least 48 hours before commencement of such operations.

At the pre-tactical component stage, demand and capacity balancing will evaluate the current allocation of ATM service provider, airspace user and aerodrome operator assets and resources against the projected demands. Through collaborative decision-making, when possible, adjustments will be made to assets, resource allocation, projected trajectories, airspace organisation and allocation of entry/exit times for aerodromes and airspace volumes to mitigate any imbalances.

3.4.1.3 Tactical Component

The tactical component encompasses normal day-to-day flight planned requirements and associated ATM procedures. At the tactical component stage, demand and capacity balancing will focus more closely on demand management to adjust imbalances. It will consider weather conditions, infrastructure status, resource allocations, and disruptions in schedules that would cause imbalances to arise. These actions will include dynamic adjustments to the organisation of airspace to balance capacity; dynamic changes to the entry exit/entry times for aerodromes and airspace volumes; and adjustments to the schedule by the users.

3.4.2 Stakeholders

3.4.2.1 ACDM (A-CDM)

ACDM operates on the principle of best planned best served (first come first served and best payer) with regard to the planning of own flights at aerodromes, with accurate and timely Target Off Block Times (TOBT), resulting in the optimisation of pre-departure flights.

The ATFM System shall cater for ACDM interaction capabilities. Figure 1 shows an illustration of ACDM Stakeholder interaction that shall form the basis of the provision for ACDM. The Bidder shall confirm that the ATFM System supports ACDM interaction. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

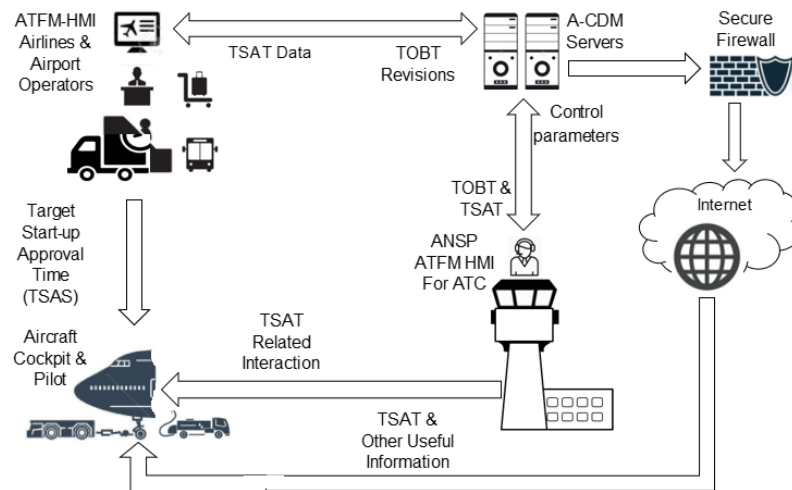


Figure 1: Illustration for ACDM Stakeholder Interaction Concept

3.4.2.2 Regional/Multi-nodal ATFM

The Regional ATFM concept (Flights longer than 3-hour flights) shall aim to achieve optimised demand and capacity balancing at constrained resources for adverse and unforeseen situations during flights. Regional/Multi-nodal ATFM operational concept depends on independent ATFM Computers connected via an information sharing network and operating on the same principle. Each ANSP implements their own ATFM System and is responsible for managing flights to their own aerodromes. Data will then be shared between the ATFM System of ATNS and that of regional systems.

The ATFM Main System shall cater for an interfacing capability with regional ATFM systems within the SADC region according to the basic high-level concept of operation in line with ATNS' aim for the Regional/Multi-Nodal ATFM functionality as illustrated in Figure 2 and the Multi-Nodal ATFM Network concept illustrated in Figure 3. The Bidder shall confirm that the ATFM System supports Regional/Multi-Nodal ATFM functionality. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

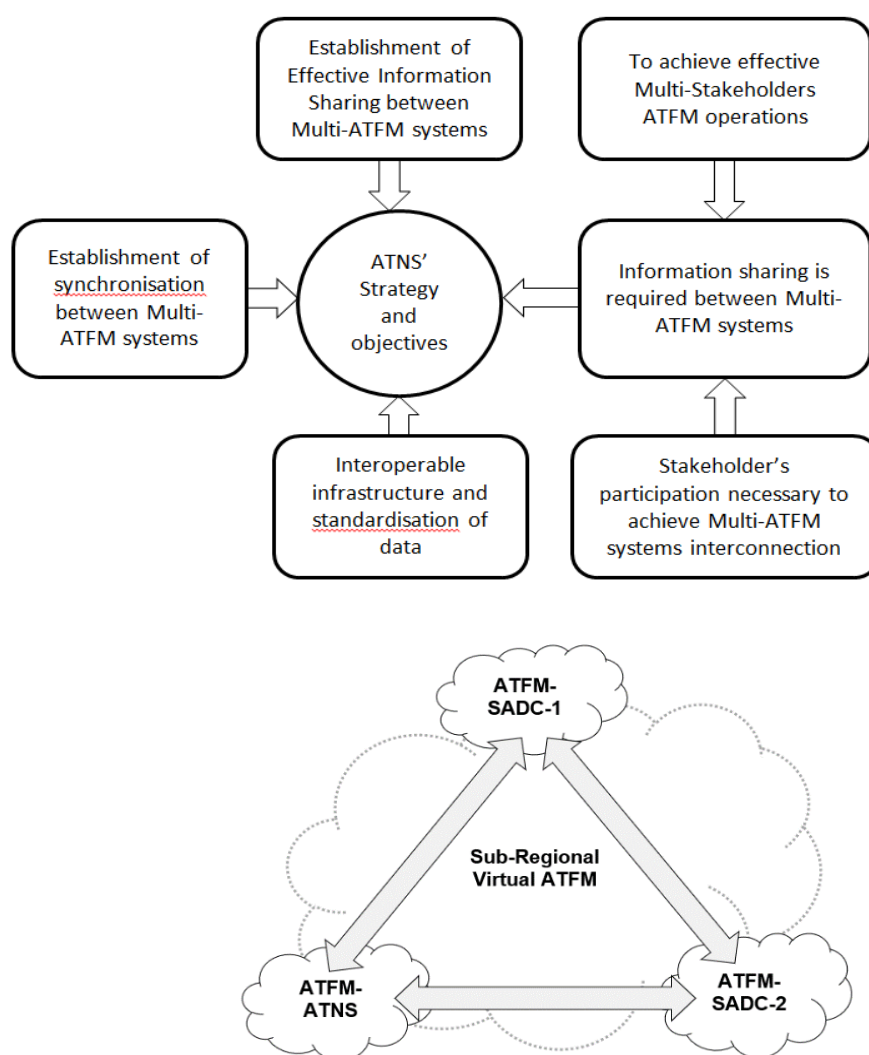
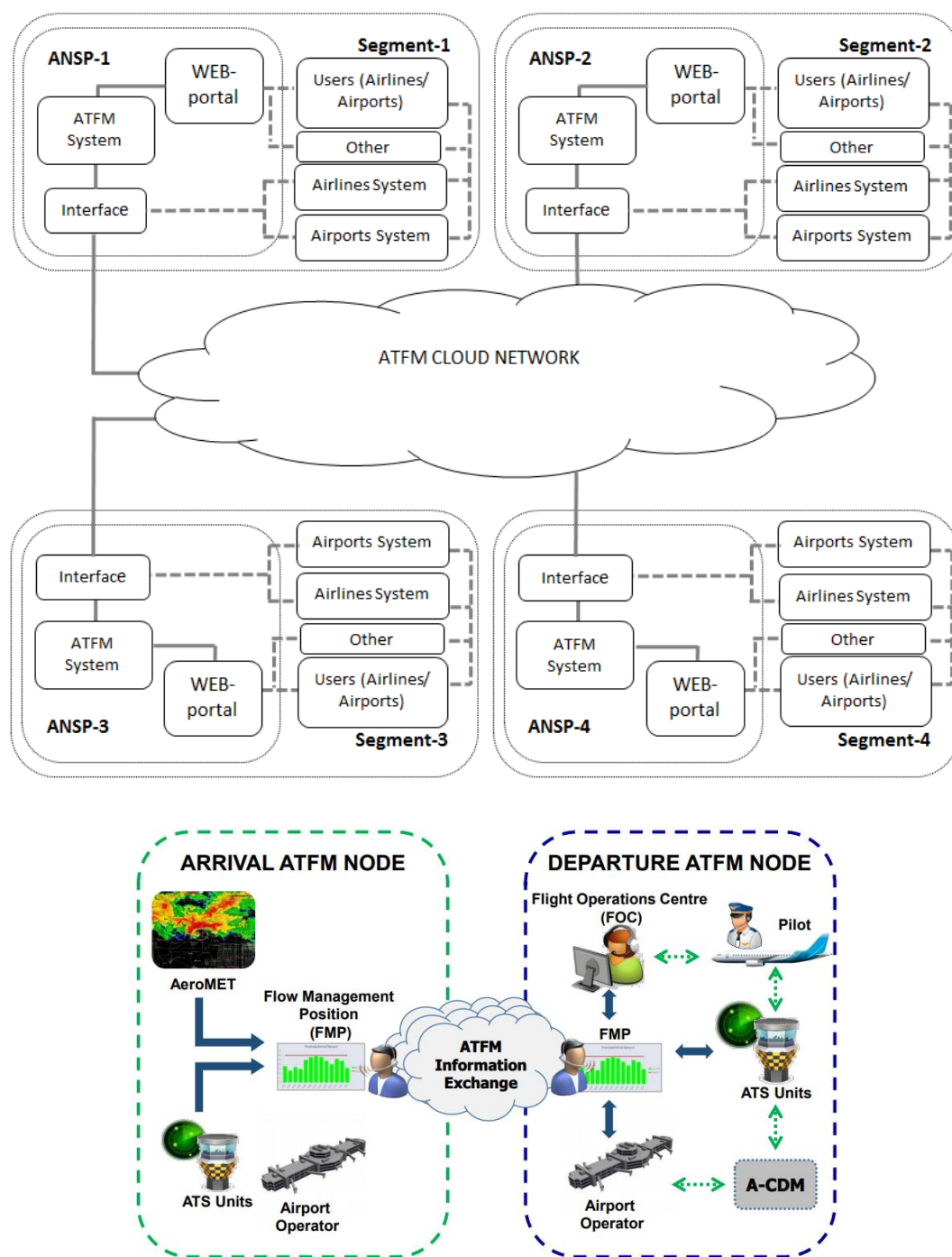


Figure 2: High Level Multi-Nodal ATFM System Concept



ICAO MID ATFM/TF/1

Figure 3: High Level Illustration of a Regional Multi-Nodal ATFM System Network Concept

3.4.2.3 Long-Range ATFM (LR-ATFM)

The Long-Range ATFM concept (flights within 3-hours from airports) shall aim to achieve optimised demand and capacity balancing at constrained resources for adverse and unforeseen situations during flights. LR-ATFM is intended to improve air-traffic flow services for arriving international flights to enhance demand and capacity through early provision of accurate estimated arrival times (adherence to ATOTs) as well as to expand demand and capacity management. LR-ATFM will carry benefits to the industry such as more accurate

predictability of operations (Less fuel usage – more efficient), orderly flow into tactical arrival management environment (Reduce ATC workload – safety benefit), improved network performance (Fewer tactical delays – more efficient), impartiality in allocating network delays (Fewer GDP delays – increased efficiency and satisfied airline/airport clients). Figure 4 illustrates the basic concept of LR-ATFM.

The ATFM Main and DR Systems shall cater for LR-ATFM capabilities. The Bidder shall confirm that the ATFM System supports LR-ATFM capabilities (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4.2.4 Unmanned Traffic Flow Management (UTFM)

A joint research initiative was launched by SESAR to develop UTFM for unmanned aircraft that requires to fly within controlled airspace. Unmanned aircraft will introduce additional demand and capacity that requires flow management to be adapted accordingly.

The ATFM Main System, ATFM DR System and ATFM ATA Training System shall cater for such related capabilities. Refer to Figure 5 for the basic illustration of the requirement components of UTFM. The Bidder shall confirm that the ATFM System supports UTFM. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

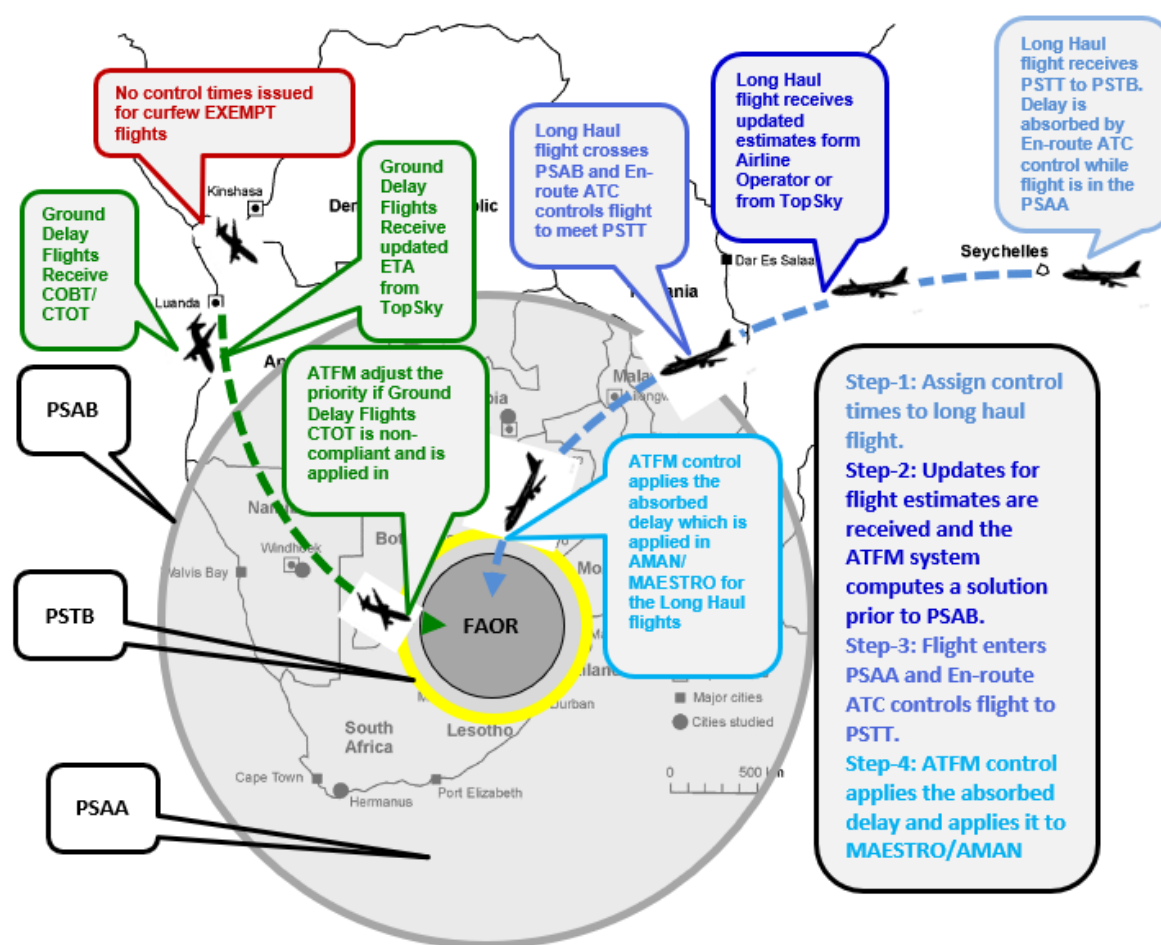
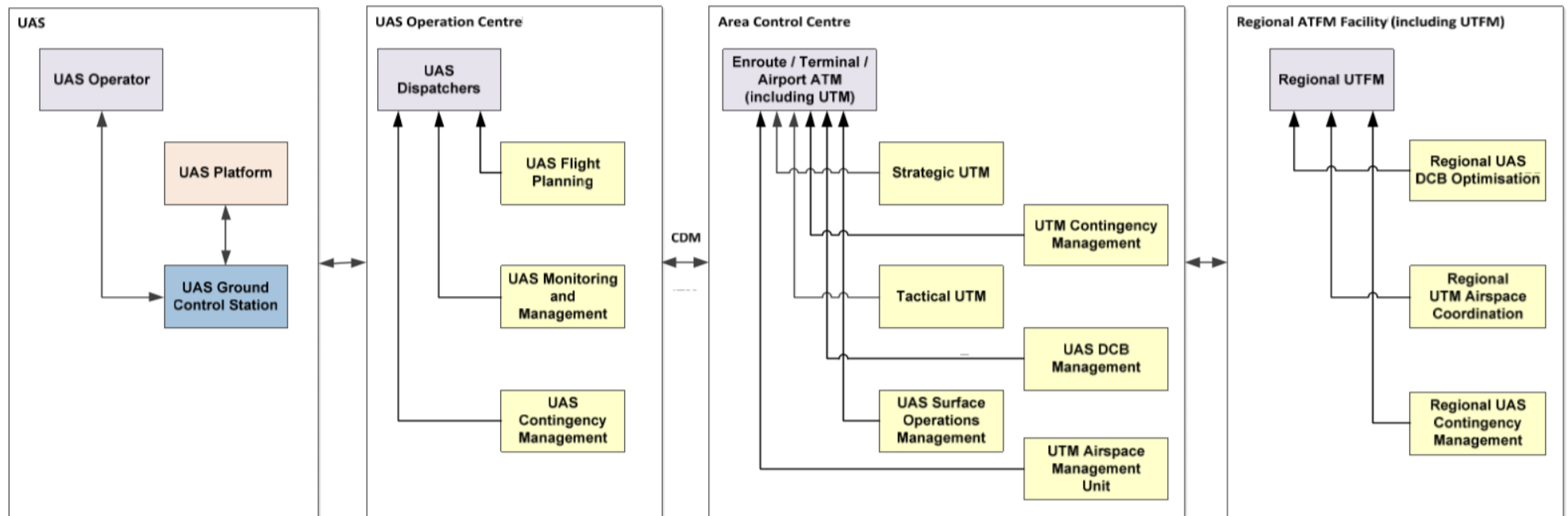


Figure 4: Basic Concept of Long-Range (Long Haul) ATFM



S. Ramasamy, R. Sabatini, and A. Gardi, "A unified approach to separation assurance and collision avoidance for flight management systems", 2016 IEEE/AIAA 35th Digital Avionics Systems Conference, DASC2016, Sacramento (CA), USA, 2016.

Figure 5: UTM and Regional UTM Concept

3.4.2.5 Virtualisation

Virtualisation allows for increased efficiency of applications, their upgrades, operations, and allows for a centralised and separate data storage/backup means, system management, deployment of software upgrades, and cost-effective and quick system expansion.

Computers that are virtualised can host more than one operating system, in the virtualised environment, running at the same time and can be deployed on any system. It does not rely on the operating system and neither on the hardware of the host. A Virtualised infrastructure gives the technical administrators the flexibility to manage resources put together across remote locations and allows for flexibility in changing customer requirements cost effectively as well as effortlessly.

- a. Virtualisation shall be implemented for the ATFM DR, ATA and all relevant Stakeholder remote-control workstations. The Bidder shall indicate how the requirement are incorporated in their design and proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The virtualisation technology shall share a “cloud based” network, hosted by ATNS, with a number of virtual environments and the Server Consolidation virtualisation concept shall be used as illustrated by Figure 8. The Bidder shall indicate how the requirement are incorporated in their design and proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The virtualised environment shall not be limited to any physically configuration or application execution and the resources of the associated computer shall be shared logically. The Bidder shall indicate how the requirement are incorporated in their design and proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. Hypervisors shall be utilised to control and separate the hardware from the virtual environment and segregate the assets from the physical environment to the virtual machine as appropriate in order to allow for enablement and provision of a virtualised hardware environment that can support multiple running operating systems simultaneously utilising one physical server. The Bidder shall indicate how the requirement are incorporated in their design and proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. The virtualised concept shall be applied to the ATNS CDM/ACDM, Regional and LR ATFM capability initiatives, as well as to the ATFM DR and ATA Systems with further reference to the illustrated concepts that shall be applied as baseline which is depicted in Figure 6 to Figure 9. The Bidder shall indicate how the requirement are incorporated in their design and proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

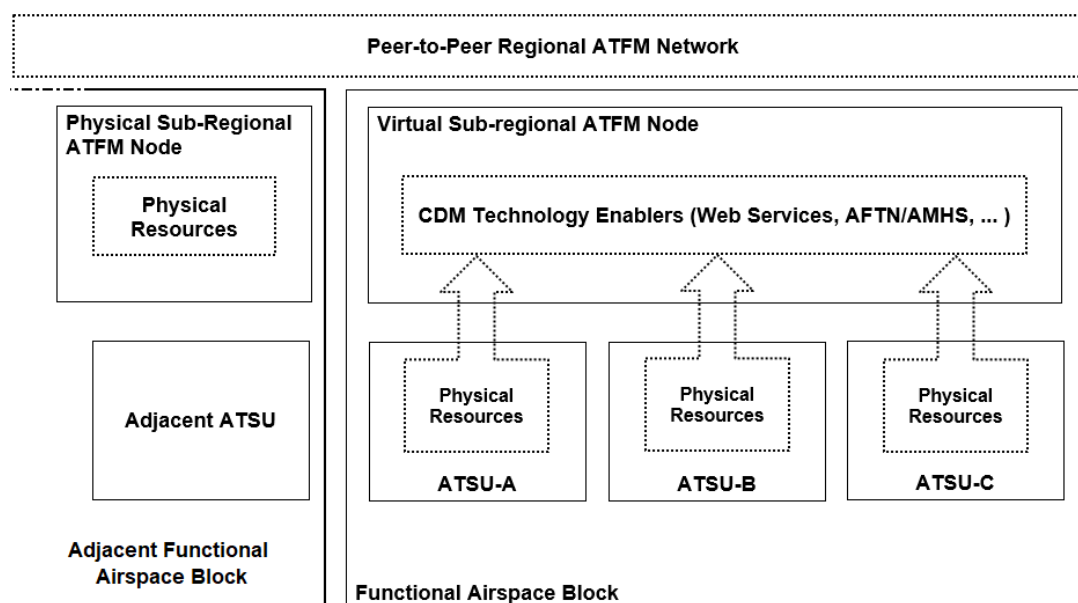


Figure 6: Illustration for a Basic Physical and Virtual Distributed ATFM-Multi Nodal System Concept

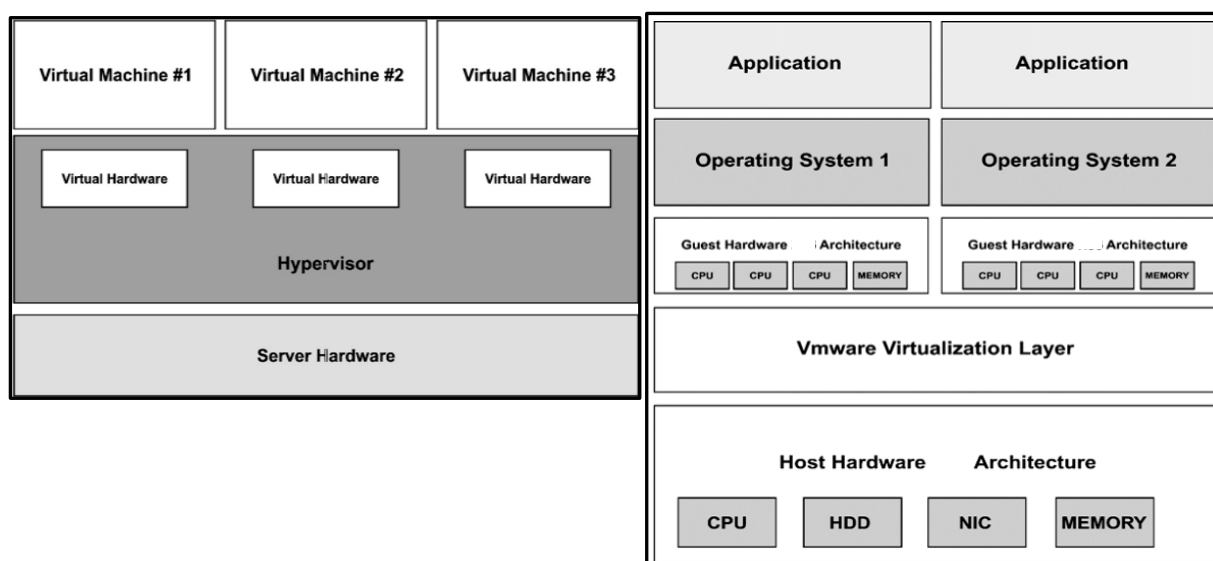


Figure 7: Illustration of the Concept for Hardware Virtualisation

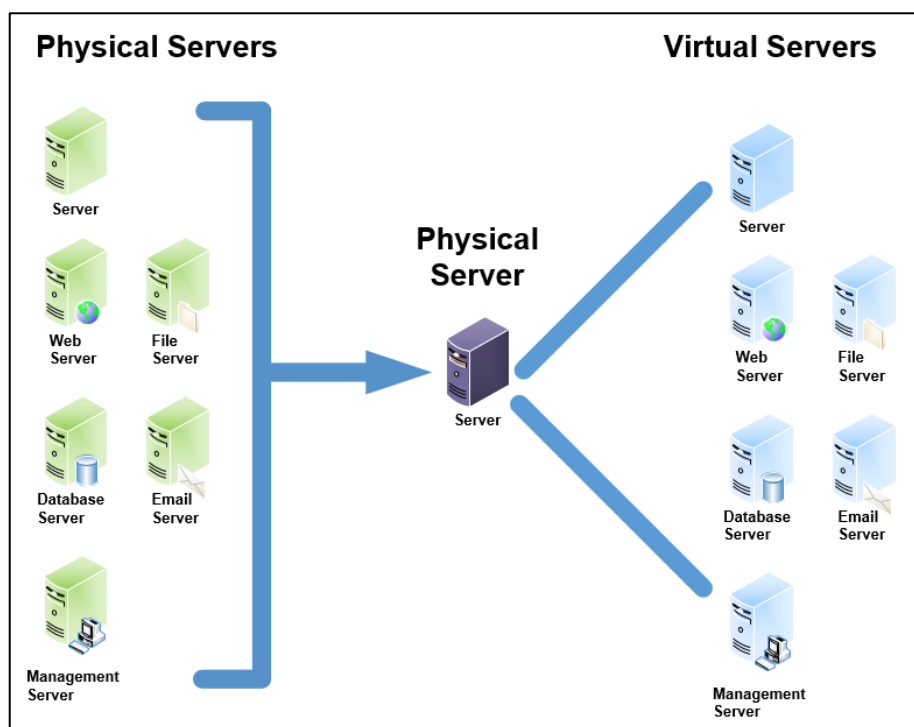


Figure 8: Concept for Consolidated Virtualisation Server Technology

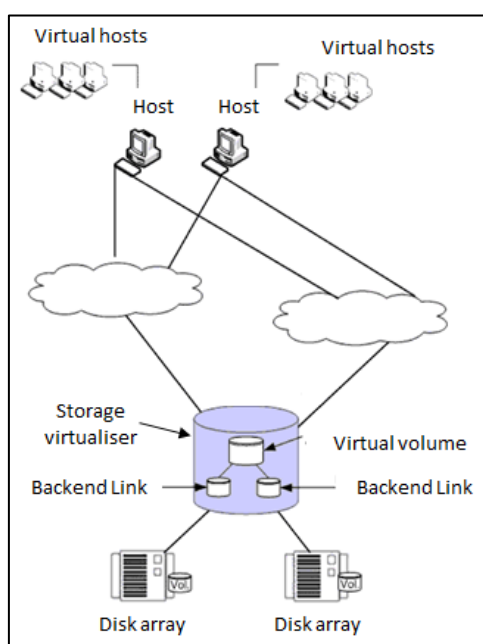


Figure 9: Illustration of the Concept for Storage Virtualisation

3.4.3 ATFM System Expectations

The ATFM Main and DR Systems are expected to provide for:

- a. Strategic planning and early disruption management to reduce the levels of uncertainty and unpredictability allowing for increased capacity;
- b. The creation of long range situational awareness of all concerned, thus allowing for better air traffic flow management across all ATM regions;
- c. The establishment of ATFM CDM between regions;
- d. The extension of the horizon of ATFM generated benefits for Airspace users, Airports and ATM Stakeholders.
- e. The establishment of a ATFM DR Test and Evaluation System, DR Training System and ATA Training System to support the ATFM System and ATNS resources.

The Bidder shall confirm that the ATFM System will support and deliver on the expectations as indicated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4.4 Project Deliverables

The project shall deliver and deploy the following Systems:

3.4.4.1 ATFM Main System

- a. The ATFM Main System shall be deployed at FAOR main ATC Centre. The Bidder shall confirm that the ATFM System shall be delivered and deployed as stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4.4.2 ATFM DR System

- a. The ATFM DR System shall be deployed at the ATNS SSS Building and shall incorporate different logical platforms to cater for DR Operational, DR Test and Evaluation and DR Training Simulation functionality. The Bidder shall confirm that the ATFM System shall be delivered and deployed as stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM DR Operational System shall comprise of a functional replica of the ATFM Main System but shall operate in a virtual environment with a reduced number of operator positions. The Bidder shall confirm that the ATFM System shall be delivered and deployed as stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4.4.3 ATFM ATA Training System

- a. An independent Virtualised Training System (replica of all the functionalities of the ATFM Main System) shall be deployed at the ATNS ATA centre utilising simulation data for Meteorological, GRIB, FPL, ATM systems, WEB application, Score and OAG data, and for all other required data and external interfaces. The Bidder shall confirm that the ATFM System shall be delivered and deployed as stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.4.4.4 Virtualisation

- a. The ATFM System shall support the following features as applied to the virtualisation environment, but shall not be limited to:

- Flexibility
- Scalability
- Usability
- Availability
- Manageability
- Reliability
- Efficiency
- Security

The Bidder shall confirm that the ATFM System shall be delivered and deployed as stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.5 Aviation System Block Upgrades (ASBU)

ICAO Document 9750 (Global Air Navigation Plan or GANP) involves a plan that addresses global air navigation. The plan drives the Aviation System Block Upgrades (ASBU) methodology to achieve global ATM interaction and coordination. ATFM is conveyed as network operations (NOPS) in the ASBU blocks and is an important capability for major national aerodromes and even for neighbouring (cross-border) aerodromes. ASBU Block-0 (the initial set of capabilities to be already implemented since 2013) defines NOPS Block-0 capabilities as: (I)

- Sharing projections of air-traffic load for the next day.
- Advising alternative routings to avoid or minimise ATFM delays.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

ASBU NOPS further expands to include more complex ATFM techniques and upgrade implementations such as user-driven prioritisation of ATFM solutions (Block 1 for 2019), SWIM driven collaborative decision making (Block 2 for 2025), and eventually on the road to full complexity management within the widely spread information environment of a SWIM-based ATM (Block 3 for 2031+). In addition to ASBU NOPS, ASBUs consist of airport collaborative decision making (ACDM) that is the beginning and end portion of flight paths in the scope of ATFM. ACDM Block 0 capabilities are described as: (I)

- Sharing of surface operations information amongst airport operator, aircraft operator, and ANSP systems.
- Collaboratively managing departure queue.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

The design of the ATFM System shall be based on ASBU Blocks 0 to 2 of the ICAO Document 9750 (Global Air Navigation Plan or GANP) as stipulated above. The Bidder shall confirm that the ATFM System design are based on the requirements as stipulated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

3.6 System Wide Information Management (SWIM)

System Wide Information Management (SWIM) is a technology qualifier that improves IT standards, infrastructure and governance necessary for airspace systems to share information,

interoperability, collaborative decision making and use of information and services. Airspace systems are transformed into efficient information-based systems by establishing inter-operative processes and infrastructure required for airspace modernisation and flight information inter-communication. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

Two ICAO GANP ASBU module blocks focus on SWIM development, namely B1-SWIM and B2-SWIM. B1-SWIM is labelled “*Performance Improvement through the application of SWIM*”. It addresses the “*implementation of SWIM services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximize interoperability*”. B2-SWIM is labelled “*Enabling Airborne Participation in collaborative ATM through SWIM*”. It addresses the “*connection of the aircraft as an information computer in SWIM enabling participation in collaborative ATM processes with access to rich voluminous dynamic data including meteorology*”. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

The technology of the ATFM System shall be aligned with the latest SWIM developments concerning ATFM services. The Bidder shall confirm that the ATFM System technology are aligned with the SWIM developments as stipulated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4 ATFM SYSTEM FUNCTIONAL CAPABILITIES

The ATFM System shall perform at least the following summarised functions or shall be aligned and prepared to provide these functions in the near future through minimal configuration changes.

4.1 ATFM Key Performance Indicators (KPI)

A. The ATFM Systems shall cater for and include the following minimum set of KPI performance measures, but shall also cater for ATNS customisation requirements that is portrayed within this document:

- a) Take off time
- b) Landing time
- c) Gate occupancy times
- d) Terminal airspace transit time
- e) Holding times
- f) Off Block time
- g) Taxi out
- h) En route
- i) Descent- Terminal
- j) Taxi-in
- k) In-blocks
- l) Turn-around time

The Bidder shall indicate to what extend the ATFM System support the KPI performance measures as indicated above. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.2 Airport

The ATFM System shall cater for Airport related functionalities consisting of the following:

4.2.1 Queue Management

The Airport Queue Management function shall incorporate at least the following components:

- a) Pre-departure flights sequencing for interfacing with AMAN
- b) Departure flights sequencing
- c) Arrival flights sequencing
- d) Airport surface (gate) control and management
- e) Simulation modelling

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.2.2 Capacity Management

The Airport Capacity Management function shall incorporate at least the following components

- a) Time based management
- b) Wake turbulence and RECAT where RECAT shall cater for the following categories:
 - BADA data
 - CAT A - "Super Heavy"
 - CAT B - "Upper Heavy"
 - CAT C - "Lower Heavy"
 - CAT D - "Upper Medium"
 - CAT E - "Lower Medium"
 - CAT F - "Light"
- c) Simulation modelling

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.2.3 Capacity and Load Balancing

The Airport Capacity and Load Balancing function shall incorporate at least the following components

- a) Arrival and departure rate balancing
- b) Runway balancing
- c) Parking bay surface management
- d) Simulation modelling

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.2.4 Slot Management

The Airport Slot Management function shall incorporate at least the following components

- a) Allocation of slots utilising the Ration-By-Schedule principle
- b) Compression and clustering
- c) Ground delays
- d) Ground stops
- e) Slot allocation forecasting (minimum seven days)
- f) Simulation modelling

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.2.5 A-CDM

The Airport A-CDM function shall incorporate at least the following components

- a) SWIM up to ASBU-B2
- b) FF-ICE
- c) Slot swapping of own flights
- d) Sharing of information
- e) Apply the milestone approach
- f) Allow variable taxi times
- g) Pre-departure sequencing
- h) Impact of adverse conditions sequencing
- i) Airport slot co-ordination and management system input
- j) Gate time management input
- k) Compute historical punctuality
- l) Balancing of bay-slots during peak times
- m) Re-allocation of late flights to bay-slots

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.2.6 CDM

The Airport CDM function shall incorporate at least the following components:

- a) Interoperability
- b) SWIM (Driven by ASBU/SESAR/NEXTGEN/FAA/ICAO/IATA and CANSO master plans' initiatives)

- c) Datalinks
- d) Data exchanges

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.3 Approach

The ATFM System shall cater for Approach related functionalities consisting of the following:

4.3.1 Queue Management

The Approach Queue Management function shall incorporate at least the following components:

- a) Time-based metering
- b) Arrival sequencing
- c) Extended AMAN
- d) Point merging
- e) Departure sequencing

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.3.2 Trajectory-based Operations

The Approach Trajectory-based Operations function shall incorporate at least the following components:

- a) Continuous descent arrival
- b) Customised arrivals
- c) Continuous climb departures
- d) Remodelling for adverse conditions
- e) Re-routing

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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4.3.3 Capacity and Load Balancing

The Approach Capacity and Load Balancing function shall incorporate at least the following components:

- a) Feeder Fix and Waypoint balancing
- b) Airborne holding

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

4.4 En-route

The ATFM System shall cater for En-Route related functionalities consisting of the following:

4.4.1 Queue Management

The En-route Queue Management function shall incorporate at least the following components:

- a) Time-based metering
- b) Extended AMAN

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

4.4.2 Dynamic Airspace Management

The En-route Dynamic Airspace Management function shall incorporate at least the following components:

- a) FUA – Flexible use of airspace
- b) FCA, TDA, TSA, and SUA co-ordination and management
- c) Civil/military co-ordination
- d) Dynamic sectorisation

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.4.3 Optimised Trajectories

The En-route Optimised Trajectories function shall incorporate at least the following components:

- a) Enhanced en-route trajectories
- b) User preferred routing
- c) Trajectory based operations
- d) Traffic synchronisation
- e) Weather avoidance

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.4.4 Capacity and Load Balancing

The En-route Capacity and Load Balancing function shall incorporate at least the following components:

- a) Feeder Fix and Waypoint balancing
- b) Airport holding
- c) Miles-in-trail
- d) Minutes-in-trail
- e) Rerouting
- f) Level threshold capping
- g) Conditional routes

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

4.5 Regional

The ATFM System shall cater for Regional related functionalities consisting of the following:

4.5.1 Queue Management

The Regional Queue Management function shall incorporate at least the following components:

- a) Time-based metering
- b) Waypoint slot management
- c) Cross-border Extended-AMAN (XMAN)
- d) Exit separation management

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.5.2 Seamless Air-traffic Management:

The Regional Seamless Air-traffic Management function shall incorporate at least the following components:

- a) Compatible procedures
- b) The ATFM System shall allow for FlightRadar24 or similar system live data processing which shall include:
 - flight departure times (ATD),
 - flight positional data (Real-time in flight),
 - flight departure gate times,
 - flight gate arrival times (Dynamic ETAs updated as the flight progresses)
 - flight diversions
 - flight take-off delays/rejections
 - flight take-off times
 - flight level changes
 - flight landing times (ATA)
 - flight holding data
- c) All relevant plugins shall be provided on all CWS's to accommodate viewing of FlightRadar24 or similar system data.

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.5.3 Optimised Trajectories

The Regional Optimised Trajectories function shall incorporate at least the following components:

- a) Enhanced en-route trajectories
- b) Green routes
- c) FlexTracks
- d) Weather avoidance management

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.5.4 Capacity and Load Balancing

The Regional Capacity and Load Balancing function shall incorporate at least the following components:

- a) Manage Declared/agreed capacities
- b) Feeder Fix and Waypoint balancing
- c) Airport holding
- d) Miles-in-trail
- e) Minutes-in-trail
- f) Rerouting
- g) Level threshold capping
- h) Conditional routes

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.5.5 Regional CDM

The Regional CDM function shall incorporate at least the following components:

- a) Interoperability
- b) SWIM (Driven by ASBU/SESAR/NEXTGEN/FAA/ICAO/IATA and CANSO master plans' initiatives)
- c) Datalinks
- d) Data exchanges
- e) Virtual centres

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.6 Long-Range ATFM (LR-ATFM)

The ATFM System shall cater for long range related functionalities consisting of the following:

- a) Exchange of full data with neighbouring areas (within 3-hours)
- b) Disruptions management
- c) Long term situational awareness and predictability
- d) Collaborative management of traffic flows
- e) Extension of ATFM horizons

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

4.7 Unmanned Traffic Flow Management (UTFM)

The ATFM System shall cater for Unmanned Traffic Flow Management related functionalities consisting of the following:

- A. Flight planning – Flight planning shall be performed, including approval of flight plans and associated alterations when required (e.g. take-off delaying, trajectory revisions, pre-allocates (freezes) the flight plan during certain time interval (decision time window)).
- B. Trajectory negotiation.
- C. Capacity and demand - Capacity and demand balancing shall be performed based on fairness criteria (e.g. first-come-first served, capability-based, most loyal and best paying customer, least polluter, etc.)
- D. Control and operation - UTFM control and operations shall be provided for example as depicted in Figure 5 Steps 1 to 4.
 - Step-1: Assign PSTT to PSTB control times to long haul flight at.
 - Step-2: Updates for flight estimates are received and the ATFM Main System computes a solution prior to PSAB.
 - Step-3: Flight enters PSAA and En-route ATC controls flight to PSTT.
 - Step-4: ATFM control applies the absorbed delay and applies it to MAESTRO/AMAN

The Bidder shall provide supporting documentation to confirm the components incorporated under this function. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	



5 ATFM SYSTEM INTERFACES

5.1 Interfaces to/from other systems

- A. The ATFM Main System shall interface with at least the SCORE, OAG, A-SMGCS, ATM, AFTN/AMHS, AIM, AMAN, DMAN, Airline Operations, Airport operational systems and other support systems. The system shall also cater for an interface with other ATFM Systems from SADC countries as depicted in Figure 2 and Figure 3. The Bidder shall confirm that the offered ATFM System can interface to the systems stated. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. Figure 13 provides an indicative (not exhaustive) schematic block diagram showing the fundamental ATFM System components for both hardware and software. The ATFM System block diagram shall be adapted to accommodate the actual requirements for the ATFM systems. The Bidder shall provide a schematic block diagram of the offered ATFM System. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.2 Provision of Interfaces

ATNS continuously enhances its systems to comply with the ICAO ASBU and associated Global Aviation Safety Plan (GANP, ICAO Doc.9750) and Global Air Navigation Plan (GASP) plans, including the SESAR and NEXTGEN initiatives.

- A. The ATFM System shall therefore provide and/or support all interfaces stipulated within this document regardless whether all external systems are available at the time of system commissioning and implementation or not. This shall allow ATNS to implement the interface with planned future systems as they are deployed. The Bidder shall clearly indicate which of the interfaces requested are supported by the system as a default. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The ATFM System shall be delivered with a complete and comprehensive set of Interface Control Documents (ICDs) that includes a comprehensive and full description for all interfaces, whether implemented at the time of system acceptance and commissioning or not. The Bidder shall provide a provisional list of ICD's with an associated description as part of their proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. All relevant information, processes and methods on how to activate and implement such future interfaces shall be made available to ATNS before the commissioning date. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- D. All interfaces shall furthermore be tested and validated at the time of commissioning, including future interfaces that shall be demonstrated to be ready and operational with a simulation of an interface data feed shall also form part of the validation tests (SAT). The Bidder shall indicate where this has been accommodated in the validation test procedures defined in Volume 4. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. All interfaces shall connect to external systems (External to the ATFM Systems) through router firewalls with access and permission lists through VLAN configuration setups and shall allow as such for only one-way or two-way communication dependent on the interface requirement. The Bidder shall provide supporting documentation as well as supporting system diagrams to indicate how this will be achieved. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. Every firewall router shall allow for at least two maintenance ports that are setup and configured for command-line maintenance and monitoring purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. All interface requirements shall apply to the ATFM Main, DR Operational and DR Test and Evaluation systems while the ATFM ATA Training and DR Training systems shall incorporate

an interface simulation to cater for all the different interface data inputs and protocols. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.3 Interface Community

A. The ATFM Main System shall cater for an interface capability that will support the ATM community in their requirement for information management within a global SWIM concept. Current and/or future interested parties, from the ATM community, include, but are not limited to:

- a) ATM service providers;
- b) Airspace providers;
- c) Airspace users;
- d) Aerodromes and airports systems and services;
- e) Meteorological (MET) information providers;
- f) ATM support industry;
- g) Regulatory authorities;
- h) Cross-border Countries (Regional and Long-Range ATFM);
- i) Any direct consumer of information and services from the ATM environment.

The Bidder shall indicate to what extend the interface capability of the offered ATFM System supports the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4 ATFM Main System Interface Requirements

5.4.1 Systems Definition

- a) The ATFM System shall provide for a detailed configuration management plan defining the interfaces between the ATFM System and the various systems within ATNS as well as future planned interfaces. The Bidder shall provide a draft configuration management plan as part of their response. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM System shall cater for an interface with the following existing internal systems as deployed within ATNS and defined in the document:

- A-SMGCS
- TopSky-ATC ATM systems at FAOR and FACT – surveillance data, MAESTRO, AMAN/DMAN
- AMHS
- AIM System
- SCORE
- South African Weather Services - NsGib Tool GRIB2
- South African Weather Services - TITAN System
- VSAT Communication System

The Bidder shall clearly indicate which of the interfaces requested are supported by the system as a default and which will require development. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

c) The ATFM System shall cater for interfaces to the following planned systems:

- Advanced AMAN/DMAN
- FlightRadar24-Pro or similar
- Regional ATFM Systems
- LR-ATFM Systems
- ACSA Airport Gate System
- ACSA Bay-slots systems
- Subscribed Clients (ACARS/ARINC)

The Bidder shall clearly indicate which of the interfaces requested are supported by the system as a default and which will require development. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

d) The ATFM System shall cater for an interface with the following existing external systems:

- OAG
- ISP Provider via ATNS DMZ
- FlightRadar24 or similar system – Local and International Flight tracking

The Bidder shall clearly indicate which of the interfaces requested are supported by the system as a default and which will require development. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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5.4.2 Weather and Meteorological Information Interface

5.4.2.1 Interface Definition

- a. The ATFM Main and DR Systems shall cater for a Weather and Meteorological Information interface to the South African Weather Services (SAWS) TITAN system for the receipt of meteorological information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b. The ATFM Main and DR Systems shall cater for a GRIB2 data interface to the ATNS NsGIB Tool. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- c. The ATFM Main and DR Systems shall populate the weather and meteorology information database based on the weather and/or meteorological files received from the weather and meteorology information Interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

5.4.2.2 Hardware Connection and Protocol

- a. The interfaces shall be based on TCP/IP connectivity. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b. ATNS shall provide the leased circuit for interconnecting the ATFM Systems with the TITAN servers. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- c. Both GRIB2 and TITAN interfaces shall route via a firewall to the relevant systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.3 Multi-Surveillance Sensor Interfaces

5.4.3.1 Interface Definition

- a. The ATFM Systems shall cater for a Multi-Surveillance Sensor Interfaces to the TopSky-ATC ATM System to receive Surveillance Sensors data for the purpose of presenting information of active aircraft throughout the South African airspace and FIRs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The surveillance information received shall be used to correlate simulated aircraft trajectories with that of the aircraft's position information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The ATFM Systems shall be able to process all surveillance data from the TopSky-ATC ATM system and shall include, but not limited to:
- SSR
 - PSR
 - MLAT (WAM included)
 - ADS-B
 - ADS-C
 - CPDLC

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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- d. The Multi-Surveillance Sensor Interface shall be based on the All Purpose Structured Eurocontrol Surveillance Information Exchange (Asterix) Category-062 format for the Surveillance Sensor information shall be obtained from the network of the TopSky-ATC ATM System through a TCP/IP interface connection. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

5.4.3.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- b. The Surveillance data interface to the TopSky-ATC System shall comply to the Category-062 data blocks and shall have the following layout:

CAT = 062	LEN	FSPEC	Items of the first record	FSPEC	Items of the last record

Where:

- Data Category (CAT) = 062, is a one-octet field indicating that the Data Block contains System Track Data;
- Length Indicator (LEN) is a two-octet field indicating the total length in octets of the Data Block, including the CAT and LEN fields;
- FSPEC is the Field Specification.
- The composition of the message shall be:
 - Messages shall be composed of Data Items assembled in the order defined by the Field Reference Number (FRN) in the associated User Application File (UAP).
 - When sent, items shall always be transmitted in a Record with the corresponding FSPEC bits set to one.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The standardised Data Items which shall be used for the reception of System Track Data are defined in Table 2.

Table 2: Asterix Category-062 Data Items

Data Item Reference Number	Description	Resolution
I062/010	Data Source Identifier	
I062/015	Service Identification	
I062/040	Track Number	
I062/060	Track Mode 3/A Code	
I062/070	Time Of Track Information	1/128 s
I062/080	Track Status	
I062/100	Calculated Track Position (Cartesian)	0.5 m
I062/105	Calculated Track Position (WGS-84)	180/225 °
I062/110	Mode 5 Data reports & Extended Mode 1 Code	
I062/120	Track Mode 2 Code	
I062/130	Calculated Track Geometric Altitude	6.25 ft
I062/135	Calculated Track Barometric Altitude	1/4 FL
I062/136	Measured Flight Level	1/4 FL
I062/185	Calculated Track Velocity (Cartesian)	0.25 m/s
I062/200	Mode Of Movement	
I062/210	Calculated Acceleration (Cartesian)	0.25 m/s ²
I062/220	Calculated Rate Of Climb/Descent	6.25 ft./min.
I062/245	Target Identification	
I062/270	Target Size & Orientation	Length/Width:1m Orient.: 360°/128
I062/290	System Track Update Ages	
I062/295	Track Data Ages	
I062/300	Vehicle Fleet Identification	
I062/340	Measured Information	
I062/380	Aircraft Derived Data	
I062/390	Flight Plan Related Data	

Data Item Reference Number	Description	Resolution
I062/500	Estimated Accuracies	
I062/510	Composed Track Number	

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.1 FlightRadar24 Interface

5.4.1.1 Interface Definition

- a. The FlightRadar24 system provides for a stable and secure flight tracking service-based interface capability on combined data sources from ADS-B, MLAT, ASSR radar and FLARM receiver networks. Live data feeds on position-based and events-based flight data are available for ANSP providers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. This interface shall provide for a live data input from the FlightRadar24 service provider for viewing and processing of data for updating the flight plan database in real-time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.1.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on a TCP/IP connection to an ISP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The FlightRadar24 interface shall connect to an ATNS DMZ via a router. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.2 Subscribed Clients Interface

5.4.2.1 ACARS/AIRINC Interface

5.4.2.1.1 Interface Definition

- i. The ATFM Main and DR Systems shall cater for a Subscribed Clients Interface to connect the ATFM Main System to a Subscribed Client Host via the ACARS network. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- ii. The AFTM System shall, when messages pertaining to a particular flight are received, extract the relevant data and update the ATFM parameters with the latest information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- iii. The ATFM System shall provide for ACARS message exchanges for the following three types of messages based upon their content:
 - o Air Traffic Control (ATC) – for LR-ATFM
 - o Aeronautical Operational Control (AOC) – ACDM/Aircraft (TDLS/PDC/CPDLC-DCL)
 - o Airline Administrative Control (AAC)

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.2.2 CPDLC/ADS-C Interface

5.4.2.2.1 Interface Definition

To allow for flexible routing, optimisation of aircraft separations (increased capacity) and increased safety in airspace areas, where ground-based surveillance is not possible, automated and manual ADS-C and CPDLC messaging shall be sent and received to allow for the early inclusion of ATC information in the sequence planning and application of ATFM measures as well as the timely, reliable and accurate transmission of ATFM measure instructions to such aircraft.

- i. The ATFM Main and DR systems shall cater for CPDLC data processing. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.2.2.2 CPDLC

- a. The ATFM System shall cater for a CPDLC (VDL) interface to connect the AFTM System to the CPDLC network. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM System shall be able to send/receive and process messages, and in particular pre-departure clearance communications pertaining to a particular flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.2.2.3 ADS-C

- i. The ATFM Main and DR Systems shall cater for the processing and reception of ADS-C data extracted from the CAT-062 interface to the TopSky-ATC ATM system as described in Section 5.4.3. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- ii. The ATFM Main and DR Systems shall receive ADS-C track messages from subscribed and active aircraft, whereby the relevant data shall be extracted and used to update the ATFM parameters with the latest information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.2.3 Hardware Connection and Protocol

- a. The connection and protocol shall be based on a TCP/IP connection. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The CPDLC/ADS-C service shall be able to share an existing ground to ground network in TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.3 Aerodrome CDM/ACDM Interface

5.4.3.1 Interface Definition

- a. The establishment of collaborative ATFM services includes ACDM which will facilitate the timely sequencing of aircraft in order to comply with ATFM measures such as for example Calculated Take-Off Time (CTOT), Target Off-Block-Time (TOBT), Target Start-up Approval Time (TSAT), Target Take-Off-Time (TTOT), Taxi-Time (TT) or Flexible Taxi-Time (FTT) or Variable Taxi-Time (VTT) etc., in conjunction with ATFM and AMAN/DMAN systems utilising common and future data reference sources in line with the SESAR ATM master plan. The Pre-SESAR phase of the master ATM plan includes:
- Local collaboration - Where an airport becomes an interactive message exchange environment at local level, where information is shared and decisions are taken in a collaborative manner in operational terms (ACDM) but also in safety terms (Local runway safety) and environmental aspects (Collaborative environmental management).

- First link to the network - Connect the airport to the Message Network through the exchange of information with the Network Manager to collaboratively manage flight updates (Airport CDM).
- Improved runway throughput - Entails the introduction of capacity assessment and planning tools, improved pre-departure sequencing by applying CDM principles, enhanced procedures for operations in low visibility conditions and reduced separations for arrivals in crosswind conditions.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM Main System shall cater for CDM/ACDM interfaces for the exchange of messages with the aerodromes and airports ATFM systems, such as for example parking bay and gate time systems. The purpose of this interface is to enhance and address the following issues in preparation of future ACDM expansions:

- Non-optimised turnaround and sequencing performance creates inefficient CDM.
- Poor punctuality and performance (such as airport start delays).
- Poor compliance to Estimated Off Block Time (EOBT) and non-compliant to ICAO Filed Flight Plans (FPL).
- Lack of transparency on the overall airport flight-traffic plan, or the lack of procedural information and/or practices.
- First come first served principles for start-up lead to poor sequencing that adversely impacts airport throughput.
- Poor data into interfaced networks and relevant Stakeholder's systems (where existing) resulting in high regulation/instructions to airport.
- Poor recovery of airport after disruption.
- Start-up delay due to false demand created by airlines.
- Poor interface with handling agents where airlines do not have access to real time systems on turnaround and delay status.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. This interface shall allow for the ATFM System to have the capability to address and to provide solutions for the above issues through appropriate APIs to enhance ACDM operations in the near future. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The design and implementation of the CDM/ACDM interface shall take note of the ASBU enablers ACDM-BO/1 and ACDM-BO/2 in order to address the issues listed above. For clarity, Figure 11 provides an illustrative ACDM benefit versus example enablers (indicative only). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. The following key elements shall be included in the provision of the ACDM interface.
- It shall support a common API to allow cross-border, subscribed and other Stakeholders, access to ACDM data. The same API should be supported by either a network manager, for centralised access to ACDM airports, or individual airports where there is no network manager.
 - It shall support a common API to allow regional airports lacking a type of network manager but intend to cooperate between ACDM implementations, such as establishment of a distributed ACDM Information Sharing Platform (ACISP) interface supporting the common API for the provision of centralised data.
 - The interface for data exchanges via the common API shall support the entire domain of ACDM data and not be limited in scope. Full scope messaging will provide an appropriate framework to enhance situational awareness.
 - The format of the message packages shall adhere to all relevant standards. The IATA Aviation Information Data Exchange (AIDX) standard message supports full ACDM data and as such shall be the applied format.
 - An open source platform to ACDM data exchange mechanisms shall be used for the ACISP interface and multiple proprietary interfaces shall be avoided. This will result in reduced licensing costs for airline Stakeholders that intend to implement data exchange via the common API.
 - Messages interfacing speed shall be an essential design factor in the provision of the CDM interface and API implementation. Message communication shall be achieved in milliseconds (less than one second) to reduce any delay in data sharing, as there may be legacy Airport, airline, and other management systems in the connectivity chain.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.3.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP to ATNS DMZ for ISP connection.
The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.4 Advanced Surface Movements Guidance Control Systems (A-SMGCS)

- a) A-SMGCS provides the ATFM controllers with an improved situational awareness. Benefits from its implementation are usually associated with low visibility conditions (maintained throughput) but significant improvements in terms of airport capacity can also be achieved under good visibility conditions (reduced taxi times). (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- b) Pre-SESAR phase of the SESAR ATM master plan includes: (I)
- Improved surface management using advanced surface movement, guidance and control systems (A-SMGCS) which will form the basis for the future implementation of airport safety nets.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- c) The ATFM Systems shall cater for an interface between the ATFM Main and DR Systems and the A-SMGCS for the purpose of achieving the benefits and improvements mentioned above. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.4.1 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.5 AIM/AIS Interface

5.4.5.1 Interface Definition

- a. The ATFM Main and DR Systems shall interface with the ATNS Aeronautical Information Management System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.5.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

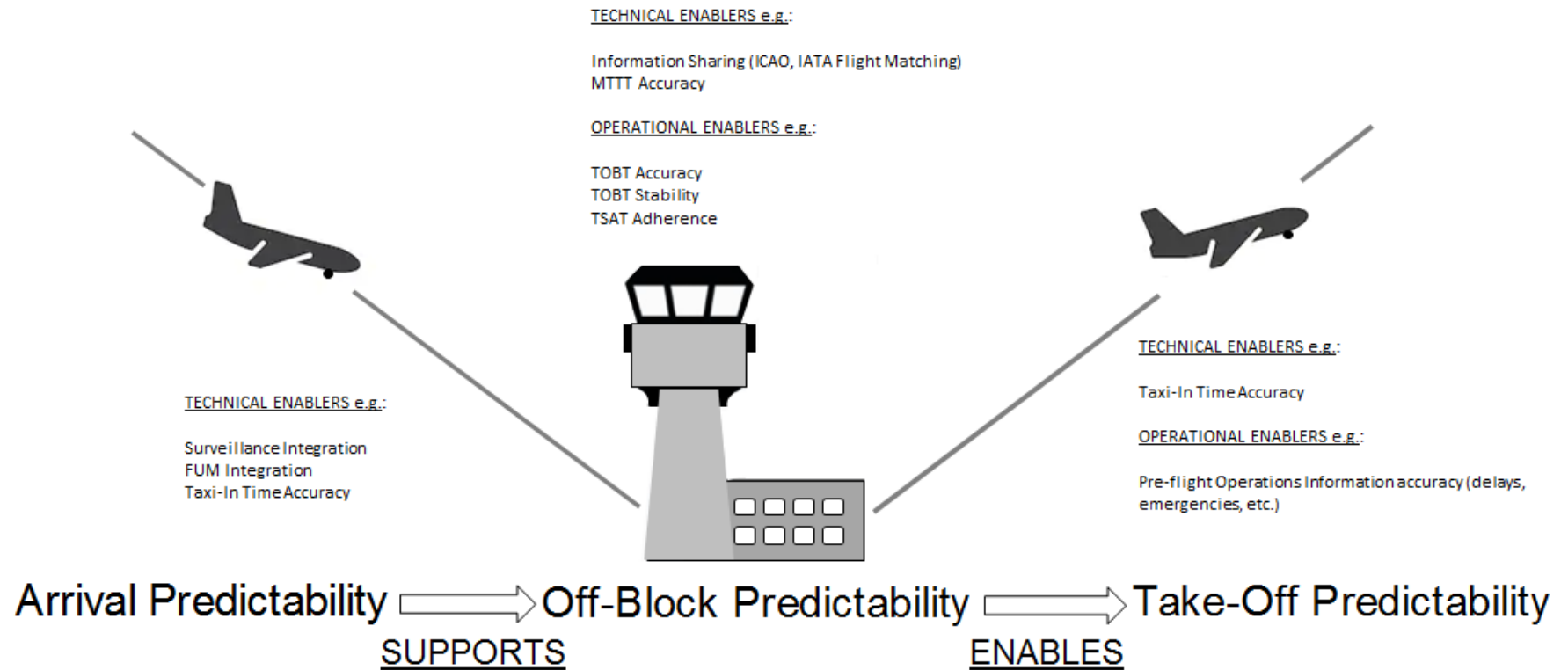


Figure 11: ACDM benefit mechanism and indicative example enablers

5.4.6 AMAN/DMAN**5.4.6.1 Interface Definition**

- a. The AMAN/DMAN interface shall process arrival and departure flights sequencing to and from multi-runway aerodromes or locations with multiple dependent runways at closely neighbouring aerodromes to efficiently utilise the inherent runway capacity through information synchronisation between AMAN/DMAN systems (for e.g. from TopSky-ATC ATM system) and the ATFM Main and DR Systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM Main and DR Systems shall interface with, and process, AMAN data received from the current TopSky-ATC ATM system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The AMAN/DMAN interface shall address the ICAO Aviation System Block Upgrades Module (ASBU) N° B0-15/PIA 1: Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN) based on:

- KPA-02 Capacity
- KPA-04 Efficiency
- KPA-06 Flexibility
- KPA-09 Predictability
- GPI-6 ATFM

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The design of the AMAN/DMAN interface shall incorporate the recommendations from the SESAR and NextGen improvement plans using the following guidelines:

- SESAR European ATM Master Plan
- SESAR ASBU Phase-0 to Phase-5
- NextGen Midterm Concept of Operations

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

DMAN

- e. The DMAN interface shall connect to a Departure Management (DMAN) tool to provide/obtain target start-up times, off-block and take-off times (TSAT, TOBT and TTOT) to optimise departure operations and to utilise aerodrome resources most efficiently. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. The DMAN interface shall support departure management automation of slot assignments and adjustments based on the sequencing of aircraft to fit into the capacity according to the airspace situation, wake turbulence, aircraft capability, and user preference. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

AMAN

- g. The AMAN interface shall connect to an Arrival Management (AMAN) tool to compute the arrival times of flights at known/defined points close to the aerodrome through the Calculated Time Of Arrival (CTOA). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h. The AMAN interface shall support arrival management automation by sequencing the aircraft based on the airspace situation, wake turbulence, aircraft capability, and user preference resulting in an optimised arrival sequence to allow for an increased aerodrome throughput. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.6.1 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.7 AMHS Interface**5.4.7.1 Interface Definition**

- a. The ATFM Main and DR Systems shall accommodate an interface to the AMHS system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM Main and DR Systems shall furthermore allow for an AMHS client, as supplied by ATNS, to reside on every ATFM CWS. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.7.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.8 IATA/SITA Communications Interface**5.4.8.1 Interface Definition**

- a. This interface shall connect the ATFM Main and DR Systems to the Airline and Airport IATA type-B messaging services through a service provided by the data link service provider. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. This interface shall enable IATA type B movement and other messages pertaining to a particular flight to be received and or transmitted to the end users connected to the Network Service. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.8.1 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.9 Strategic Slot Allocation (SCORE) Interface**5.4.9.1 Interface Definition**

- a. The ATFM Systems shall have a database of all scheduled flights that are approaching or operate in South African airspace. The flight information shall be automatically updated once a RPL is activated, a FPL is received, flight updates, or a delay or change message is received. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The IATA slot allocation tables shall be automatically loaded into the ATFM System with all flight schedule details. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. This SCORE interface shall connect the ATFM Main and DR Systems to the Strategic Slot Allocation System (SCORE) for downloading seasonal strategic slots as agreed upon by the airlines, Airports Company (ACSA) and air traffic control services (ATNS ATS). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.9.1 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The SCORE interface shall connect to an ATNS DMZ via a router to the SCORE server. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.10 Official Airline Guide (OAG) or Similar Provider Interface

5.4.10.1 Interface Definition

- a. This interface shall provide a connection to a service provider for retrieval of accurate and timely digital flight information to allow for pro-active streamlining of arrival flights, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

5.4.10.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The OAG interface shall connect to an ATNS DMZ via a router to the OAG server. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.11 Advanced Air Traffic Control System (TopSky-ATC) Interface

5.4.11.1 Interface Definition

- a. The ATFM Main and DR Systems shall cater for an interface to the ATNS advanced air traffic control management system (TopSky-ATC) to upload pertinent air space use volumes for activation and display on the different air traffic control displays, receive flight trajectory data, flight sequencing data, arrival management data, flight plan changes/updates data, flight plan conflict data, flight re-routing data, flight holding data, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.11.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.12 Mail Server Interface**5.4.12.1 Interface Definition**

- a. The ATFM Main and DR Systems shall cater for an email interface that shall connect to the ISP for secured and encrypted incoming/outgoing emails between Stakeholders and the ATFM Main System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The Mail application interface shall be connected through a secure firewall consisting of an ATFM System router through the ATNS DMZ network to the ISP (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.12.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The email server interface shall connect to an ATNS DMZ via a router. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.13 Web Server Interface**5.4.13.1 Interface Definition**

- a. The ATFM Main and DR Systems shall cater for a Web application interface that shall connect to the ISP for secured and encrypted Web application message exchanges between Stakeholders and the ATFM Main and DR Systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

5.4.13.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- b. The Web application server interface shall connect to an ATNS DMZ via a router to the ISP provider. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

5.4.14 MAESTRO Interface

5.4.14.1 Interface Definition

- a. A MAESTRO interface (for the existing ATNS ATM system) shall be provided to allow for multi-runway air-traffic sequencing information to be received from the TopSky-ATC ATM system and shall accommodate AMAN air-traffic management processing capabilities to the ATFM System for the purpose of receiving timely sequencing changes of arrival aircraft to update current arrival slots accordingly, to update airport and airspace sector capacities for demand amendments, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

5.4.14.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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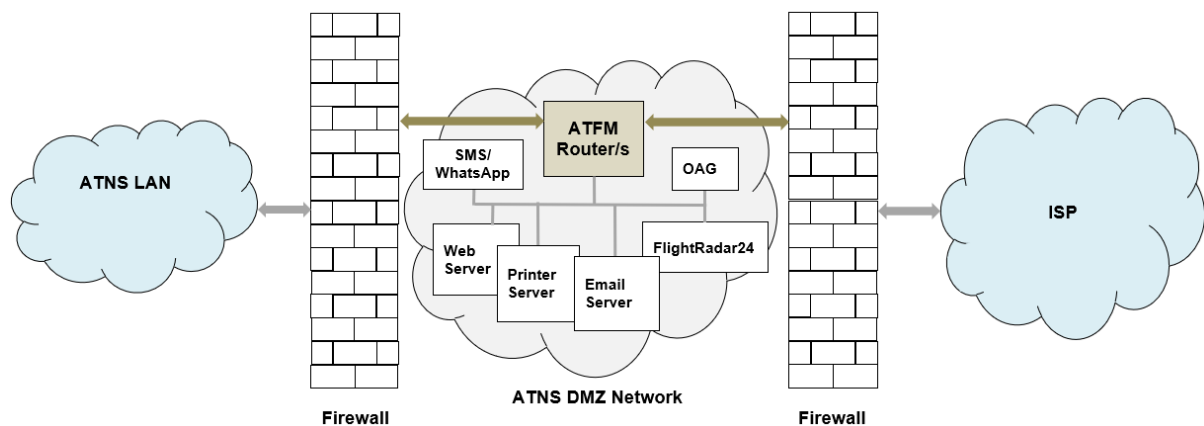


Figure 12: ATFM Web and Email Applications Network Connection to the ISP via ATNS DMZ

5.4.15 NTP Servers Interface

5.4.15.1 Interface Definition

- a. The ATFM Main and DR systems shall interface to two (2) existing ATNS NTP servers (as detailed in Section 6.10) for the purpose of time synchronization. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.15.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.16 Printer Interface

5.4.16.1 Interface Definition

- a. The ATFM System shall provide an interface to the ATNS local domain printers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.16.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The Printer interface shall connect to an ATNS DMZ via a router to the ATNS print server. (Refer to Figure 12). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.17 TV Wi-Fi Projection Interfaces**5.4.17.1 Interface Definition**

- a. The ATFM Main system shall cater for devices to wirelessly connect to the televisions for the purpose of projecting the CWS displays to the TVs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.17.2 Hardware Connection and Protocol

- a. The connection shall be established through Wi-Fi HDMI video streaming screen mirroring devices. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.18 ATFM Main and DR System Network Interface**5.4.18.1 Interface Definition**

- a. The ATFM Main system's network shall be securely connected to the DR system's network to allow for real-time data duplication from the Main system to the DR system (one-way only). The DR system shall not update the Main system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

5.4.18.2 Hardware Connection and Protocol

- a. The connection and protocol shall be based on TCP/IP from the Main system network to the DR system network. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

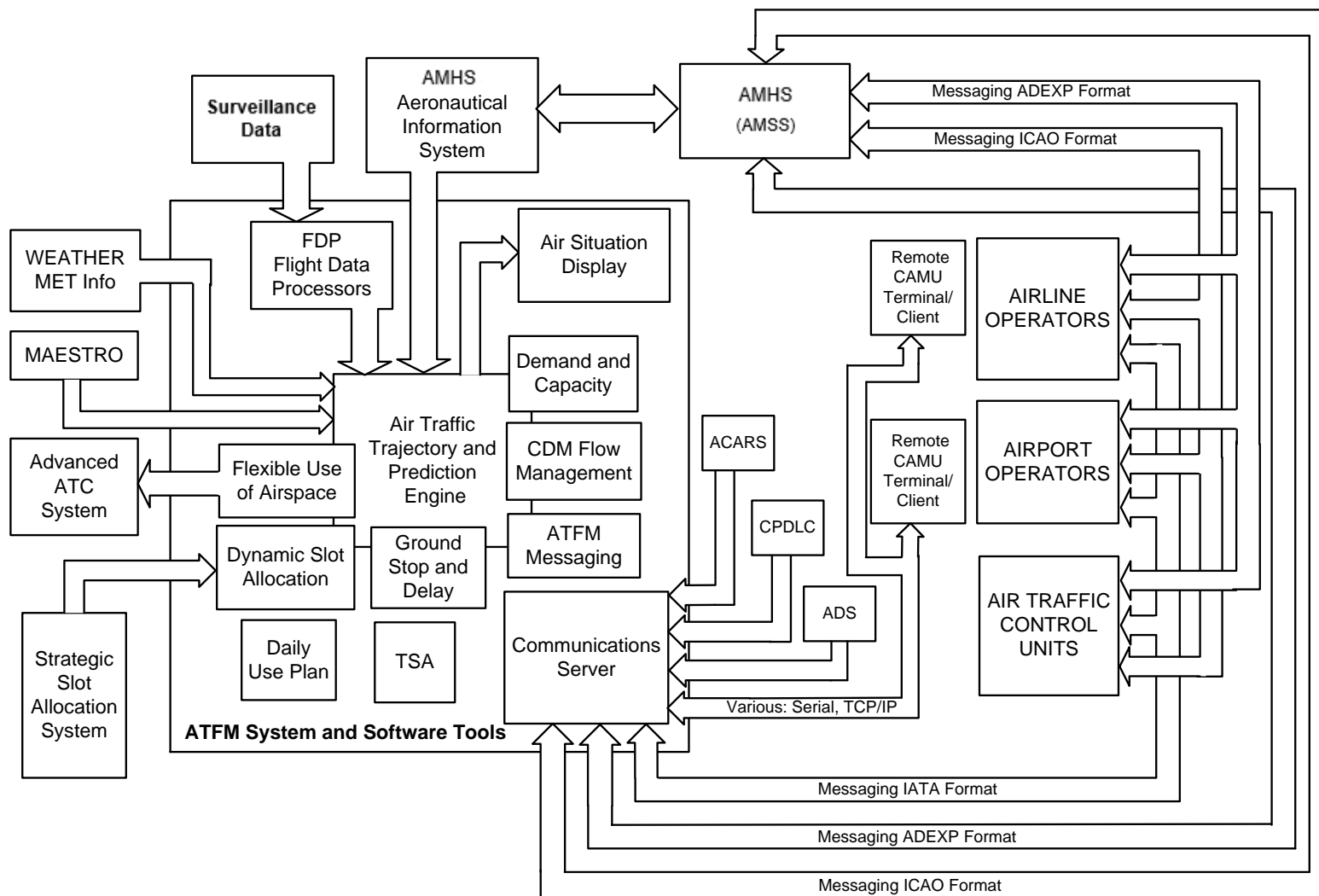


Figure 13: Basic ATFM System Hardware and Software Components

AMHS/AFTN

6 ATFM SYSTEM SOFTWARE APPLICATION MODELS

6.1 The Generic Data Gateway (GDG) Function

- A. The Generic Data Gateway (GDG) shall serve as a middleware between the ATFM Flight Data Processors (FDPs) and the Airport Flow Tool (AFT) processors. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The GDG shall fetch/receive and store Slot Coordination, Reporting (SCORE) and Official Airline Guide (OAG) data, from their various sources. Slot substitution and flight field updates from the Web application shall be sent directly to the GDG. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The GDG shall create a Ground Delay Program (GDP) from SCORE, OAG and FDP data and shall transmit the GDP to the AFT application through an Aggregate Demand List (ADL).

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The GDG shall use a redundant database, consisting of data of all flight information sent by both ATC (TopSky-ATC System ATC Controllers) and other users and FPL sources interfaced to the ATFM Main System, for the ATFM main system tools (AMT, AFP, GDP, Web App, etc.) The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The GDG shall run an automatic daily start-of-the-day GDP for pre-defined offline configurable aerodromes/airports and with pre-defined offline configurable parameters,

running for a 24-hour period and with a start time that shall also be offline configurable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The ATFM controllers (operators) shall be able to revise/terminate the full GDP at any time during the day. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM controllers (operators) shall be able to revise or terminate the GDP of each specific controlled airport/aerodrome (offline defined) whenever required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The daily automatic GDP for pre-defined aerodromes/airports (controlled airports) shall be offline configurable and expandable to as many aerodromes/airports as ATNS deem fit for a GDP that needs to run daily. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The offline configurable expansion of the automatic daily GDP for aerodromes/airports shall allow for configurable time periods, other than 24-hours, and shall be offline configurable for each additional aerodrome/airport added. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- J. The GDG function shall cater ATFM controllers (operators) to manually create GDPs for any non-offline defined (un-controlled) GDP aerodrome/airport, also with pre-defined offline parameters, at any time during the course of the day for any specified period up to 24-hours. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The GDG shall allow and receive CTOT substitutions from all user inputs and system relevant sources concerning FPL data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. The GDG shall perform FPL matching on all FPL's received from all relevant FPL sources to ensure the data quality of the FPL database and CTOT allocations. The FPL matching shall prevent multiple FPLs for the same flight during the first automatic slot allocation process of the day. Thereafter, real-time FPL updates from the different and relevant sources shall be used to match and update FPLs and CTOTs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The GDG shall release suspended flights' CTOTs and shall make those CTOTs available for re-use. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The GDG shall cancel suspended flights and shall automatically remove suspended flights after an user offline configurable time period. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. EXEMPT VS. NON-EXEMPT FLIGHTS: The management of non-exempt and exempt flights shall be handled and processed differently. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. Exempt flights are flights that are exempted from a revised ground delay program (GDP). For example, flights which are relating to long range flights (mainly international flights departing on one day and arriving the next day) and that departs outside of a certain distance from the arrival airport, shall typically be exempted when a revised GDP is applied due to a capacity reducing event that has the potential to be cancelled early (due to early arrivals, etc.). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. Exempt flights shall be considered in the capacity demand but are not expected to respond to an ATFM control time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. All international or long range flights, travelling long distances, are viewed as exempt flights and shall be exempted from GDP revisions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- S. When a GDP is automatically created at a pre-configured initial start time for the day, or a GDP is revised during the course of the day, all exempt flights shall be assigned slots first, followed by non-exempt flights allowing exempt flights to receive minimal delays. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- T. Exempt flights shall be issued a “priority” slot and should therefore not be influenced by any delay assigned by the GDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- U. ATFM subscribed users shall be able to move exempt flights manually at any time as and when required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- V. The ATFM System shall allow subscribed users (being allocated certain user rights) to manually move exempt flights' CTOTs relating to their own airline or business aspect as and when required. This shall allow for CTOT manipulations to accommodate unforeseen circumstances whereby allocated CTOTS can no longer be met or has become obsolete due to departure or other delays, early arrivals, cancelled flights, diverted flights, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- W. The ATFM System shall create Departure and Arrival CTOTs for each FPL existing in the FPL database prior to the GDP CTOT program running at the start of the day, as well as for each FPL (new/change/update) received from the FDP processing during the day if relevant for a CTOT allocation. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- X. The ATFM System shall cater for CTOT presentations on the Operator positions and Web application to be dynamic (new/changes/updates, revised GDPs, etc.) and in accordance to live and periodic updates of the presentation received from the AFT/GDG processors and associated databases. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Y. The GDG shall assign the next available CTOT, relevant to Arrival or Departure times, for dynamic (new/updates/changes/pre-activation) FPLs received in real-time from the FDP processor. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Z. If the flight change/update from the FDP is a delay message, the GDG shall assign a CTOT according to the ELLDT time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- AA. The relevant tools (AFT, Web application, Subscriber positions, Tower-ATC positions, etc.) shall cater for the CTOT presentations to be sorted, based on any field and all fields

according to the presented columns. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

BB. CTOTs shall be allocated per hour and as many within the hour as can be accommodated within the allowed hourly traffic capacity after all offline defined (taxi time per aerodrome, etc.) as well as real-time relevant dynamic FPL parameter changes and computations have been considered and applied by the system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

CC. The SCORE data shall, for the automatic GDP CTOT/ATOT allocation at the start of operations for the day, take priority over OAG, FlightRadar24 or similar system data unless there is no match between SCORE, OAG, FlightRadar24 or similar system for a specific flight. If the latter is the case, the GDP program shall also apply the OAG, FlightRadar24 or similar system flight data to allocate a CTOT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

DD. If no CTOT-slot is available for a particular flight (DEP/ARR) within the hour of its ETD/ETA, the GDG shall calculate the next relevant (ARR/DEP) available CTOT using the FPL (Flight Plan) ETD/ETA parameter and assign the available CTOT as close as possible to the ETD/ETA time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

EE. The GDG shall, for new FPLs (pop-up FPLs) arriving from the FDP processing as received/filed during the day, use the IGTA/IGTD time to assign a next available CTOT and

the flight be regarded as a GAAP (General Aviation Airport Program) control type flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

FF. The GDG shall, for delayed FPL changes/updates from the FDP, allocate a new CTOT according to the ELLDT time of the FPL and shall release the existing CTOT if relevant. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

GG. Flight Plan ID matching and tracking between GDG and FDP shall take place and each unique flight shall be assigned a unique identifier (GDGID) by the GDG. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

HH. The GDG system shall allow for re-control (RCTL) flights. This will prevent flights to be controlled by more than one program (GDP, AFP, etc.) from being considered pop-up flights when one program terminates. A flight that is controlled by a GDP program has precedence and as the program runs to completion or is dismissed, the associated flight shall then be further controlled by the program that remains running (the AFP program). A GDP program will always take precedence over an AFP program and a GDP at the destination aerodrome will take precedence over a GDP at the origin aerodrome. If the GDP is lifted (completed/terminated) and the AFP is still in place, the flight will get a new CTOT for the AFP and shall be assigned a control type of RCTL (re-control) flight reference. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

II. The system shall use the Ration-By-Schedule (RBS) algorithm to assign departure slots to airlines. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

JJ. The ATFM System shall not allocate a CTOT or ATOT to Excluded/Exempt flights. These Excluded/Exempt flights shall include:

- a) Flights carrying the South African Head of State or equivalent status ["STS/HEAD"],
- b) Flights conducting search and rescue operations ["STS/SAR"],
- c) Flights authorised by the relevant States Authorities to include in the flight plan "STS/ATFMEXEMPTAPPROVED",
- d) Flights in a state of emergency ["STS/EMER"]

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

KK. The System shall produce GDP revisions slot data, print and produce them electronically in report or display format for distribution to Airline Operators (AO) via email, Controller Pilot Data Link Communications as interface feeds. Purpose is for CDM between airports, airlines, or remote view only screens, etc. which is a shortcoming of the current system and a requirement by the various users – ACSA, Airlines, Pilots, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.1.1 GDG Communication with FDP

- a) Periodic requests for information shall be maintained between the FDP and the AFT/GDG. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) GDG messaging shall be initiated to the FDP if a match is found between FPLs sent from the FDP and FPLs found within the GDG for existing flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) A match between a FPL message and a flight without a FDPID shall be actioned using the 7 field matching criteria according to ACID, ADEP & ADES & ETD & ETA & DOF (all as were filed in the FPL) and IOBT as was described earlier. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The GDG shall update the FPL information with the FPL data provided by the FDP FPL message with the associated FDPID. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) If a flight is controlled or it is an active flight, with a GDP already in place, an update-request message shall be sent to the FDP with the following fields:

- FDPID
- CTOT/CLDT control times
- SAM message
- REGCAUSE
- REGUL
- DOF
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) When FPLs are received from the FDP and no matching flight is found in the GDG, then a new FPL shall be created with the FDPID. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) If the flight in paragraph f) above is a controlled or active flight, a slot shall be assigned and an update message shall be sent to the FDP having the following fields:

- FDPID
- CTOT/CLDT control times
- SAM message
- REGCAUSE
- REGUL
- DOF
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) If the GDG receives a delete message from the FDP for a FPL and a matching FPL is found, the flight shall be suspended. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) If the flight in h) above is a controlled or active flight, the associated slot shall be released, and an update message shall be sent to the FDP having the following fields:

- FDPID
- A FLS message in the resultant message field
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) When a CTOT SWAP message is received from the ATFM WEB Application to swap a suspended flight with an available slot, the system shall de-suspend the flight and move it into the specified available slot. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) An update request shall be sent to the FDP having the following fields:

- FDPID
- CTOT/CLDT control times
- A DES message in the resultant message field
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Messages received by the FDP from the AFT/GDG for flights no longer active or controlled by any TMI, the system shall cancel the slot. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) The ATFM system shall send an update message to the FDP having the following fields:

- FDPID
- SLC message in the resultant message field
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) For a dropped FPL (out of an existing TMI) and the associated flight message received from the FDP that it is no longer controlled or active, the system shall free the associated slot and shall send a message to the FDP having the following fields:

- FDPID
- SLC message in the resultant message field
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) For re-controlled flights (for e.g. when a higher priority TMI exists, or when a higher priority TMI is cancelled or completed moving into a lower priority TMI), the system shall send a message to the FDP having the following fields:

- FDPID
- CTOT/CLDT control times
- SRM in the resultant message field
- REGCAUSE
- REGUL
- COMMENT

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) The ATFM system shall display the latest flight status. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q) The ATFM system shall allow delayed aircrafts that missed their initial slots to re-enter into the slots management process after the delay lapses. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.2 Flight Data Processor (FDP) Function

- A. The FDP servers shall receive, and process, live flight information changes, updates and creations received from multiple sources to extrapolate aircraft positions, model flight trajectories and manage flight related messages. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The flight data sources and data types shall include:

- a) FlightRadar24 or similar system
- b) AMHS
- c) AIM System
- d) TopSky-ATC ATM System
- e) Surveillance – ASSR, PSSR, ADS-B, WAM, MLAT, ADS-C
- f) MAESTRO – Sequencing information
- g) FPL update messages
- h) A-SMGCS
- i) AMAN/DMAN
- j) MAESTRO
- k) OAG
- l) SCORE – IATA

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. Flight data shall be stored in a flight plan database and for each flight a data record is stored which is referred to as a Flight Data Record (FDR). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.2.1 Messages Management

- a) The FDP shall process the following messages, but not limited to, as received:
- IATA: To be converted to ICAO messages.
 - ICAO: ATS Messages, including FPL, CHG, CNL, DLA, DEP, CPL, ARR, EST, LAM, TDM
 - IFPS (ADEXP): Including, IAPL, IACH, IAFP
 - CFMU (ADEXP): Including, SAM, SRM, SLC, FLS, DES

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Message data shall be extracted and processed to update FDRs and initiate FPL status changes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) When a SAM or SRM messages is received, the ATFM System shall initiate the store of CTOT, or NEWCTOT, respectively, as well as initiate the update of the ETD with the CTOT/NEWCTOT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) When a SLC messages is received, the ATFM System shall initiate the restore of the original ETD and store the SLC as the CTOT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) When a FLS or DES messages is received, the ATFM System shall initiate the store of FLS or DES, respectively, as the CTOT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) A warning shall be issued to the controller on reception of a TDM message. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The FDP shall send the following messages, but not limited to, automatically over the AMHS/AMSS:

- CFMU (ADEXP): SAM, SRM, SLC, FLS, DES. RRP
- ICAO: CHG, DLA
- IFPS (ADEXP): ICHG, IDLA

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) IFPS messages shall be constructed from slot allocation data received from the AFT The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i) RRP messages shall be used to propose a re-route of the flight and shall be send to offline configured addresses, but which shall also be online user modifiable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- j) SAM and DLA messages shall be sent via the FDP when a GDP was activated or revised on the AFT to the addresses determined from the GDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- k) SRM and SAM messages shall be the same, with the exception that the SRM message shall reflect the first slot message and the SAM message shall reflect the subsequent slot message. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- l) If a SLC message is used for a FPL cancellation, the FDP shall transmit a SAM or SRM instead. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

6.2.2 Flight Plan Management

- a) An FPL Management Workstation (FPMW) shall be supplied to manage and modify FPLs as and when required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The result of the FDP flight plan processing shall be fully FPL2012 compliant according to all fields and specifications as recommended by ICAO, including all ICAO associated validations of all relevant and recommended fields and the maximum recommended allowed characters for each field. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The processing of received flight plans shall cater for ICAO, IATA and ADEXP formats and the computed result shall comply to ICAO recommended formats only. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) All flight plan validations shall comply with the ICAO and/or ADEXP syntax as well as the recommended field validations for an FPL according to the documented recommendations/standards. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) In the event that an IATA FPL cannot be converted to ICAO format, the FPL shall be queued at the FPMW. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Any manual creation of a FPL via the FPMW shall be adequately validated before it is send to the FDP for processing and the result transmitted to the AFT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The FDP shall perform at least the following semantic validation checks on a FPL before it creates a FDR:

- SSR code
- SSR code is not an emergency code
- Aircraft type is compatible with flight level, speed and wake turbulence
- Mach speed, cruising speed and flight level is in line with the aircraft performance
- EET is required if FDP cannot compute it.
- Flight plan life is within offline defined value.
- Total flying time does not exceed 24-hours.
- Elapsed time between two fixes does not exceed offline defined value.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Any received FPL with a validation discrepancy shall be queued at the FPMW and the user shall be able to make the required corrections and submit the corrected FPL for further processing by the FDP. The AFT shall then update the associated slot for the flight and shall update the slots list accordingly. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) When any manual FPL change is introduced to an existing FPL (such as a DEP time inserted manually to an already airborne flight's FPL from the ATFM Flight Management workstation), or a new FPL is created, the FDP shall process the change, and shall transmit the result to the AFT which shall revise the slot for that flight and update the slots

list accordingly. A SRM message shall be sent. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) Flights that are diverted or re-routed due to weather constraints, or due to FCAs and TDAs, and therefore experience a delay shall be processed by the FDP as such and shall automatically update the associated slot allocations for these flights accordingly through the AFT processing as well as updating the slots list. An SRM message shall be sent for each. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Flights that fly the same route with the same callsign and aircraft registration more than once per day shall be managed accordingly, and effectively, to allow for adequate processing of such flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Flight Plan ID matching and tracking between FDP and GDG shall take place. Each unique flight shall be assigned a unique identifier (FDPID) by the FDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) FPLs shall be matched using the following seven FPL fields: ACID, ADEP & ADES & ETD & ETA & DOF (all as were filed in the FPL) and IOBT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- n) The FDP shall create an FDR automatically in the FPL database when receiving a valid FPL message. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The FDP shall create an FDR automatically in the FPL database when receiving a valid operator message prior to departure or when in flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.2.3 FPL Validations

- a) All FPLs shall be validated exactly in accordance to the ICAO Doc 4444, Procedures for Air Navigation Services — Air Traffic Management, 16th Edition specified format and data conventions unless otherwise specified. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) FPL filing can be up to 120-hours before EOBT and the system shall validate all these FPLs filed before retaining/storing them in the associated database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) All FPL validations shall take place after reception of a FPL and after conversion to ICAO FPL format, before it is stored, processed and send to the AFT and any other relevant

system components. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) If any cancellations of FPLs occur, the system shall apply these to the matching FPL and update all required processing of that FPL accordingly which is then distributed to the GDG for the required processing and resultant messaging. The AFT/GDG shall update the slots list accordingly. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) If a mismatch between GDG and FDP Flights exist after SCORE and OAG data have been processed by the GDG, the FPLs within the GDG not matching with those in FDP shall be suspended. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Where applicable in the offline system database, and for each aspect of FPL related impacts concerning FPL validation, if any discrepancy between the FPL and related offline parameters is detected, the FPL shall be queued at the FPMW. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Duplicate FPLs shall be queued at the FPMW. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- h) If an FPL is delayed by more than 30-minutes past its existing EOBT, the system shall suspend the flight and shall send this flight to the FPMW. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) All erroneous and invalid FPL messages shall be queued at the FPMW. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The FPMW position shall, for each queued FPL provide a clarification of the discrepancy detected in a pop-up information window, when the mouse pointer is hovered over the queued FPL. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) FPL validations shall include, but not be limited to:
- Aircraft Identification (Maximum 7 Characters) any combination of alpha numeric and numeric characters shall be allowed,
 - Flight Rules and type of flight (1-2 Characters),
 - Number of aircraft (1-2 characters) and type of aircraft (2-4 characters) including wake turbulence category (1-character),
 - Equipment capability (1-character) or equipment availability (1-2 characters),
 - Departure aerodrome and time (8-characters),
 - Routing,
 - Cruising speed and level each 5-characters, including changes of speed, level, flight rules,
 - ATS route (2-7 characters),
 - Significant point (2-11 characters),

- Change of speed/level (max. 21 characters),
- Change of flight rules (max. 3 characters),
- Cruise climb (max. 28 characters),
- Destination aerodrome and total EET (8-characters), alternate destination aerodrome (4-letter),
- Other information (field 18) as allowed and as per ICAO FPL2012 recommendations
- Supplementary information – endurance, persons on board, emergency and survival equipment.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.3 Flight Plan Conflict Function (FPCF)

- A. The FPCA (Flight Plan Conflict Airspace/Area) areas defined as 3-D areas shall be offline created and shall be user configurable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The FPCF shall allow the user to create individual FPCA areas, but shall also allow for the whole airspace (Flight Plan System Area - FPSA) to be defined as a single FPCA area. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The FPCF shall allow for FPCI (FPL Conflict Inhibition) areas to be offline defined. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The FPCF shall allow for FPCA and FPCI areas to be activated/de-activated by Controllers at CWS positions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The FPCF shall cater for processing of FPCA areas within the RVSM airspace. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The FPCF shall allow up to 40 FPCA areas to be defined offline. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The FPCF shall allow up to 10 FPCI areas to be defined offline. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The FPCF shall allow for 25 vectors per polygon for each FPCA area. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The FPCF shall use flight plan information (probing) to check for future loss of separation (in each of the longitudinal, lateral and vertical separation domains) between an aircraft and any other aircraft computed to be in an active Flight Plan Conflict Area (FPCA), assuming that aircraft follow their filed or amended flight route. Both automatic and manual activation of

conflict probing shall be provided. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The ATFM System shall permit the offline definition of non-intersecting FPCAs within the geographic extent of the Flight Plan System Area (FPSA). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The FPL conflict alerting shall be based on the detection of conflicts in longitudinal (time) and vertical domains through conflict prediction and risk of conflicts, as well as for potential conflicts. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. FPCF alerts shall present at least the following information:

- Detection time of the FPL conflict.
- Start and end time of conflicts per FPCA including the a/c positions for each time.
- ETOs, lateral, longitudinal and vertical separations, and a/c positions shall be displayed at a computed closest point of approach.
- The Callsigns of the conflict FPL pair with an indication whether it was automatically or manually inserted into the FPCF database.
- The Name of the FPCA plus the offline defined qualifiers for the particular FPCA.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The FPCF shall provide both an audible and a visual alert if a conflict is detected. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The FPCF audible alerts shall remain audible until it is acknowledged, or the conflict is resolved. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. The FPCF visual alerts shall only be cleared when the conflict is resolved. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. The Flight Plan Conflict Probing shall be performed within offline-defined FPCAs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. The FPCF shall allow for automatic re-route solution proposals to eliminate FPL conflicts using the offline defined parameters per FPCA. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. The FPCF shall allow for manual re-route solution proposals to be entered by the user. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

6.4 Temporary Segregated Airspace/Area (TSA) Function

- A. The TSA function shall also include TDA (Temporary Danger Airspace/Area). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The ATFM System shall cater for TSA's to be defined online and stored in the system Static Database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The ATFM System shall automatically activate stored TSA's at the defined date and time within the TSA. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The ATFM System automatically create TSA's when adverse weather conditions are detected upon reception of such Meteorological data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The ATFM System shall cater for the online creation and submission of TSAs to be processed and used by the system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- F. The TSA created online due to severe weather, shall follow the weather pattern automatically or through the manual insertion of direction and speed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The TSA function shall allow for automatic re-route solution proposals to eliminate SAP conflicts based on offline defined parameters. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The TSA function shall also allow for manual and online re-route solution proposals to be entered by the user (modelling proposals by the GCU users). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The ATFM System shall cater for text consisting of 3 lines with at least 20 characters per line, as entered at the ATFM system position, to be associated with the distributed and displayed TSA to provide information on the TSA to the controller. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The TSA displayed shall be colour coded in order to present the status of airspace i.e.:

- Yellow -half hour before activation,
- Orange - 5 minute before activation and
- Red - while TSA is activated.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The TSA display shall disappear once the operation or mission is completed or cancelled by the Controller. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. The system shall cater for audible and visual warnings on the activation of the TSA on the ATFM system and ATFM controller position to draw attention to TSA activation. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The system shall cater for acknowledgement of the audible warnings as stated above. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The ATFM Systems shall cater for TSA simulation and analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. The ATFM Systems shall produce the way points, print and produce them electronically for distribution to (Aircraft Operator) AO via SITA or Controller Pilot Data Link Communications. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. The ATFM Systems shall raise an audible and visual alert on the CWSs of the termination of TSA by configurable parameters. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. The ATFM Systems and/or a General Controller User (GCU) shall have the ability to amend/extend or cancel the TSA at any time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. Whenever a scheduled TSA is cancelled, or its activation period has changed, the GCU shall be able to manually change the particulars of the TSA or cancel a TSA completely if necessary. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.5 Flexible Use of Airspace (FUA) Function

- A. The ATFM Systems shall cater for automated FUA modelling capabilities. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The ATFM System cater for FUA activities to be presented on the Web application page. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The FUA Web application shall allow the user to easily submit their own FUA proposals. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The area for the FUA shall be plotted on the CWS map display by coordinate entry in order to determine the position of the FUA. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The plotted FUA will then need to be converted to radial and NM distance from the nearest NAVAID or waypoint or fix. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. Text shall be added to the plotted area showing time and vertical limits so as to observe full description of the FUA. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM System shall perform the following functions in terms of Flexible Use of Airspace (FUA):

- shall have the capability of sending modelled FUA airspace relevant information (as outlined above, but not limited to) via e-mails through an option (drop down or other) selectable from the FUA map when a mouse button click is executed. .
- shall have the ability to store all online created FUAs for easy retrieval and distribution whenever required in future.
- shall have the capability of linking the FUA/airspace reservation to the respective published NOTAM.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.6 Segregated Airspace Probe (SAP) Function

- A. The Segregated Airspace Probe (SAP) shall detect flight plans that are currently infringing, or are predicted to infringe, a Temporary Segregated Area (TSA) that is active at the time of the infringement. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. SAP processing shall allow for the look-ahead affected/infringing flight plans to be revised automatically with proposals to the CWS Controller (or allow for a manual proposal/submission by the CWS Controller to be modelled) and, upon submission/acceptance of the automatic/manual proposal/model, be entered into the SAP database automatically for processing by the ATFM System as per normal FPL updates received. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. Flight plans in the SAP database shall be eligible for SAP processing based on the operational ATC flight plan state, offline-defined selection criteria regarding flight rules and the availability of CFL (Cleared Flight Level) information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- D. A flight plan in the SAP database shall be automatically probed against all TSAs on initial insertion into the database and on subsequent modification of relevant trajectory data (ETO, route, ground speed, CRL, flight rules and either PCFL or CFL). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- E. SAP probing shall also be possible through manual modelling using a 4-D flight plan trajectory profile and through 2-D using the FPL route in relation to the CRL and CFL. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- F. An SAP alert shall identify the flight plan and TSA in conflict and note the conflict entry and exit date and time and position. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

6.7 Airports Flow Tool (AFT) Function

The AFT is an application used to monitor and adjust aerodrome capacity against demand. It is also used by users such as airlines and can operate on different platforms and communicate with the Airport Traffic Flow Management (ATFM) sites independently. Therefore, the AFT is basically responsible for managing and monitoring of aerodrome capacity, demand balance, TMI modelling, and the evaluation of alternative approaches to managing the aircraft traffic. (I)

The AFT consists of two primary components, namely, the AFT Server and the AFT Client. (I)

The AFT Server handles communications with the Generic Data Gateway (GDG) through Aggregate Demand Lists (ADLs) and supports multiple clients. The AFT Client is the end user

interface for AFT users, and it allows for the processing and monitoring of data in both live and historical modes and Traffic Management Initiative (TMI) modelling. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- A. The AFT shall display all information in ICAO nomenclature. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The AFT shall forecast future capacity demands (period shall be online configurable) for multiple resources (more than 10), and shall update the demand forecasts at a minimum of 5-minute intervals based on updated or new data and information received from users and external interfaces. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The AFT shall calculate estimations for the time taken between the actual pushback and take-off (Taxi-time), runway-to-runway flight phase (which is divided into terminal departure, en-route, terminal arrival and associated irregular points, which presents the time of take-off, passing terminal departure fix, passing terminal arrival fix, landing), ground operation phase (divided into turnaround time, taxi-in and taxi out times, off-block and in-block times) utilizing a priority scheme regarding received data from all sources. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The AFT shall cater for real-time and historical data to be available for users to model future demand and capacity as load graphs, flight lists and timelines, map-based flight displays. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- E. Load graphs shall be displayable for at least Airline, terminal fix, flight states. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- F. Online configurable filtering and sorting of flight lists shall be possible based on, at least, the following:

- CALLSIGN
- A/C Registration
- Departure airport
- Arrival airport
- EOBT
- ETOT
- ELDT
- EIBT
- COBT
- CTOT
- COFT
- CLDT
- Flight state
- Terminal fix

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- G. The AFT shall allow for the arrival slot allocation parameters to be specified for each airline and aircraft operator which shall be:

- Minimum notice as required by the airline or aircraft operator for EDCTs.
- Earliest runway arrival and departure time per flight.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The AFT shall allow for the departure slot allocation parameters to be specified for each airline and aircraft operator which shall be:

- Minimum notice as required by the airline or aircraft operator for EDCTs.
- Earliest runway arrival and departure time per flight.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The AFT shall cater for “What-if” flight reroute modelling scenarios and shall send a Rerouting Proposal (RRP) message once the modelling is submitted and a new CTOT shall be proposed after the flight was refiled containing the new route (NEW RTE). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The AFT shall allow for an automated Demand and Capacity Balancing modelling as well as scenario modelling for strategic, pre-tactical and tactical flow management. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The AFTM tools and reports shall provide at least, but not limited to, the following features:

- Predict and monitor demand;
- Automatically determine demand and capacity discrepancies (imbalances) for airports and for airspace, as well as for modelling and implementation of collaborative ATFM solutions;
- Automatically exchange ATFM measure, demand, and capacity information to operationally cross-border ATFM systems;

- Simulation and human-in-the-loop exercise capabilities to allow ANSPs and Stakeholders to model and assess ATFM operational scenarios and solutions to develop improved operational concepts and procedures to reach the best possible operational outcome during periods of demand/capacity imbalance; and
- Operational performance reports to support analysis and alignment with KPIs for post-operational analysis and reviews.
- The system shall cater for modelled or active programs to be presented on the Web and provided via Email to subscribed clients.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.7.1 AFT Client Application

- A. An AFT client application shall be available on each CWS. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The AFT client shall cater for a Ground Delay Tools (GDT) to accommodate the monitoring of historical and live data modes of operation. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The AFT client shall cater for user setup preferences to be stored and selectable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The AFT client shall cater for Timeline, Bar Graph, and Flight List displays of any of the live controlled aerodromes active within a GDP program. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The AFT client shall cater for Timeline, Bar Graph, and Flight List displays of any of the historical controlled aerodromes active within a GDP program at the date selected/specified. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The AFT client shall cater for the display of all R.S.A. FIRs and relevant regional FIRs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The AFT client shall cater for the display to expand automatically when associated offline configuration files are updated/amended. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The AFT client shall cater for the display of all ACDM subscriber ATFM ANSPs and shall expand automatically when associated offline configuration files are updated/amended. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The AFT client shall cater for the display of all Airline and Aerodrome Stakeholders listed in the ADL files sent from the GDG to AFT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The AFT client shall cater for the display of all flight data available in the ADL. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The AFT client shall cater for the display of all arrival and departure flight data for aerodromes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. The AFT client shall cater for the display of slot management for airports similar but more comprehensive than to that of the Web application. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The AFT client shall utilise the initial GDP program with Score and OAG data which were executed at the start of the day until a GDP revision is performed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The AFT client shall cater for the display of the monitoring of unassigned slots based on the rate for each aerodrome through GDG tracking published in the ADL. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. The AFT client shall cater for a pre-defined priority for slot allocations and shall follow the following priority:

- Aerodrome arrival slot – Exempt and non-exempt flights to be considered in the prioritised slot allocations for arrival flights.
- Aerodrome departure slots
- AFP arrival slots.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. The AFT client shall cater for graphs and associated data to be exported to an Excel (.xlsx) file. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. The AFT client shall retain, for each of the controlled airports and associated programs, the latest state for selection and display in case an AFT Client loses connection to all AFT servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. The AFT client shall cater for the user to manually activate flights using the departure time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- S. The AFT client shall cater, as a proposal function, for the users to be able to create, edit and cancel airspace reservations (FCA, TDA, SAP, FUA and TSA) and event scheduling within the Strategic, Pre-Tactical and Tactical ATFM phases. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- T. The AFT client shall, in the event that a CTOT is about to expire or to be missed, sent a warning to the web client of the owner of the aircraft (Airline User and User Role), to the CWSs and to the tower controller web client (Tower User and Tower User Role). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- U. The AFT shall cater for missed slots to be made available for reallocation after suspension by means of the associated airline web client as well as by GCU controllers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- V. The ATFM system shall for the AFT function, capture the user information of any user (external or internal), that is the User-ID (Could be Role and Airline Identifier) and the IP address if it is an external user, plus the date and timestamp, for every manipulation of slots performed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- W. The AFT client shall allow users to change slots on flight lists by means of a drag and drop action. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- X. The AFT client shall cater for the slots view to include selective filtering to show only the slots for a selected Stakeholder or airline, as well as the open slots for ARR and DEP flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Y. The AFT client shall have a filtering mechanism to filter messages according to personalised profiles in order to reduce clutter on the user interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Z. The AFT client shall allow the user to move or suspend multiple slots at a time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- AA. The AFT client shall incorporate an integrated search field for the flight lists. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- BB. The AFT Client shall be able to model “what if” scenarios when implementing TMIs and propose the best solutions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

CC. The system shall have capability for the Tower view to flash Flight Activation Monitoring (FAM) messages. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

DD. The AFT Client shall present the GDT data in a Bar Graph and Timeline format.

- a) The AFT client shall display the ARR and DEP data for the following modes:
 - a. Setup mode,
 - b. Model mode,
 - c. Monitor mode,
 - d. Historic mode.
- b) The AFT Client shall within the graphical display provide a clear distinction between the modelled ARR and DEP data (eg. Solid line versus dotted line).
- c) The AFT Client shall cater for the selection of the data to be displayed on the timeline as either ARR only, DEP only, ARR and DEP combined or both ARR and DEP, but listed separately.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.7.2 Ground Delay Tool (GDT)

A. The GDT shall:

- a) Be able to model both departure and arrival data simultaneously in one GDT mode which shall be user selectable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Disable the Purge and Time block options for a program per airport that is managed full-time, but users shall still be able to revise the GDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Always enable the CTA compression option. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Allow the user to select the rate mode, maximum or target, during a GDP revision. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) Allow the user to toggle between max and target rate modes when modelling a GDP revision. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Display columns with Time and Program Rate when modelling an AFP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Allow for displayed columns including Time, Program Rate, Arrival, Departure, when maximum rate mode is selected, and shall automatically compute the new program rate

by adding the departure rate to the arrival rate. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Disable the program rate column when in maximum rate mode. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) Set the arrival rate, in maximum rate mode, to the AAR rate for aerodromes that are excluded from an active GDP or AFP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) Set the departure rate, in maximum rate mode, to the ADR rate for aerodromes that are excluded from an active GDP or AFP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Not exceed the aerodrome capacity rate for any of the arrival and departure rates when in maximum rate mode. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Display for target rate mode columns for Time and Program Rate. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) Allow for the Program Rate to be editable in target rate mode. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) Not exceed double the aerodrome capacity rate for any of the arrival and departure rates when in target rate mode. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) Set the program rate for non-controlled elements, when in target rate mode, to the AAR time or ADR time when available. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) Set the program rate for non-controlled elements, when in target rate mode, to the AAR + ADR times when either one is not available. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8 Capacity Management and Monitoring

- A. The ATFM System shall have a capacity/demand look ahead capability of 24 hours. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The system shall display capacity/demand balancing in different coloured graph formats for sector, fix and airfield. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The ATFM System shall display any sector in the airspace format where the demand is going to exceed capacity. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The alert function shall be in the format of colours, i.e. Amber for 100% capacity and red 110% of capacity. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The alert function shall have the ability to be set for predictive alerts. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The ATFM System shall display the demand/capacity for 10 different sectors/airfields/fixes concurrently on the display system, this will enable the system to monitor high demand areas continuously. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM System shall monitor every sector/ Aerodrome /Waypoint continuously and issue an audible and visual warning when demand exceeds capacity for any sector/ Aerodrome /Waypoint. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The sector/ Aerodrome /Waypoint where demand exceeds capacity shall automatically be displayed, this function must however be able to be switched on or off. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The ATFM System shall show all flight plan information for flights, which are in a sector/ Aerodrome /Waypoint where demand exceeds capacity. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The flight plan information as defined above shall be available by mouse-clicking on the graph where a drop-down menu of all the flights in that sector will appear. Another mouse-click on an individual flight will display all flight plan information for that flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. There shall be a sort function for the flights displayed, i.e. by Aerodrome of departure, destination etc, to categorise the flights as required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. The ATFM System shall have the capability to export any defined list of flights, which are displayed as per previous requirements above, into a comma separated (.csv) format for subsequent printing, email etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The ATFM System shall allow for manual flight plan manipulation to balance demand against capacity for sector/Aerodromes /Waypoints. This manipulation will be for example by changing departure times (Air Traffic Control departure slots) routes etc. This will render a re-computation of CTOTS. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The ATFM System shall automatically balance demand/capacity as required when demand exceeds capacity for any sectors/Aerodromes /Waypoints. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. The ATFM System shall balance demand and capacity by automatically amending departure times (Air Traffic Control departure slots) and/or suggesting alternate routings. The user shall be able to manually take over at any time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. The ATFM System shall have sort functions whereby sorting will be catered for all re-scheduled flights by airline, departure point, destination as required for preparation and dispatch to the relevant airline and airfields. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. All historical data shall be stored for a 5-year period on a RAID-6 SAN-storage system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. The ATFM AFT tools and reports shall at least provide the following features, but it shall not be limited to:

- a) Predict and monitor demand;
- b) Automatically determine demand and capacity discrepancies (imbalances) for airports and for airspace, as well as for modelling and implementation of collaborative ATFM solutions;
- c) Automatically exchange ATFM measure, demand, and capacity information to operationally cross-border ATFM systems;
- d) Simulation and human-in-the-loop exercise capabilities to allow ATFM Controllers to model and assess ATFM operational scenarios and solutions to develop improved operational concepts and procedures to reach the best possible operational outcome during periods of demand/capacity imbalance.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- S. Operational performance reports, in accordance to the specifications defined in paragraph 7.3, to support analysis and alignment with KPIs for post-operational analysis and reviews. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.1 Airspace Capacity

The following functionalities shall be available for airspace capacity monitoring.

- a) Selection of the airspace capacity monitoring functionality from a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Selection of any of the airspace definitions as contained in the airspace/sector and aerodrome database for functional capacity monitoring from a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Selection of a combination of airspace definitions as contained in the airspace/sector and aerodrome database for functional capacity monitoring from a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Switch background airspace monitoring "on" or "off". The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- e) Configure the airspace monitoring parameters in terms of type of alert, defined airspace active and/or future baseline/declared flight counts, monitoring window time, monitoring interval time, audible alarms, display colours. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- f) Display the demand/capacity for a combination of sectors, fixes, routes and aerodromes concurrently on the display system; this will enable the ATFM to visually monitor high demand areas continuously. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g) Continually measure demand against capacity using the data available for any sector in South Africa as designated by the ATFM. This should be expandable to any sector in SADC region. The ATFM System must have forecasting capability of 16 hours. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- h) Continually measure demand against capacity using the data available for any fix, aerodrome and route, in South Africa as designated by the ATFM. This should be expandable to any fix in the SADC region. The ATFM System must be able to predict 16 hours in advance. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i) Display, for any and/or a combination of airspace definitions selected, graphical coloured i.e. amber for 100% capacity and red 110% of capacity and audible alerts if the peak active and future flight counts for any monitoring interval time exceed the baseline/declared active and future flight counts. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) Selection of any of the airspace definitions indicating an alert status and display via pull-up/drop down/pop-up menu the details of the active and future flights within the airspace definition during the monitoring interval time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Export the detail of the displayed data in a comma separated (.csv) format for printing, email etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.2 Analysis

- a) The ATFM System shall Analyse Historical Data (Collect Historical Data, Compute Historical Ground Times, Determine Historical Routes). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM System shall perform the following functions in terms of scenario planning and post event analysis:
- Store all historical data of TSA and radar data to carry out post event analysis.

- Provide an interactive playback function.
- Shall use historical data to model future events.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall allow for the retrieval of operational data for post operational analysis and performance measurement. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.3 Airspace Demand

The ATFM System shall cater for the following functionalities for airspace demand analysis:

- a) Select the airspace demand analysis functionality from a pull-up/drop down/pop-up menu.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Select any of the airspace definitions as contained in the airspace/sector and aerodrome database for airspace demand analysis from a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Select a combination of airspace definitions as contained in the airspace/sector and aerodrome database for airspace demand analysis from a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- d) Select any airspace volume within a randomly set of selection points on an airspace boundary map for airspace demand analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) Configure and/or confirm the configuration parameters of the selected airspace for demand analysis in terms of vertical, lateral, temporal, applicable altitude, applicable flight level, analysis window start and stop times via configuration pull-up/drop down/pop-up menus. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Rename the selected airspace for demand analysis and save temporarily in the airspace and sector information database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Switch background demand analysis "on" or "off". The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Display all active and future flights that have trajectories intersecting the vertical and lateral limits of the airspace selected for demand analysis within the analysis window start and stop times. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) Display all active and future flights that have departure and/or arrival times within the demand analysis window start and stop times and flight trajectories traversing the vertical and lateral boundary limits of the airspace selected for demand analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) Display the flight detail and flight plan data of all active or future flights either intersecting or traversing any particular airspace selected for demand analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Display in user selectable time intervals between the analysis windows start and stop times a graphical representation of all the active and future flights intersecting a particular airspace volume selected for demand analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Display in user selectable time intervals between the analysis windows start and stop times a graphical representation of all the active and future flights entering and or traversing a particular airspace volume selected for demand analysis. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) Configure the graphical display from a pull-up/drop-down/pop-up menu for displaying the demand analysis data 2-D or 3-D stacked or side by side graphical format. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) The ATFM System shall continually measure demand against capacity using the data available for any fix, aerodrome and route. in South Africa. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The above capability shall be expandable to any fix in the SADC region. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) The ATFM System must be able to predict the measured demand against capacity as defined above for 24 hours in advance. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q) Generate reports in accordance to the specifications defined in paragraph 7.3. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.4 Traffic Management Initiatives (TMI) Function

The ATFM Systems shall allow for the following program tools:

- Airspace flow programs (AFP)
- Ground delay programs (GDP)
- Ground stops (GS) program
- Level Capping
- Re-routing
- Miles in trail
- Minutes in trail
- Calculated time over
- FCA, TDA, SAP, TSA, FUA.

a) The user shall be able to model ground delays and departure times to optimise capacity demands through ATFM measures as listed below (not limited to):

- GDP for airport departures
- GDP for airport arrivals
- GDP per runway for airport departures
- GDP per runway for airport arrivals
- Ground stops for airport arrivals and departures
- AFP for airspace
- Ground stops for airspace
- Level Capping for en-route
- Re-routing for en-route
- Miles in trail for en-route
- Minutes in trail for en-route and departures
- Calculated time over for waypoints and en-route
- FCA, TDA, SAP, TSA, FUA for en-route

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b) The ATFM System shall allow for a graphical comparison of the forecasted demand impact of a modelled program to the current forecasted demand. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- c) The ATFM System shall, for flights exempted or included from a modelled departure times program, include at least time of operation, distance from GDP, and departure airports, and the user shall be able to pull a list of the exempt flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- d) The ATFM System shall cater for the purging of any existing modelled program. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- e) The ATFM System shall cater for ground stop modelling concerning restricted areas. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- f) The ATFM System shall for new flights (not present at the time of the program modelling) assign a CTOT slot to the next available slot. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g) The ATFM System shall cater for airspace demand modelling concerning restricted areas. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- h) The ATFM System shall for new flights (not present at the time of the program modelling) assign a CTO. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The ATFM System shall cater for subscribed clients to be supplied with program modelling parameters and flight-specific control times. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The ATFM System shall cater for users to revise modelled or active programs and shall be able to provide the new program modelling parameters to subscribed clients. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) The ATFM System shall notify relevant Stakeholders automatically when a TMI revision is implemented. The notification shall be distributed via email to users with pre-defined privileges and also presented on the web for those users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) The ATFM System shall cater for the export of the notification to a file in comma separated (.csv) format for the purpose of manual notifying relevant Stakeholders. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

6.8.5 GDG and AFT Communication

- a) The ATFM Main System shall be able to receive FPL messages in both ICAO, ADEXP and IATA formats. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM Main System shall convert the IATA FPL data formats to ICAO format. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) FPL data sent from and to the AFT shall always be in the ICAO format. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM Main System shall create an Aggregate Demand List (ADL) file at 3-minute intervals (offline configurable). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The ADL shall contain data of 1-hour in the past and 96-hours in advance from the present time filtering on the following time related fields:
- ETA for an ARR list
 - ETD for DEP list
 - ENTRY for an FCA list.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The GDG and/or AFT shall sent filtered ADL data relevant to a subscribed user. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The AFT shall process the updates and changes from all registered users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The GDG shall interface with the following external data sources:

- GDG Master to GDG slave
- FDP Master
- AFT
- Web application – ATFM Main System and all subscribed Stakeholders
- SCORE
- OAG
- ACDM
- Long range (Haul) Flights ATFM
- Multi-nodal Cross-border ATFM Systems

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.6 Strategic and Tactical Functions

- a) The ATFM Systems shall perform modelling, initiations, monitoring and revisions of automated ATFM Measures for selected resources concerning demand and capacity

balancing strategically, pre-tactically and tactically. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM System shall provide strategic, pre-tactical and tactical demand forecast and monitoring for both airport and airspace situational timeframe capacities. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.6.1 Pre-Tactical

The ATFM Systems shall for pre-tactical demand:

- a. Provide demand forecast and monitoring up to 7-days ahead of time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. Present airport slot allocation data (SCORE), OAG or similar data, and/or airline schedule data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. Present demand for airports and airspace. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. Present, model and propose ATFM Measures for all TMI's. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. Be able to generate FCAs to establish the impact of FUAs on operations. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. Present Stakeholder information sharing. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g. Exempt certain special and long-haul flights from the GDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h. Present how CDM operations and airspace users perform CDM functional aspects. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.6.2 Tactical

- a. Tactical processing shall focus mainly on demand management to adjust imbalances for demand and capacity balancing purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM System shall consider weather conditions, infrastructure status, resource allocations, and disruptions in schedules impacting on schedule imbalances in the processing for tactical demand and capacity balancing. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. Tactical processing shall involve user adjustments of airspace management to balance capacity dynamically concerning changes to entry/exit times for aerodromes and airspace volumes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. Tactical arrival messages shall be received from the TopSky-ATC ATM system (e.g. MAESTRO component) and the position and time information shall be extracted to update the ATFM parameters. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. Tactical departure and arrival slots will be calculated for each day dependent on the airspace situation and capacity on that and the immediate future as projected. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. The tactical component of the ATFM System shall be able to calculate and allocate tactical departure and arrival slots for all offline pre-defined co-ordinated airports and shall consider all future predicted aircraft trajectories entering and/or crossing the South African airspace and/or airspace constraint(s) that may exist at the time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g. Tactical slot allocations shall at all times be based on minimising the overall delay per flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h. The calculation of tactical slots shall be based on reducing the average delay each aircraft is held on the ground before it is allowed to take-off. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i. Correlated scheduled initial off-block times (IOBT) and scheduled initial in-block times (IIBT) shall be used as an initial value for calculating tactical departure and arrival slots. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j. Tactical slot modelling and calculation shall be based on, but not be limited to, the following variables and calculation methodology:
- i. A set of airspace volumes (aerodromes), each with a start time and end time during which period the particular airspace is active.
 - ii. A set of flights for which tactical slots shall be calculated.
 - iii. The time, calculated from its projected trajectory, when each flight will enter a particular airspace (calculated flight time).

- iv. The declared capacity of the particular airspace (flights per hour).
- v. A time base or interval for the capacity constraint (minutes).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k. Flights or entry time slots shall be sorted on the basis weight turbulence and aircraft type to minimizing the average delay for each flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l. The aerodrome airspace constraints computations applicable to calculation of tactical departure and arrival slots, in particular for the offline pre-defined co-ordinated airports shall also include aerodrome, airspace sector and waypoint load/capacity constraints. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m. The output of the tactical departure and arrival slot allocation computation shall be based on a list in tabular format that will be issued to air traffic control centres as part of the Daily Airspace Plan (DAP). These lists shall show the calculated time over (CTO), calculated time of take-off (CTOT) and calculated time of arrival (CTOA) within the departure and arrival slot windows for each aircraft departing from or arriving at a particular aerodrome. An example of such a tabular list format is shown in Table 3. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

Table 3: Tabular Example of a Tactical Departure Slot Allocation List

	Flight	NR	EOBT	ACFT	ctot+5		Flight	NR	EOBT	ACFT	ctot+5
06:00 ---	CAW	0403	06:00	732	06:20	07:30 ---	SAA	0182	07:30	738	07:50
	SAA	0313	06:00	738	06:20		EXY	1103	07:30	DH8	07:50
	SAA	0535	06:00	738	06:20		LNK	8052	07:35	J41	07:55
06:09 ---	EXY	1003	06:00	DH8	06:20	07:39 ---	SAA	0190	07:35	738	07:55
06:10 ---	DEN	0008	06:10	ZZZ	06:30	07:40 ---	CAW	6411	07:40	732	08:00
	ZSOHR		06:10	ZZZ	06:30		NTW	0410	07:40	732	08:00
	EXY	1801	06:15	DH8	06:35		SAA	0054	07:40	744	08:03
06:19 ---						07:49 ---	MNK	8956	07:45	ERJ	08:05
06:20 ---	MDG	0125	06:20	733	06:40	07:50 ---	RNX	0401	07:50	DC9	08:10
	ITK	0401	06:25	J31	06:45		SAA	0188	07:50	738	08:10
							MNK	8982	07:55	ERJ	08:15
06:29 ---						07:59 ---	EXY	1603	07:55	DH8	08:15

- n. SAM messages shall be used to inform the relevant Stakeholders of the CTOT/CTOA as computed for tactical slots allocated. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o. Revised tactical departure and arrival slot lists shall be calculated as per the standard tactical slot modelling functionality except for the additional average ground delay introduced per flight included in the GDP. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.7 Collaborative Decision Making (CDM)

- a) The ATFM System shall incorporate a database for all typical flight parameters and dynamically update the information from the various sources. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) ATFM CTOT/ATOT (departure/arrival) and CTO data relevant to the subscribed users shall be made available via Web application, email etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) New and revised slot allocations (specific to a particular registered Stakeholder and according to their allocated user roles) shall automatically be made available to the associated airline or CDM/A-CDM users via emails and the Web application in the event that any CTOT/ATOT and associated CTO changes throughout the day, or whenever a GDP, AFP, or GS is revised or implemented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM System shall accept from all subscribed users the following messages:

- Request for improvement (RFI),
- Slot improvement proposal acceptance (SPA),
- Slot improvement proposal rejection (SRJ),
- Slot missed message (SMM).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The ATFM System shall have the capability to dispatch via e-mail FUA areas to the relevant CDM partners to enter into negotiation for FUA and for FUA notification. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.8 Web application (Web-app) Function

- a) The ATFM Web application shall be a web-based application that allows for the monitoring of active traffic management initiatives (TMI's). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM Web application shall generate reports in accordance to the specifications defined in paragraph 7.3 and these reports shall be updated with the most current information after an Aggregate Demand List (ADL) update every three minutes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The information provided in these reports shall assist to identify problems as they occur to allow users to correct problems that impact TMI performance and shall also serve to view and obtain historical flight data such as for example slot compliance, slot allocations, individual and aerodrome flight detail, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The following three main components, as a minimum, shall be made available on the Web application for ATFM CWSs and the MCS:
- Administration section – User management and user roles and associated items for each such as usernames and passwords, airline designators, etc.
 - Reports section – all reports and flight lookup capability.
 - Flight Data Management/Modification section – Flight data fields and allowed slot and other flight data substitutions/alterations.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The ATFM Main System shall provide a web-app to subscribed users (Stakeholders) and shall allow for access to flight data. Flight data parameters shall include, but not be limited to:

- CALLSIGN
- A/C Registration
- Departure airport
- Arrival airport
- EOBT
- ETOT
- ELDT
- EIBT
- COBT
- CTOT
- COFT
- CLDT
- Arrival Fix
- Departure Fix
- Subscribed airline operators shall be able to manage own flights by:
 - CALLSIGN
 - A/C Registration
 - Aircraft type
 - Scheduled/estimated times
 - Flight pre-departure delays
 - Flight airborne delays for departed flights

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Subscribed airline operators shall be able to swap their own flights and shall be able to allocate unassigned slots to own flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) CTOT and ATOT slots shall be frozen to airlines for own flight substitution (but shall not be frozen for ATNS ATFM Controllers) through an offline configured time parameter (between -30 minutes before and +30 minutes after assigned CTOT slot) implemented before and after the current assigned CTOT slot time. The offline configurable time shall allow for different freeze-times for before CTOT slot time and for after CTOT slot time. General Controllers shall be able to delete the frozen slots at any time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Airborne flights that missed their slots shall be flagged as such and presented on the web application for General Controllers as well as to any selectable Stakeholder if permission was granted by General Controllers through an available radio button for this purpose residing on the General Controller web application. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The ATFM Main System shall provide an interface to subscribed users for data exchanges with external ATFM/CDM systems, ACDM systems, Airlines and airport. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) Web application users FSM interface references shall be changed to AFT. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Time references shall be displayed in GMT/UTC (Zulu) time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Date formats shall be displayed in four-digit year, three-letter abbreviation of the month, two-digit day (example: 2003JUL04) – YYYY/MMM/DD. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) The Web applications landing page shall be hosted on the ATNS domain and shall be encrypted through a certificate SSL to create a secure connection between the ATFM web server and the web browsers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) The Web application shall be customisable by ATNS Web administrators to accommodate ATNS branding. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The Web application shall further be security protected by passwords and usernames as specified under section 7.2.3 and 7.2.4. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) The Web application shall cater for user privileges levels as described in section 7.2.5. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.9 AFT Web Application

- a) The AFT Web application shall allow users to change slots on flight lists by means of a drag and drop action. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The AFT Web application shall cater for the slots view to include selective filtering to show only the slots for a selected Stakeholder or airline, as well as the open slots for ARR and DEP flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The AFT Web application shall have a filtering mechanism to filter messages according to personalised profiles in order to reducing clutter on the user interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The AFT Web application shall have an integrated search bar keyboard shortcut. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The AFT Web application shall allow the user to move or suspend multiple slots at a time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The system shall be able to model “what if” scenarios when implementing TMIs and propose the best solutions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The AFT Web application shall cater for a popup window or an ALERT message showing that a flow control is in place. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.10 Web Application (Web-App) Interface

- a) At any time, only the master web application server shall interface (connect) with the ISP link via a firewall and router. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The latest security features shall be implemented that is available at the time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) In the event of a failure of the master web application server the new master web application server shall connect to the ISP interface automatically. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The web application shall be able to be properly presented and utilised on any of the major web browsers including Microsoft® Edge, Microsoft® IE-Explorer, Firefox and Chrome and shall also be able to run on all latest versions of these. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The Web application shall cater for tactical, pre-tactical and strategic plans/predictions to be viewable via menu/option selection on the web interface. These plans shall be predefined and managed by the ATFM Controllers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Operational Administrator Users shall be able to grant report access, etc., to specific clients, and more such as specific flight data additional columns to be added to web pages specific for operator and client use (per user according to privileges assigned per user). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Daily Airspace Plan (DAP), Demand Forecast and Telcon minutes shall be made available on the web interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- h) Display slot allocations and accept slot reallocation requests per airline operator. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- i) Display a list of flights impacted by a TMI and their estimated departure times. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- j) Periodically update to reflect new or modified information. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- k) Employ latest technologies, firewall protection and shall use latest tools to manage user authentication and security profiles. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- l) The web interface shall not allow subscribed users to manipulated ATOT's and CTOT's within an offline defined time of up to 30 minutes before and after slot time, by freezing the slots, to prevent undesirable slot exploitations. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- m) The ATFM Controllers shall be able to manipulate frozen slots at any time, including deletion of the CTOT/ATOT. Upon deletion of the slot it shall be released for re-use if so required. The Bidder shall provide full details to support compliance to the requirement.

(D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) The Daily Airspace Plan (DAP), Demand Forecast and Telcon minutes shall be made available on the web interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The website shall be upgradable when industry requires security and other changes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) The ATFM System shall permit external clients' bi-directional access to the ATFM via:
- Internet enabled COTS email applications.
 - Internet enabled COTS web browsers. This shall apply to all major web browsers including Edge, IE, Firefox, Chrome, etc.
 - WAN TCP/IP enabled vendor-supplied client application Enhanced Substitution Module (ESM).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q) The Web application web page shall also be able, but not limited, to:

- Display a slot list view of open slots for controlled elements.
- Display the slot type
- Allow for single slot management
- Allow for suspension/unsuspension of flights
- Allow to swap flights
- Allow to swap slots
- Allow for certain flight data fields to be modified/alterd
- Cater for different views for each specific user privilege
- Cater for different views for each specific user role type
- Communicate with the GDG
- Communicate with the AFT
- Periodically automatically refresh the flight data, assigned slots and reports
- Allow for an immediate manual refresh of the flight data, assigned slots and reports.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

r) The Web application shall allow for the following on the Web page:

- Flight history page
- Lookup flights page
- Departure Clearance page shall allow for:
- The user to select or enter an aerodrome.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

s) The Web application shall incorporate a help page on the web page. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11 Airspace Management Tool (AMT)

- a) The AMT shall integrate and display flight progress information from multiple sources to extrapolate aircraft position, model flight trajectories and manage messages for demand and capacity monitoring, prediction and situational awareness such as entry or overflight time estimates at waypoints, at airspace sectors, at FIRs, at airspace areas with weather, at flight constraint areas, at temporary dangerous airspace areas, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The main features of the AMT shall include, but not be limited to:
- Display of the current air situation in terms of real-time Flight tracks, Graphical Routes, Maps, Flight-lists, Weather Data, GRIB and other Meteorological data, FCA, TDA and TSA areas.
 - Provide an Airspace Traffic Flow Program to allow airspace ground stops and Calculated Time Over (CTO) values to meet a specific flow rate for example.
 - Display of the future air situation (Strategic Mode).
 - Capable of analysing and predict expected in-flight holding based on capacity and demand for certain airspaces, arrival flights and even departure flights.
 - Display of sector/position/TSA traffic load
 - Quick Sorting/Filtering capabilities
 - Predict the entry time or crossing time for flights associated with monitored airspaces.
 - Update flight routes and associated transfer time estimates on receipt of validated aircraft in flight position updates.
 - Monitor demand that originates or terminates within the ANSP airspace / Flight Information Region (FIR)
 - Monitor demand that overflies the ANSP airspace / FIR in the short-term
 - Calculate the demand utilising methods to analyse historical flight and weather data to constantly determine the probability of a specific flight to overfly the ANSP airspace / Flight Information Region (FIR).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Airspaces shall be structured by means of offline defined:

- Polygons with altitude layers.
- Volumes (3D)
- Functional sectors for volumes.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.1 Re-routing and Alternative Routing

- a. The ATFM System shall provide the capability for modelling, creation and distribution of re-routing proposals. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. Should there be an anticipated incursion into the planned TSA the ATFM Main System shall offer alternative routings (Flex Track) around the TSA for the affected flight or flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The ATFM System shall show multiple re-routes for multiple FPL's at the same time.
- d. Re-route options shall consider CCOs and CDOs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. Once the re-route has been computed, the ATFM System shall show the effect, (balance demand against capacity) on relevant sectors. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- f. Should the effect be undesirable, the process shall be repeated until an optimal routing is found. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g. The ATFM System shall indicate the optimal route considering:

- Time;
- Distance;
- Cost; and
- airspace capacity

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- h. The ATFM System shall route traffic automatically around the TSA to create an optimal route. This function shall be applied through vectoring to various points (e.g. mouse clicking while vectoring) to establish the new route. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i. The ATFM System shall generate waypoints after generating an optimal route whether the optimal route is produced automatically or manually. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

6.8.11.2 Flexible routing data

a. For flexible routing the following functionalities shall be accommodated:

- Select the flexible routing functionality from a pull-up/drop down/pop-up menu.
- Select any active or future flight from the current displayed airspace boundary map for flexible rerouting.
- Select any active or future flight from a pull-up/drop down/pop-up list for flexible rerouting.
- Select any single or multiple active or future flights that have their current and predicted flight paths passing between two selected points on the airspace boundary map for flexible rerouting.
- Select any single or multiple active or future flights that have their current and predicted flight paths passing through a selected volume of airspace on the airspace boundary map for flexible rerouting.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b. The ATFM System will be able to continually advise the operator of any aircraft which may incur into any active or to be active TSA after any changes are made to aircraft trajectories. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

c. In addition to computing the optimal trajectory around a TSA, the ATFM System will also have the ability to calculate the optimal trajectory considering upper winds. The ATFM System will have the ability to compare distance, time, and cost between the flight planned trajectories to the proposed trajectory. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. Select any single or multiple active or future flights from the flight plan information database for flexible rerouting. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. Edit the route of the selected active or future flight by changing the specified route parameters in the flight plan (FPL) to other known navigational aids or significant waypoints or flight levels. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. Edit the route of the selected active or future flight by selecting new routing points on the current airspace boundary map displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g. Edit the routes of the selected multiple active or future flights by changing the specified route parameters in the different flight plans to other known navigational aids or significant waypoints or flight levels. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h. Edit the routes of the selected multiple active or future flights by selecting new routing points for each flight on the current airspace boundary map displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i. Select a specific route for rerouting of the selected active or future flight by choosing a new route from the route information database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- j. Update and display the flight path or route of any selected active or future flight with the reroute information as edited. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- k. Update and display the flight paths or routes of the multiple selected active or future flights with the reroute information as edited. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- l. For any reroute displayed, switch "off" or "on" the graphical representations of the navigational aids, significant waypoints, fixes, radials and co-ordinates or other geographical identification points of the new route. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- m. For any displayed active and/or future rerouted flight path, display the corresponding flight distance, flight time, delay time changes in comparison with the original flight path distance, time and delay parameters in a pull-up/drop down/pop-up window. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n. Any displayed active or future rerouted flights that are selected "acceptable" shall be written and stored in a reroute flight list for further processing such as updating of flight plans and allocation of new CTOT slots. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.3 Airspace and geographical data

- a. The processing and display of the geographical and geospatial characteristics of the airspace boundary map shall be applicable to all types of air traffic flow management data processing and display with at least the following functionality: (D)
- The different airspace boundary maps in terms of FIRs, Sectors, TMAs, CTRs, CTAs and ATZs at different selectable altitudes or flight levels shall be displayed through individual selection and shall allow for all to be displayed at the same time.
 - It shall also be possible for Controllers to specify the geographical co-ordinates of an airspace boundary map to be displayed.
 - It shall be possible to select and display navigational aids and significant points within the airspace boundary map selected.
 - It shall be possible to select and display the ATS and RNAV routes and airways within the airspace boundary map selected.
 - It shall be possible to select and display the SIDs, STARs and instrument landing configurations for the selected airspace boundary map where applicable.
 - It shall be possible to select and display any prohibited, restrictive and danger areas within the airspace boundary map.
 - It shall be possible to select and display the relative configuration parameters or list of parameters for the selected airspace boundary map, navigational aids, significant waypoints, routes, airways prohibited, restrictive and danger areas through a pull-up/drop down/pop-up menu.
 - It shall be possible to switch "off" and/or "on" (activate or deactivate) any of the selected airspace boundaries map, navigational aids, significant waypoints, routes, airways and prohibited, restrictive and danger areas displayed.
 - It shall be possible to select any point within the selected airspace boundary map and display the geographical reference position of the selected point.

- It shall be possible to select any two points within the selected airspace boundary map and display the distance and bearing between the selected points.
- It shall be possible to switch "off" or "on" the map scale of the selected airspace boundary map.
- It shall be possible to display any area within the airspace boundary map by selecting a set of random points.
- It shall be possible to display any area within the airspace boundary map by selecting a set of random geographical reference points (Coordinates)
- It shall be possible to select via pull-up/drop-down/pop-up menu the active border, line, and icon or object to modify or change its colour display settings.
- It shall be possible to display the weather radar intensity and convective precipitation for the selected airspace boundary map.
- It shall be possible to reposition any displayed window at any position within the displayed airspace boundary map.
- It shall be possible to print any airspace boundary map and selected detail as displayed through a screenshot capability.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.4 Types of Meteorological data

a. Types of Meteorological data to be processed and/or received shall include, but not be limited to:

- GRIB2 data (GRIdded Binary or General Regularly-distributed Information in Binary form) Coded according to the International Alphabet Number 5 – for historical and forecast weather data.
- Thunderstorm Identification, Tracking, Analysis and Nowcasting data from the S.A. Weather Services (SAWS) TITAN servers
- METAR/SPECI data hourly surface weather observations data for TAF forecasts.
- AIREPS/ACARS/AMDAR/AIRINC data for in-flight weather conditions reports.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.5 GRIB2 Data

- a. The ATFM System shall provide for an easy and User-Friendly (refer to definition) means to re-inject and re-process the latest GRIB2 data as received prior to any system parameter or software upgrade performed to the ATFM System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM System shall store the GRIB2 data for re-use. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The ATFM System shall replace the stored GRIB2 data only when the next GRIB2 message package is received. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The ATFM System shall use GRIB2 data in all relevant computations for example; the re-routing and elapsed flight time calculations for ATOTs, Waypoints and feeder fixes, FCAs, TDAs, Weather avoidance, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.6 Thunderstorm Identification, Tracking, Analysis and Nowcasting (TITAN) Meteorological Data

- a. TITAN meteorological data shall be used and processed to identify, track, analyse and nowcasting (2-hours short range) of thunderstorms for the purpose of alerting, displaying and proposing the re-routing of aircraft, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The TITAN meteorological information shall include, but not be limited to:
- Convective weather forecast radar and precipitation data, which shall be used to overlay coloured patterned weather information on the airspace situation display.
 - Mosaic weather data in a file type QLAY MDV Image (.mdv), that shall be used for processing and display. The format of mosaic weather data shall be of file type QLAY MDV Image (.mdv) for processing and display;
 - Thunderstorms data (.tstorms) that shall be used for processing and display;
 - Converted format into Extensible Mark-up Language (.xml) data or similar for display purposes shall be applied.
 - Convective weather risk detection data, which shall be used to highlight and display areas of thunderstorms and other adverse weather conditions that pose a flight risk.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The meteorological information received shall be converted into the Extensible Markup Language (.xml) or similar data format for display purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The ATFM Systems shall process the convective weather risk detection data to generate the display data by performing automated Quality Controls to the WSR-88D national mosaic of Vertically Integrated Liquid (VIL) density reflective data, removing areas of the light precipitation and filtering out areas of strati-form (Horizontal cloud formation) precipitation from the significant weather data package. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- e. The ATFM System shall generate forecasts of 30, 60, 90 and 120-minutes probabilities using the convective weather risk detection data and observed tracks and trends. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. The forecast shall highlight and display the probability or possibility that a thunderstorms or other adverse weather condition could pose a safety flight risk for a particular airspace area at a given time together with a pop-up alert to warn the operator of the development of probable adverse weather conditions in the short term, medium term and long term (30, 60, 90, 120 minutes look-ahead warnings). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g. An interactive HTML map of South Africa and the different provinces shall be displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.8.11.7 Additional AMT Requirements

- a. The ATFM System shall allow for the display of all aircraft symbols for active flights at all flight levels within the limits specified by the selected airspace boundary map through a pull-up/drop-down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The ATFM System shall allow for the display of all aircraft symbols for future flights at all flight levels within the limits specified by the selected airspace boundary map through a pull-up/drop down/pop-up menu. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The ATFM Systems shall allow for the selection of a particular flight level to display all active and future flights at that flight level. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The ATFM System shall allow for the switching off/on (activate/deactivate) of any of the active or future flights displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e. The ATFM shall allow the selection of, and modifying of, the future flight prediction window start and stop times. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f. The ATFM System shall allow for the switching off/on (activate/deactivate) of the current flight plan route for any of the active or future flights displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g. The ATFM System shall allow for the display of the detailed flight plan data (FPL) for any individually selected active or future flight. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h. The ATFM System shall allow for the switching off/on (activate/deactivate) of the display of the actual tracks to show the difference between the actual flight paths and the predicted flight paths, for active flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i. The ATFM System shall allow for the display of the predicted position of any selected active or future flight along the flight plan route as given in the FPL at user selectable time intervals within the future prediction window. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j. The ATFM System shall allow for displaying the predicted "time over" at a user selectable in-flight position or fix along the flight plan route of any selected active or future flight as given in the associated FPL. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k. The ATFM System shall allow the display of "conflict resolution resolved data" and display all the aircraft details for aircraft that conflict along the flight path that was

identified/selected and automatically resolved. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l. The ATFM System shall allow accessing the "conflict resolution pending data" and display all the aircraft detail for aircraft that conflict along the flight path has been identified and not automatically solved. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m. The ATFM System shall allow for the processing of new FPL's received for all conflict resolved flights. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n. The ATFM System shall process all non-resolved conflict flights via manual flex re-routing of the aircraft. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o. The ATFM System shall allow for the declared capacity of any sector, fix, aerodrome and route to be manually set or changed online by the ATFM Controllers as required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p. The ATFM System shall continually measure demand against capacity using the data available for any sector in South Africa. This shall be expandable to any sector in the Regional and Long-Range ATFM Stakeholder countries. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q. The ATFM System shall be able to display any sector in the airspace format where the demand is going to exceed capacity. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- r. The alert function shall cater for audible and visual alerts in colours. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- s. The ATFM System shall display the demand/capacity for a combination of sectors, fixes, routes and aerodromes concurrently on the CWS screen to enable ATFM users to visually monitor high demand areas continuously. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- t. The ATFM System shall monitor every sector, fix, route and aerodrome continuously and issue an audio and visual warning when demand exceeds capacity for any sector, fix, route and aerodrome. The sector/ /fix/route/aerodrome where demand exceeds capacity shall automatically be displayed; this function shall also be selectable (audio alert enabled/disabled). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- u. The ATFM System shall allow for a full sort function for these flights displayed, i.e. by aerodrome or departure, destination etc. so as to categorise the flights as required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- v. The ATFM System shall have the capability to print or save to a csv/xlsx file any defined list of flights, which are displayed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- w. The ATFM System shall have a sort function whereby it shall sort all re-scheduled flights by AIROPS, departure point, destination or as required by the ATFM users for preparation and dispatch to the relevant AIROPS and ADOPS and ATMSD. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- x. The ATFM System shall provide the capability to perform a snapshot (data dump) of available data for a flight. Information in this dump will include schedule information and route record for each plan. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.9 Electronic Mail (Email)

- A. The ATFM Main and DR Systems shall make provision for the sending and receiving of email messaging, with any type of attachments and shall cater for the sending to and receiving from any email address world-wide. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. Email APIs shall be in a redundant configuration residing on dual email servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The latest security measures and virus protections shall be implemented on the email servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. An email client shall reside on every CWS as well as on the technical MCS position. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. Email clients on the CWSs shall automatically switch the associated email interface to the ISP link to re-establish connection whenever a switchover of the email servers or failure of one API occurred and without any manual re-configurations. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The ATFM Main and DR Systems shall allow for proposed re-routes through “What-if” modelling to be manually emailed to any online user specified email address via the ISP internet link. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM Main and DR Systems shall allow for proposed re-routes through “What-if” modelling to be emailed to CDM, ACDM, Remote Workstations, Regional and Long-Range subscribed users via AMHS addressing as offline defined in the Static database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The ATFM Main and DR Systems shall allow for user defined system email addresses for a minimum of 10 different addresses, all with authentications, permissions and settings that shall be configurable by the TSAU. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The ATFM System shall incorporate quick-selection template proposals that shall be made available at CWS positions to be emailed to relevant Stakeholders for the purpose of CDM, ACDM, Regional and LR ATFM operational information sharing and shall allow for any combination or individually selectable flight information as listed below, but not limited to:

- FLS
- DES
- SAM
- SRM
- SLC
- CHG/ICHG
- DLA/IDLA
- FREE
- SAP modelled proposal for delays, vertical and horizontal deviations

- Re-route proposals
- FPCF modelled proposal for delays, vertical and horizontal deviations
- FCA creation, rate definition, deletion
- TSA definition
- STORM TSA definition, characteristics, forecast
- Sectorisation proposal
- Position load
- Sector load
- Volume load
- Runway proposal
- FLEXTRACK
- Holding proposal
- GDP, GS, AFP implementations
- Airline average delay
- NOTAM
- BIRDTAM
- SNOWTAM
- ASHTAM
- METAR
- SPECI
- TAF
- SIGMET
- ARFOR

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

6.10 NTP synchronization requirement

NTP Time Management Handling (TMH) allows for every computer and relevant equipment on a LAN WAN, and/or MAN, to have their local clocks synchronised to the same date and time source. Reference to Figure 14 as an example of the NTP time management intend.

- A. The ATFM Main and DR Systems' date and time shall be synchronized to a Dual GPS NTP Time Server setup together with a dual TMH server setup in a main (preferred server) and standby (alternative server) configuration according to a priority setup scheme (preferred and alternative). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The dual configuration shall adopt the setup of 2x NTP servers to which 2x TMH servers are separately synchronized and the rest of the system equipment shall then sync to the TMH servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. All virtualized and all remote equipment (including remote workstations) shall sync to the ATFM Main System's TMH servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. For remote equipment the time synchronization shall be to two other ATFM System servers, now called the Remote-TMH (RTMH) servers, which are already synchronized to the TMH servers. The RTMH servers will then become the TMH servers for the remote equipment. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. If for any reason both or one of the NTP, TMH and RTMH server's date and/or time becomes corrupt or outdated or jumps into the future, it shall not cause the rest of the system to inherit the wrong date and/or time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The ATFM System shall reject any wrong date and/or time and shall continue from the last “good” date and/or time on the local clocks of the TMH servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. When one NTP server fails, the date/time switchover to the other NTP server shall be automatic, seamless and effective. No manual intervention shall be required. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The System Time shall be in UTC time (Zulu). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The Timestamps of all ATFM System log and trace files shall be according to an International Standard format and shall be in the 24h format as follows:
- YYYY-MM-DD HH:MM:SS:XXX, where XXX is milliseconds and shall be applied where applicable such as for logging and tracing of system threads, CDC communication, other system events, etc.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

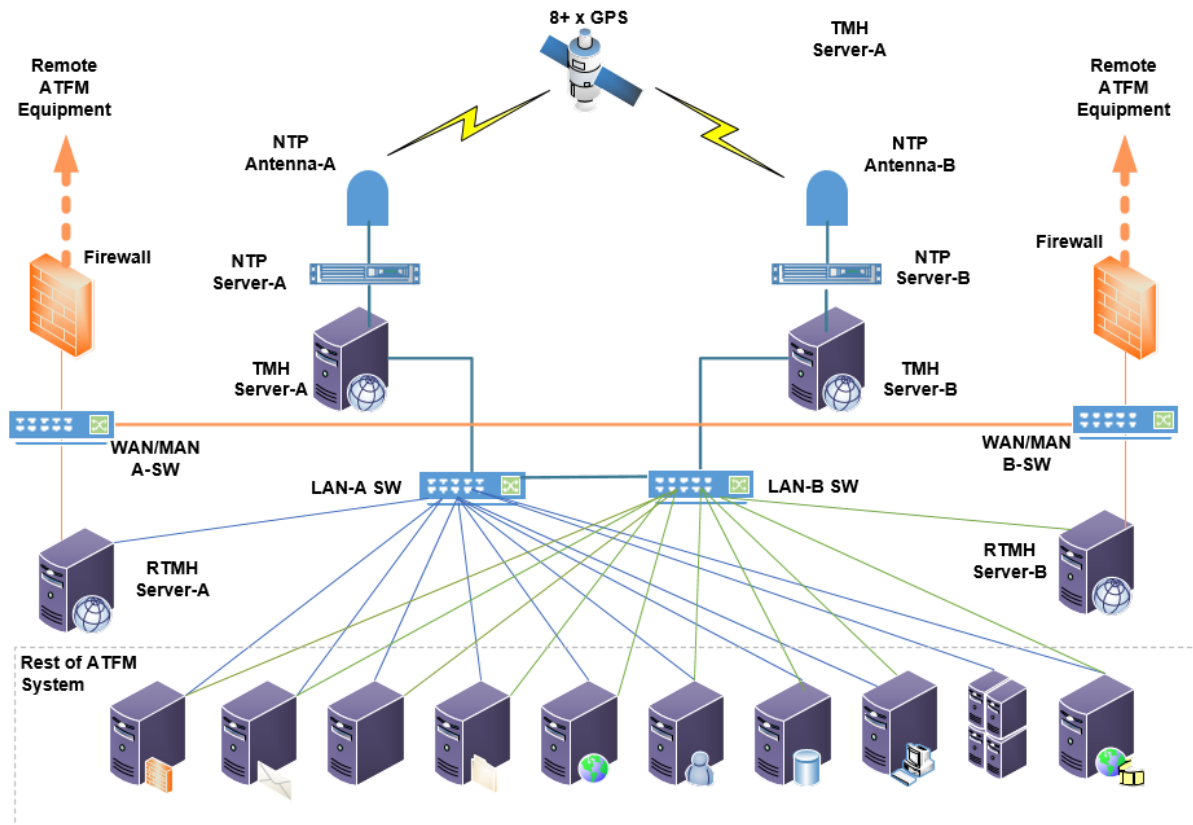


Figure 14: NTP Time Management Network Example

6.11 NOTAM Function

- A. The ATFM System shall allow for the generation of proposals for publication of NOTAM where airspace reservations or airspace structure allocation requires a NOTAM publication. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- B. The ATFM System shall allow for the display of airspace related NOTAM and/or digital NOTAM on the Web application. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

7 GENERAL REQUIREMENTS

7.1 IT Requirements

- A. The ATFM System design shall incorporate the principle of least functionality by identifying any unused/ unnecessary operating system and OS functionality, including protocols, ports, and services that could potentially be disabled or uninstalled in order to meet the ATNS Cyber Security Policy requirements. The disabling or uninstallation shall only be done in consultation with ATNS. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The following principles shall be incorporated on the ATFM System:

- a) The ATFM System shall utilise Secure Services and ports, including, DNS over port 53. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM System shall implement Secure Network protocols; including, NetBIOS, IPv6 and network interfaces; including, Bluetooth, IEEE 802.11, and infrared. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall implement secure methods of remote access via SSL, SFTP, SCP, VPN, SSH, and IPSEC. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM System shall implement access control to control permissions to files, directories, registry keys, and restricting user activities such as modifying system logs or

installing applications. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The ATFM System shall implement Secure Management of identifiers/accounts; including, changing default account names, determining length of time until inactive accounts are disabled, using unique usernames, establishing user groups. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The ATFM System shall implement Secure Authentication controls: including, password length, use of special characters, minimum password age, multifactor authentication/use of tokens. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The ATFM System shall implement Secure Audit settings; including, capturing key events such as failures, logons, permission changes, unsuccessful file access, creation of users and objects, deletion and modification of system files, registry key and kernel changes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The ATFM System shall implement Secure System settings; including, session timeouts, number of remote connections, session lock. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i) The ATFM System shall use Cryptography - use only FIPS 140-3 validated cryptographic protocols and algorithms to protect data in transit and in storage. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- j) The ATFM System shall allow for vendor-released patches in response to identified vulnerabilities, including, software updates to be installed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- k) The ATFM System shall use approved, signed software, if supported. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- l) The ATFM System shall implement safeguards through software to protect end-user machines against attack, including, antivirus, antispyware, anti-adware, personal firewalls, host-based intrusion detection systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- m) The ATFM System shall apply network protections, including, TLS, IPSEC. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- n) The network installation security requirements; for example, within a DMZ, on a specific subnet, as required, shall be defined for the ATFM System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The technical specification and design documentation, system security documentation, system procedures, etc. shall be maintained and updated throughout the life of the ATFM System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) Data loss prevention requirements shall be defined for the ATFM System, i.e. Classify the data traversed across the LAN as Public or Private. This will allow ATNS Security to ensure that Private information is not shared outside the network. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q) The ATFM System design shall cater for and ensure that, the installation is behind the firewall and Intrusion prevention systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- r) If access from mobile devices are catered for, the ATFM System shall incorporate mobile device security. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- s) The ATFM System design shall ensure that remote access to the application is only accessible via the VPN. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- t) The ATFM System design shall ensure that all applications are only accessible publicly via the firewall. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- u) The ATFM System shall implement access rights to enable role-based access control at application and device level. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2 Security Management

7.2.1 General

- a) Over and above the relevant generic IT security requirements as stipulated in paragraph 7.1, the ATFM, DR and ATA Systems shall implement security management, including authentication, authorisation, and access control for users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Any relevant System-Components connecting with ATNS external systems and with the outside world shall be secured through firewalls, data encryptions, access and allowed/permissions lists, as well as other industry security measures to prevent unauthorised access and data mining. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall enable users/operators to only access the system via a log-in procedure protected by a password. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM System shall allow for user access and permissions groups to be created to allow for a set of system functions and associated user access to be allocated per user group. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) There shall be no restriction/limit on the number of user accounts and groups that can be created. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The ATFM System shall allow users to be assigned to a specific or more than one user group. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g) The ATFM System shall not limit the number of users allowed to be logged in simultaneously to a particular and relevant functional aspect of the system. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The ATFM System shall monitor and record in a Dynamic Database and on a real time basis all users and operators accessing or attempting to access the system. Failed attempts shall be included. All entries into the database shall be date and time stamped. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The ATFM System shall ensure that every data package sent to a disaster recovery system over the network shall be encrypted. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The ATFM System shall present the user with a login window for entering a username and password after a workstation boot-up. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.2 Virtualisation Security

- a) The virtual systems shall be protected by the latest industry security measures as a matter of high importance to minimize the security risks to the virtualised environment. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Risk and security vulnerabilities preventive measures shall include the primary virtual layers to protect the Hypervisor layer, the remote virtual machine's OS layer, the Virtual and Physical Network layers, the Physical and Virtual Storage layers and images, the Virtualisation Management layer/system, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Security and protection shall include redirection of network traffic through a firewall, application of an intrusion prevention system to monitor network traffic, utilisation of a virtual firewall within the Virtual Machine (VM) cluster. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) In addition, security measures shall include, but not limited to, the following:
- Encrypt data stored on virtual and cloud network servers.
 - Release encryption/ decryption keys only to validated and authorized physical or virtual servers.
 - Apply identity and integrity checks when VMs request access to secure storage volumes.
 - Encrypt both boot and data volumes.
 - Create a secure storage environment for physical and virtual storage of data.
 - Restrict storage of VM images and snapshots through tracked authorization login credentials (configurable and changeable by Technical System Administration User - TSAU).
 - Establish an image change management authentication that involves creation, distribution, storage, use, retirement, and destruction of virtualisation components.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- e) A proper and User-Friendly (refer to definition) backup and failover system shall be designed and delivered for all virtualised machines. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- f) Deletion and wiping (zero-filling) of the VM images shall automatically be applied when removed by the TSAU. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- g) Cryptographic checksum protection shall be implemented to detect unauthorized changes to VM images and snapshots. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- h) Packet filtering shall be implemented on network traffic – ingress and egress filtering. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- i) The latest and most secure Network Security measures shall be enforced. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

j) Virtual Machine Security shall include:

- Management of networks connected to hypervisors shall not be used to store VMs.
- Data being exchanged between the Host and VM shall be encrypted.
- Traffic segmentation shall be deployed through VLANs within a single VM switch.
- Different trust levels of workloads shall be placed in different physical servers or security domains.
- Access control principles shall be applied on the communication network between VMs according to the concept as depicted in Figure 15.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.2.1 Hypervisor

- a. Provision shall be made to allow for the latest security and OS updates and patches, as they get released, to be deployed and installed on all the VMs throughout the lifecycle of the VM systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. Hypervisor logs shall be analysed and monitored consistently through an incorporated OS application or software application and shall be presented to the Technical System Administration User (TSAU) on the management servers in a GUI-based or HTML Web based API. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. A multi-factor authentication process shall be implemented for the hypervisor functionalities. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The management interface of the hypervisor shall not be exposed to the LAN. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

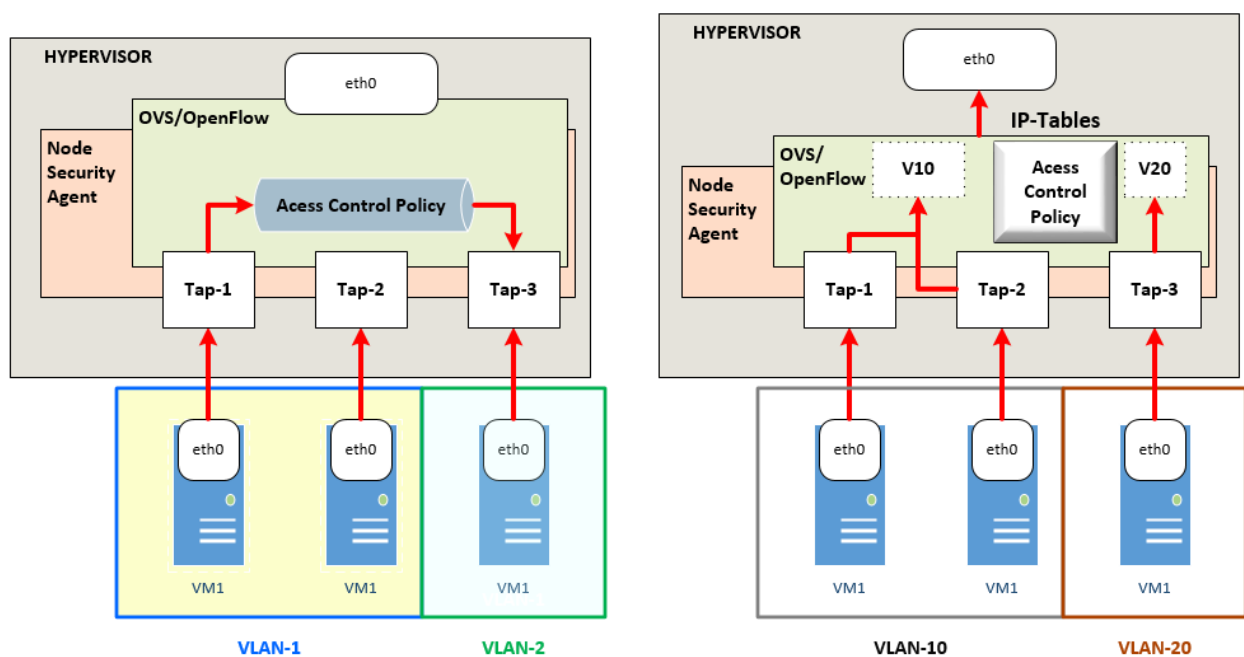


Figure 15: Network Access Control Concept for Communication between VMs.

7.2.3 Passwords

- a) All passwords shall be encrypted with the usage method of either Blowfish or AES. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) All user related password entrees shall at a minimum force the user to enter a password containing the following:

- At least 8 characters in length.
- A combination of both upper and lowercase alphabetic characters (A-Z and a-z).
- At least 1 alphanumeric character (0-9).
- Contain at least 1 special character such as one of the following: ~, !, @, #, \$, %, ^, &, *, (,), _, -, +, =

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Secure protocols shall be implemented such as HyperText Transfer Protocol Secure (HTTPS), Secure File Transfer Protocol (SFTP), and Secure Shell (SSH) throughout all systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Automatic auditing shall be implemented to log all ATFM System activities and every user activities individually by date and time stamp. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) All commands executed by the ATFM System or user shall be tracked and logged with date and timestamps. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) System-level passwords shall be separated from day-to-day operations and maintenance activities and requirements, and no user shall need to use a system password to login to perform any of their day-to-day duties, apart from advanced maintenance and operations

which shall be conducted by Technical System Administrator Users and where applicable Operational System Administrator users, respectively. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.4 Usernames:

a) The following criteria will be enforced in the selection or allocation of usernames:

- alphanumeric characters only
- 8 to 20 characters
- No spaces
- Special cases allowed shall be “-” and “_”

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.5 User Levels

Apart from the ATFM System related usernames and passwords, the following user privilege-levels shall be provided to ATNS users:

- a) **Technical System Administration Users (TSAU)** with full rights for all aspects of every application, operating system, databases, operations, maintenance, and all other software components for 6 (six) Technical System Administrators each with own personal login tracked authentication.
- The TSAUs shall be able to create security groups (SG) isolated according to the virtual machine security demands and specify a set of access rules for each group.
 - By default, VMs assigned in the same security group shall, respectively, reside on multiple distributed physical hosts and these machines can communicate with each other.
 - However, virtual machines in different security groups shall, by default, not be allowed to communicate with each other unless they are permitted through configuration by the TSAUs. Refer to Figure 16.
 - The TSAU shall be able to create, modify, delete and generate all Web application related configurable items and components as well as all other capabilities of the Web application.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

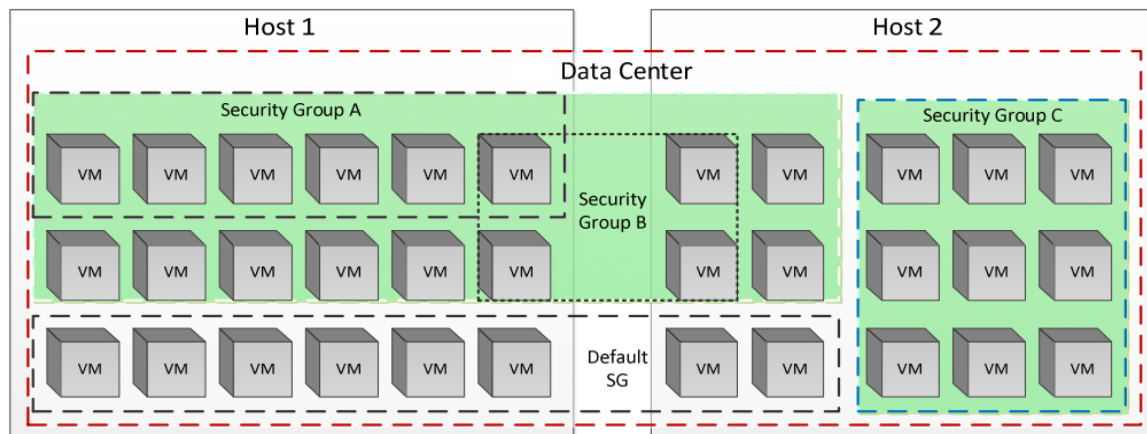


Figure 16: Isolation Groups for VMs with Different Security Privileges

- b) **Technical General Users (TGU)** with restricted administration, maintenance and operational rights for all monitoring and maintenance (preventive and corrective) activities each with own login tracked authentication for an unlimited number of TGUs each with own personal login tracked authentication. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) **Controller System Administrator Users (CSAU)** shall be able to assign/issue all Stakeholder user roles, usernames and passwords, and other related and relevant Stakeholder items and fields excluding username and passwords, as well as all operational related capabilities. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) **General Controller Users (GCU)** shall be able to perform all ATFM controller related functions and operations on the Web application and they shall be able, but not limited, to:
- View all flights departure and arrival slots for one specific controlling element (airport/aerodrome).
 - View all flights departure and arrival slots for two controlling elements (airports/aerodromes) in a split view next to each other. (Example: Departure slots for FAOR and arrival slots for FACT viewed simultaneously next to each other.)
 - Swap any two flights.
 - Move any flight into any open slot distinguished between departure and arrival slots.
 - Modify any flight EETOT
 - Modify any flight EELDT
 - Modify any flight CTD via CTOT slot substitution
 - Modify any flight CTA via CTOA slot substitution
 - Suspend status
 - Suspend flight
 - Modify Registration
 - Delegate control to an Aerodrome User (Sub-user of Stakeholder Users) specific Stakeholder User (e.g. TWR controller)
 - Observe a status indication on the Web application display of the delegated control to an Aerodrome User.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) **Stakeholder Users (SU)** shall be assigned roles by the Controller Administrator, usernames and passwords by the Technical Administrator for each aerodrome user, airline and aircraft user, etc. The assigned roles should align to
- a. Airline and Aircraft Users shall be able to, as assigned by the given role, but not limited, to:
- View all own flights departure and arrival slots for a specific controlling element (airport/aerodrome).
 - Modify own relevant data, swap own flights, suspend own flights.
 - Move own flight CTOT/CTOA slot to an available CTOT/CTOA slot.
 - Modify own flight EETOT
 - Modify own flight EELDT
 - Modify own flight CTD via CTOT slot substitution

- Modify own flight CTA via CTOA slot substitution
- Suspend status
- Suspend flight
- Modify Registration

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b. Aerodrome Users shall be able, but not limited, to:

- View all controlled flights arriving and departing at the relevant aerodrome/airport.
- Perform all functions of a General Controller when control was delegated to the Aerodrome User, excluding the capability to delegate control to another Aerodrome User.
- Shall not be able to modify flight data if the delegated control is suspended by the General Controller.
- View all controlled arrival and departure flights for own aerodrome.
- Shall by default, not be able to modify any flight data for any flights.
- See a status of the assigned role on the Web application display.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

c. General Users (GU) shall have view only privileges for one or more aerodromes as assigned by the Controller Administrator. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.6 Remote Access

a) Remote access management shall be performed by a limited set of authorized management system IP addresses. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) A strong password policy, in addition to that specified in paragraph 7.2.3, shall be applied for every authorised remote access. For high-risk areas, or attack prone environments, a 2-factor authentication or the use of a one-time generated password shall be applied. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Any data or information being sent to management systems shall be encrypted. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Appropriate security measures shall be implemented to avoid unauthorized access to data and system aspects not allowed for Stakeholders and remote users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) Firewalls shall be used for all remote user access and data grants. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Logs shall be kept for all users having access login permissions including the Web applications. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.2.7 Backups Security

- a) No root accounts shall be used for backups. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3 Reports

7.3.1 Reporting Tools

- a) The ATFM System shall provide the following report generation GUI tools (can be combined into one or more), but shall not be limited to and shall be amended where necessary:

- Web Application KPI Reporting Tool (WAKRT)
- AFT KPI Reporting Tool (AFKRT)
- AMT KPI Reporting Tool (AMKRT)
- MCS KPI Reporting Tool (MCKRT)
- Network KPI Reporting Tool (NKRT)

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) All reporting tools shall be secured with password and username login requirements which shall be directly based on all registered and subscribed Stakeholder (refer to definition) login credentials and roles allocated by the TSAU. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.2 Reporting Tools Design Structure

- a) The design of all reports shall focus on the technical as well as on the aesthetic factors and aspects of data extraction, organisation and visualisation. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The design of reports shall further involve presenting users from all relevant Stakeholders (refer to definition) and the industry with report generation tools and report results that shall be User-Friendly (refer to definition), comprehensive, Stakeholder usable, purposeful and meaningful, and professional. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Report generation shall cater for the selection of either individual or consolidated reports for the different applicable System-Components (refer to definition), items, data, and elements. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) All reports shall adopt a structure having at least the following features, but shall not be limited to, and which shall be applied to data extractions for all System-Components (refer to definition):
- Pixel-Perfect Formatting.
 - Data Filtering.
 - Data Sorting.
 - Data Grouping.
 - Data Blending.
 - Deep Data Analysis

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.3 Reporting Tool Design Elements

- a) All reporting tools shall have elements to generate not only reports, but also provide for a user to customise reports through selection choices as follows, but shall not be limited to:
 - a. Users shall be allowed to take static and dynamic screenshot images including time-delayed screenshot taking capabilities.
 - b. Tables within automatically generated reports shall be professionally presented and well organised complete with bold fonts headings and border lines.
 - c. Tables within manually (customised) generated reports shall allow for the user to create and generate a professionally presented and well organised report complete with headings and border lines all customizable by fonts, line colours and fill-in shading of cells, etc. selections.
 - d. Users shall be allowed to select graph and chart types and shall at least include line graphs, bar graphs, donut and pie charts of which their design shall be customizable in type, shape, form, editing, text input, colour schemes for each type (Refer to ATFM Replacement Volume 2 Appendix, Section 3, Appendix C: Chart and graph reporting examples).
 - e. Infographics capabilities shall allow for the visualization of any kind of relevant information and data and shall also allow for trends visualization supported by pre-defined template choices.
 - f. Data and System-Component filtering shall be available to allow users to select from drop-down menus or tick-box selections which relevant elements, items or System-Components are required in the report and the filtering shall be applied to data and charts/graphs as well. (Refer to ATFM Replacement Volume 2 Appendix, Section 3, Appendix C: Chart and graph reporting examples).
 - g. All Reporting tools' dashboards for customised reports shall include and allow for selection of the following widgets; Chart, Graph, Number, DataGrid, Text, Generate, Edit, View, Tailor, Exporting, Print, Save, Email, Clear, Refresh, Configure, Create, Elements, Search/Find, Components, Export, Performance, Device, Screenshot, Custom, System, Sorting (on any column); where relevant and where each shall have menu items for option selections. (Refer to ATFM Replacement Volume 2 Appendix, Section 4, Appendix D: Dashboard examples).
 - h. All automatically generated reports as well as pre-defined reports shall be presented in colour.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.4 Reports Exporting

- a) All reporting tools shall provide exporting and saving capabilities for graphs, charts, screenshots and reports to:
 - a. USB devices,
 - b. The workstation desktop in a user selectable directory/folder and user provided filename,
 - c. Email through automatic scheduling or manual selection by the user, to any single or multiple email addresses
 - d. An ATNS domain printers and for other Stakeholders to the default printer on their workstations.
 - e. Excel (.xlsx), HTML and .pdf formats for all reports specifically.
 - f. In jpeg, png, bmp, tiff and gif imaging formats for screenshots specifically.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The reporting tool shall allow appropriate users to save every customised report as a template (apart from date and time periods) for repetitive reports and future quick-use as a base-line report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.5 Customized Report Creation

- a) All the reporting tools shall allow for the generation of a report on every applicable System-Components' (refer to definition) performance, user and system events and actions, tactical, strategic, historical, compliance and post-event, GDP, AFP and GS revisions/implementations. (Refer to a few examples of Operational reports in ATFM Replacement Volume 2 Appendix, Section 1, Appendix A: EXAMPLES OF Reports). However, the formats of the tabular report examples shall be altered to comply and

conform to what is outlined in this section. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The Reporting tools shall allow for user selectable and customizable creation of an hourly, hourly period, daily, daily period, monthly, month period, yearly, year period, as specified by the user for a data consolidated or individual report for each relevant menu selectable item or System-Component item (Tick-box drop-down menu selectable). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Date selection for every report shall also allow for the selection of a specific hour, or hourly period, then for a day, or day period, then for a specific month, or month period, then for a year, or year period. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The Reporting tools shall allow for Drag and Drop Creation. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) Freehand SQL (or other) commands where applicable shall be allowed for creation of customised queries from the associated databases. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- f) The Reporting tools shall cater for Layouts and Themes selections. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The Reporting tools shall allow for Scheduling of Reports. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The Reporting tools shall allow for multiple simultaneous users to generate reports. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.6 Reports Retention

- a) All reports shall be retained and stored for a 5-year period on a RAID-6 SAN storage server. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) TSAU's shall be able to clean-out obsolete reports. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.7 Web Application KPI Reporting Tool (WAKRT)

- a) The WAKRT shall automatically generate many different types of reports and these reports shall be updated with the most current information after an Aggregate Demand List (ADL) update every single minute to every three minutes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The information provided in these reports shall be formulated such that they shall assist to identify problems as they occur to allow users to correct problems that impact TMI performance and shall also serve to view and obtain historical flight data such as for example slot compliance, slot allocations, individual and aerodrome flight detail, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall have the capability to produce automatic statistical and analytical pre-configured reports according to industry requirements – such as tailored for Airline’s needs, ATNS’ needs and industry needs. (Refer to examples in ATFM Replacement Volume 2 Appendix, Section 2). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Reports available to a Stakeholder shall be specific for the assigned role of a Stakeholder and shall only contain data relevant to the Stakeholder as allocated by the TSAU or CSAU. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The WAKRT reports shall be able to generate at least the following user selectable auto-generated, as well as user customised generated, reports allowing for an hourly, daily and

monthly date and time period specified/selected by the relevant users and which shall be tailored according to user allocated roles, but shall not be limited to:

- Element Flight List
- Performance
- Flight Status
- Slots Compliance
- CTD (CTOT) before POBT
- Pop-Up Flights
- Cancelled Flight That Flew
- Delayed Flights
- CTOT Delays
- CTOA Delays
- Duplicate Flights
- Unassigned Slots
- Lookup Flights
- Departure Flights
- Arrival Flights
- DEP and ARR Flights in Specified Time Frame
- Departure Clearance
- Airport Events

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Performance reports shall cater for, but not be limited to, the following:
- a. Allow for GDP, AFP, GS that were actively running
 - b. Allow for Departure and Arrival flight data.
 - c. Contain ETD data for departure flights.
 - d. Contain ADEP and ADES.
 - e. Contain DFIR and AFIR with additional demand data applicable to DEP and ARR flights.
 - f. Contain AFT GDP Rate (Target) and AFT Program Rate (Max) data in separate columns.
 - g. Contain Flights Arriving Prior to Their Control Hour (A/D) data.
 - h. Contain Flights Arriving After Their Control Hour (A/D) data.
 - i. Flight Status Reports (GDP, GS, AFP related reports) shall:
 - j. Provide for separate departure and arrival reports.
 - k. Contain the Control Element field in both reports.
 - l. Cancelled Flights That Flew Report (GDP related reports) shall:

- m. Generate a separate departure and arrival report.
- n. Contain DFIR on the arrival report.
- o. Contain AFIR on the departure report.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Compliance Reports (GDP related reports) shall generate a separate departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) CTD Prior To POBT Report shall generate a separate departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) Pop-Up/Ad-hoc FPL Reports shall generate a separate departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) FPL Timeout/Delay Reports shall generate a separate departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) Flight Duplicates Reports shall generate a separate departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) Unassigned Slots Reports shall generate a combined departure and arrival report. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) Events Reports shall:

- Generate a combined departure and arrival report.
- Present data as per the example in Figure 17 but in a User-Friendly (refer to definition) and user-acceptable format as described elsewhere within this document as well as in ATFM Replacement Volume 2 Appendix, Section 1, Appendix A: EXAMPLES OF Reports).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) Generate a Departure Clearance report for the selected/entered aerodrome of all flights having an ETD after the current time for the aerodrome that shall contain columns for, but not limited to:

- ETD
- ETA
- GDGID
- Slot
- ACID
- Role
- Type
- ADEP
- ADES
- IIBT

- IOBT
- ELTOT
- ELLDT
- EET

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

FAOR Events							
Report Time	Program Type	Start Time	End Time	Exempt Distance	Exempt FIRs Adep	Nonexempt FIRs Adep	Exempt FIRs Ades
02:02	Rbs	02:01	01:59			ALL	

Nonexempt FIRs Ades	Exempt Aerodromes Adep	Nonexempt Aerodromes Adep	Exempt Aerodromes Ades	Nonexempt Aerodromes Ades

Aerodrome If Distance	Facilities	Program Rate Type	Program Rate	Exempt By	Override Carrier	Total/Aff Arrival Flights
	ALL	MAX			NONE	

Total/Aff Departure Flights	Model Time	Reflect Time	Purge Before Revision	Purge After Revision
	02:01	02:01		

Figure 17: Example of Data Within a WKRT Airport Events Report

7.3.8 AFT Client Reports

- a) The AFT Client reports shall enable TSAU, CSAU and GCU to view/pull, print, save, create own (customised) and export the following concerning each report:
 - a. Creation of an hour, hourly period, daily, day period, monthly, month period, yearly, year period, as specified by the user for a data compilation report for each relevant selectable system item (allow for a single selection and for a combination of items) as well as allow for a selection per Stakeholder, for all Stakeholders, and for a specific number of Stakeholders (Tick-box drop-down menu selectable).
 - b. It shall, for e.g., be possible for the user to select all Stakeholders or specify a single Stakeholder or a combination of Stakeholders, then specify a single year or a year period, then select all months or specify a single month or a number of months, then select all days or a number of days or a single day or only specify a day in text format (e.g. all

Tuesdays for every month for the year or year period or Tuesday for a specified month for a specified year or year period), then select all hours for the specified day (Tuesday) or specify an hourly period for that day (Tuesday), etc., then generate the report).

- c. Real-life examples will be (by far not exhaustive):
- EXAMPLE-1: A request is received for a report on all non-compliant slot flights for a specific airline for March 2020 for the hour 10:00 to 14:00 for the 6th day up to the 12th day of the month – all shall be selectable.
 - EXAMPLE-2: A request is received for a report on all non-compliant slot flights for all airlines for the year 2020, for months March, August, November, for Days 6, 9, 11 of each month, for the hours 10:00, 12:00, 14:00 – all shall be selectable.
 - EXAMPLE-3: A request is received for a report on all non-compliant slot flights for all airlines for every Tuesday between 14:00 and 16:00 for the year 2020);
 - EXAMPLE-4: A request is received for a report on all non-compliant slot flights for 3 specific airlines for the month March for years 2017 to 2020 for the hour 10:00 to 11:00 for the 6th day up to the 12th day of the month.
- d. The Web application reports shall also be available on the AFT reporting tool and shall be manageable in the same manner as all other AFT and Web application reports.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.9 MCS Reports

- a) The MCS shall provide automatically generated reports as well as customised reports for data, being date and timestamp, of all System-Components (Refer to definition) that can be monitored, managed, supervised, controlled. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The MCS reports shall make provision for each (not exhaustive) System-Components' performance (KPIs) such as, but not exhaustive, connections/disconnections, uptime/downtime, reboots/shutdowns, restarts/stops/starts, failures/faults, user access, data and application integrity and availability, alerts, downgrades, for the date and time period specified. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

c) Real-life examples will be (by far not exhaustive):

- EXAMPLE-1: A request is received for a report on the usage of all computer's SSD, RAM and SWAP space used and free for March 2020 for the hour 10:00 to 14:00 for the 6th day up to the 12th day of the month – all shall be selectable.
- EXAMPLE-2: A request is received for a report on all computer fans' speed and CPU temperature for the year 2020, for months March, August, November, for Days 6, 9, 11 of each month, for the hours 10:00, 12:00, 14:00 – all shall be selectable.
- EXAMPLE-3: A request is received for a report on all computer's failures and Restarts (refer to definition) for every Tuesday between 14:00 and 16:00 for the year 2020);
- EXAMPLE-4: A request is received for a report for all computers for Users logged in and user command actions executed for the month March for years 2017 to 2020 for the hour 10:00 to 11:00 for the 6th day up to the 12th day of the month.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

7.3.10 Network Monitoring and Management System (NMMS) Reports

a) The NMMS shall allow GTU and TSAU to pull customised reports for analytical and statistical purposes via a single or consolidated selection of each relevant System-Component according to requirements stipulated in this section. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b) The NMMS shall cater for the following reports, but shall not be limited to:

- System Activity Reports
- User Activity Reports
- Administrative Reports
- Availability Reports
- Site Reports

- Configuration Reports
- Performance Reports
- Connectivity and Routing Reports
- Device Reports
- Server and Workstation Reports
- Inventory Reports
- Services Reports
- API Reports
- Virtualization Reports
- Status Reports
- Failure and Alert Reports
- Downtime and Uptime Reports
- Historical Reports
- Inventory Reports
- Topology Reports
- Storage Reports

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Some NMMS reporting examples are provided in ATFM Replacement Volume 2 Appendix, Section 2, Appendix B: NMMS REPORTS. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8 SUPPORTING SYSTEM REQUIREMENTS

8.1 ATFM System Platforms

A. The ATFM System shall comprise of the following platforms:

- ATFM Main System, also known as the Operational or Production system;
- Disaster and Recovery (DR) System including Test and Evaluation, and DR Training Simulation;
- ATFM ATA Training System;

The Bidder shall confirm that the offered system supports the platforms required. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.2 ATFM Main System

A. The Main System shall be delivered with the required servers, based on the ATFM System design and configuration, operating in a main/hot standby configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

B. Each of the servers shall be equipped with a redundant disk array (RAID 6 configuration). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

C. All servers shall cater for dual redundant PSUs. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

D. The servers for the Main System shall be deployed in the equipment room in the ATNS Operational Complex situated at OR Tambo International Airport. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- E. The servers shall be based on the latest commercial off the shelf servers available and supported in South Africa. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The server's performance and capacity shall not be a limiting factor to the performance of the overall ATFM System. The Bidder shall clearly indicate how the server's performance and capacity was determined to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM System architecture shall be based on a 'parallel operation' (hot standby) server configuration. The server redundancy must be Multiple Computation Redundancy (MCR) to allow both servers to compute all input data from all relevant sources simultaneously while only one outputs data. The master ensures that the slave's computation is the same as that of the master. Therefore, the hot standby server is immediately ready to take over operation when the master fails from the point of failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.3 ATFM Disaster and Recovery (DR) System

- A. The DR System shall comprise of a functional replica of the Main ATFM System, operating in a virtual environment. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The DR System shall be delivered with the servers based on the ATFM System design and configuration, operating in a main/hot standby configuration and each of the servers shall be equipped with a redundant disk array (RAID-6 configuration). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The DR System shall be a full replica of the Main System with the same functionality except that it could have reduced capacity and operator positions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The DR System shall, in the event of a disaster befalling the Main System, continue providing the ATFM service. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The DR System shall support the same interfaces as specified for the Main System and defined under Section 5. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The DR System shall be connected / interfaced to the same external systems as defined for the Main System under Section 5. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- G. The DR System shall maintain all databases and information synchronized to the Main System, such that the transition time can be minimized and loss in information can be contained and managed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The DR System shall allow for the offline system behavioural dataset parameter changes, in order to align the system behaviour, configuration and setups with that of the Main System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The DR System shall be able to move back and forth between software version releases in order to test and evaluate the new software releases and to make configuration and offline changes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

Test and Evaluation System

- J. The Test and Evaluation System shall be able to move back and forth between software version releases in order to test and evaluate new software releases and to make configuration and offline changes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The Test and Evaluation System shall be the same as the DR System (including interfaces), with the exception that there will be no operational service delivery or operational output from

the Test and Evaluation System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

DR Training Simulation System

- L. The DR Training Simulation System shall provide the same functionality as incorporated in the ATA Training System, but with a limited number of positions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The DR Training Simulation System shall cater for the import of a copy of the Main System relevant databases and associated offline configurations. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.4 ATFM ATA Training System

- A. The ATFM ATA Training System shall be delivered with the servers based on the ATFM System design and configuration, operating in a main/hot standby configuration and each of the servers shall be equipped with a redundant disk array (RAID 6 configuration). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The ATFM ATA Training System shall be a full replica of the Main System with the same functionality. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- C. The ATFM ATA Training System shall cater for operational and technical training. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The ATFM ATA Training System shall simulate/or virtually generate the connections / interfaces to the same external systems as defined for the ATFM Main System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The ATFM ATA Training System shall simulate all webpage relevant aspects as available on the Main System such as reports, all functionalities and display views. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The ATFM ATA Training System shall be deployed as a VM system setup where simulation programs can be launched from, in order to model and simulate all relevant functional aspects and outputs of the Main System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The ATFM ATA Training System shall support simulation in the context of creating specific and basic offline exercises that will simulate real-life operational interfaces and environmental situations e.g. simulate weather, traffic load (departure and arrival traffic), FPL changes/updates (EFEED), including hourly demands, external interfaces, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. The ATFM ATA Training System shall provide the capability for the trainers to alter the environmental and operational behaviours to simulate real-life situations after a simulation exercise is modelled and running. e.g. changes to FPLs, weather, departure and arrival slots, segregated airspace areas, flexible use of airspace areas, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The ATFM ATA Training System shall cater for the import of a copy of the Main System relevant databases as well as associated offline system operational setup and configuration files to align exercises and simulations with that of the true operational environment. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The ATFM ATA Training System shall cater for the simulation data to be prepared as offline configurable exercises. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The ATFM ATA Training System shall cater for copies of real-time data, collected from the ATFM Main System's historical database, to be used as an input to the ATFM Training simulator exercises in order for ATNS trainers to efficiently create exercises that are aligned with real-time scenarios. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

8.5 Mains Power and Backup Power Supply

8.5.1 Mains Power Supply

- a) The ATFM System and all equipment supplied shall operate from a mains power supply as defined below:

- 230 VAC, Tolerance: +10%, -10%
- Frequency: 50 Hz, Tolerance: +2 Hz, -2 Hz

The Bidder shall provide full details (power supply and power consumption) on each of the system components and equipment offered. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) Three-phase static switches shall be implemented to ensure continuous power and automatic switching between available phases if one phase drops. The Bidder shall provide full details on the static switches included in the offer. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

8.5.2 Backup Power Supply

- a) The ATFM System shall not degrade in performance due to a mains power failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) In the event of the mains power failure the ATFM System shall automatically be operated from the backup power supply that will primarily be the airport's Uninterruptible Power Supply (UPS). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- c) The ATFM System shall be equipped with Static Switches to connected to the mains and backup power supply. The Bidder shall provide full details on the static switches included in the offer. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The changeover between the mains power supply and the backup power supply shall occur both in an automatic and manual manner. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.6 Software Licenses

- A. All licenses required for the operation of the System or any System-Component shall be provided and shall be acquired, as valid, for the lifespan of the ATFM System. The Bidder shall provide full details on the licenses required to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The licensing costs shall be detailed in the bid costs. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- C. ATNS shall be consulted about the distribution of licenses to servers or workstations if it is required to restrict the population of licenses to save costs. For example, if there is a replay license required per CWS, ATNS will also require a license on the MCS workstation for technical staff. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- D. ATNS shall be responsible for the procurement of the associated FlightRadar24 business license. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

8.7 Environmental Conditions

- A. The ATFM System and its auxiliary components shall operate continuously under the following indoor environmental conditions without any degradation in performance. The Bidder shall provide full details to support compliance to the requirement. (D)

	Parameter	Value
1	Nominal Temperature	20°C to 24°C
2	Operating Temperature	+5°C to +35°C
3	Relative Humidity	10% to 80% (non-condensing)
4	Temperature variations	Up to 20°C within 24 hours

Table 4: Indoor operational environmental conditions.

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.8 General Requirements

8.8.1 SANS

- a) All equipment shall comply with applicable SA National Standards (SANS). The Bidder shall indicate which SANS the system complies with. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

8.8.2 Human Factors

- a) The ATFM System design shall incorporate Human Factors design standards and automation guidelines. The Bidder shall indicate which standards and guidelines have been incorporated in the design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

8.8.3 Cabling and Installation Requirements

- a) All power and communication cabling shall be neatly installed, labelled and documented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- a) All panels, cabinets, racks and connectors shall be clearly labelled and documented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) A proposed interconnection diagram(s) depicting the flow of communication and power connection between the various System-Components is required. The Bidder shall include proposed interconnection diagram(s) with their proposal. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Labelling of cables shall be colour coded and shall include a numerical identifier, cable type, source (unit name, port, location) and destination (unit name, port and location). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9 HARDWARE REQUIREMENTS

9.1 General

- A. The ATFM System design to support the requirements and specifications as stated herein shall be provided and shall incorporate all components of the ATFM System. The ATFM System design shall incorporate schematic presentation(s) of the proposed ATFM System. The Bidder shall include all relevant schematics, drawings and presentations to clearly articulate the proposed ATFM System. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The hardware performance specifications shall be such that it shall support the performance requirements of the offered software. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The ATFM System design shall cater for redundant component configurations. The Bidder shall clearly indicate how redundancy has been catered for in the system design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.2 Computer Specifications

- A. Three types of workstations shall be supplied; Controller Workstation (CWS); Control, Management and Supervision workstation (CMS); Flight Plan Management Workstation (FPMW). (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.2.1 General

- a) Each workstation computer shall have at least a minimum specification (unless the ATFM Systems supplier recommends a better minimum specification) of:
- CPU (i9) ≥ 4GHz, ≥12-core,
 - RAM DDR4 32GB

- c. DRAM/GRAM/VRAM (≥6GB), DDR4, GPU ≥8-core
- d. SSD drive according to the functional requirement as stipulated under the custom specifications for each workstation type (Sections 9.2.2 and 9.2.3).
- e. Graphics Cards shall be capable of managing all required applications including Monitor and TV display projections efficiently and sufficiently.
- f. Sufficient NIC ports/ePCI cards to support the 1GB backbone network.
- g. Each workstation computer shall cater for the connection of a standard USB-3 wired English QWERTY keyboard.
- h. Each workstation computer shall cater for the connection of a standard wired optical USB-3 scroll 3-button mouse.
- i. More than sufficient performance capabilities (hardware resources) shall be provided for each CWS workstation computer to support and manage all associated System-Components and communications (such as threading, rendering, CDC exchanges, memory cleaning, file archiving and recording, storage space, trace files and log files periodic updates, etc.) more than efficiently for the lifespan of the systems.
- j. Each workstation computer shall be delivered with all relevant software and standard drivers to support the computer hardware.
- k. Each workstation computer shall be delivered with the following installed:
 - i. Cater for a Desktop environment (GNOME or KDE).
 - ii. Support a shared Status Bar and Toolbar setup where an extended (extended desktop) dual screen configuration is required.
 - iii. Have the latest version Office package installed and available to users.
 - iv. Have the latest version email client installed and available to users.
 - v. Have the latest version Web browser installed and shall be either Firefox, Chrome, Microsoft Edge or IE-Explorer.
 - vi. Have a File Explorer capability for ease of user path and file searching and file/folder management and operations.
 - vii. Have all the main applications and support software programs available on the desktop as icons for quick launch.
 - viii. Have a file Archive and Compression software tool in GUI form available to the user (e.g. gzip, bzip2, 7z, tar, etc.).

The Bidder shall provide full details on the workstation computers offered to support compliance to each of the requirement above. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.2.2 CWS Computers Specifications

- a) Each CWS computer shall be equipped with a SSD drive having 2TB total.
- b) Each CWS computer shall be equipped with 6x USB-3 ports,
- c) Each CWS computer shall be equipped with 3xHDMI-2.1 ports with HDCP support,
- d) Each CWS computer shall be equipped with a Wi-Fi HDMI dongle capable to stream HDMI video to a smart TV without noticeable video losses (Gbps),
- e) Each CWS computer shall support a shared Status Bar and Toolbar setup in the extended (extended desktop) dual screen configuration.
- f) Each CWS computer shall cater for a Wi-Fi capability to stream video and share the screen display to the SMART TVs (To avoid cabling and video quality/performance losses).

The Bidder shall provide full details on the CWS computers offered to support compliance to each of the requirement above. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.2.3 FPMW and CMS Computers Specifications

- a) Each FPMW and CMS computer shall be equipped with an SSD drive having 1TB total,
- b) Each FPMW and CMS computer shall be equipped with 4x USB-3 ports,
- c) Each FPMW and CMS computer shall be equipped with 2xHDMI-2.1 ports with HDCP support,
- d) Each FPMW and CMS computer shall cater for a single screen.

The Bidder shall provide full details on the FPMW and CMS computers offered to support compliance to each of the requirement above. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.2.4 Server Computers Specifications

- a) The bidder shall recommend server models and their associated specifications to meet all requirements and to ensure more than adequate performance responses. The Bidder shall indicate the criteria used in determining the recommended server models. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- b) Each server performance and specifications shall ensure that there will be no degradation in performance with the ATFM System operating at full capacity over the lifespan of the systems and shall be based on the ATFM Systems design, capacity and functionality as defined in this Technical Specification document catering for software version upgrades and possible system expansions. The Bidder shall provide full details to support compliance to the requirement as well as providing the criteria used to determine the offered server performance and specifications. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall be delivered with the required servers as defined within the ATFM System design and configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The establishment of a complete virtual environment shall be included as an option for the deployment of the ATFM System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The two (ATFM MAIN and DR Systems) SAN backup servers shall be mirrored/synchronised and have a minimum storage capacity (volume) of at least 10TB each (or as recommended by the bidder to accommodate a 5-year retention storage capacity). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Each server shall be the latest commercial off-the-shelf computer available which is supported in South Africa meeting the bidder's recommended specifications. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.3 Workstations Screens Specifications

9.3.1 General

- a) All CWS workstation screens shall:
- Be a 32-inch flat smart screen.
 - Be desktop-stand type with adjustable height and tilt.
 - Have UHD/QHD/QLED with resolution of 3840x2160@120Hz, aspect ratio 16:9, brightness 300-350 cd/m2, Contrast ratio Dynamic-10M-20M:1 Static-3K:1, anti-glare, HDCP 2.2, refresh rate 1-2ms.
 - Cater for 4 x USB-3 downstream ports all shall be activated.
 - Cater for 1 x USB-3 upstream port and it shall be activated.
 - Cater for 2x HDMI-V2.0 ports.
 - Be based on the latest commercial off-the-shelf workstation screens available and supported in South Africa.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.3.2 CWS Screens Custom Specifications

- The ATFM Main System shall cater for 4 x dual screen CWS positions.
- The ATFM DR System shall cater for 1 x dual screen CWS position.
- The ATFM ATA System shall cater for 2 x dual screen CWS positions.
- Each CWS screen in the dual screen configuration shall:
 - Operate in a desktop extended screen configuration.
 - Share the Desktop Icons on both screens.
 - Display shortcuts in the task bar on both screens for the main operational applications and software tools.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.3.3 FPMW and CMS Screens Custom Specifications

a) FPMW and CMS positions shall have a single screen and shall be deployed as follows:

- a. 1 x CMS for ATFM Main System
- b. 1 x CMS for ATFM DR System
- c. 1 x CMS for ATFM ATA System
- d. 1 x FPMW for ATFM MAIN System
- e. 1 x FPMW for ATFM DR System.

The Bidder shall ensure that the quantities is reflected in the price schedules. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.4 HDMI Wi-Fi Specifications

9.4.1 Deployment

a) Three (3) of the ATFM Main System CWSs shall each connect via an HDMI Wi-Fi USB device or card to a 65" TV for mirroring the CWS display. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b) One (1) of the ATFM Main System CWSs shall connect via an HDMI Wi-Fi USB device or card to an 85" TV for mirroring the CWS display. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.4.2 HDMI Wi-Fi Devices Specifications

- a) Appropriate and efficient (performance) software shall be used to establish the proper interfacing between the CWS computer and the TV.
- b) All Wi-Fi screen mirroring devices (cards/other) shall operate at 2.4 GHz.

- c) All Wi-Fi screen mirroring devices (cards/dongles/other) shall support Video Streaming Output: Up to 3840x2160 = Ultra HD 4K.
- d) All Wi-Fi screen mirroring devices (cards/dongles/other) shall Support Video Format: AVI / DIVX / MKV / TS / DAT / MPG / MPRG / MOV / MP4 / RM / RMVB / WMV / MPEG2 / MPEG4 / MVC.
- e) All Wi-Fi screen mirroring devices (cards/dongles/other) shall Support Audio Format: MP1 / MP2 / MP3 / WMA / OGG / ADPCM-WAV / PCM-WAV / AAC / FLAC / 3GP.
- f) All Wi-Fi screen mirroring devices (cards/dongles/other) shall Support Photo: JPG / BMP / PNG.

The Bidder shall provide full details on the software and screen mirroring devices to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.5 Televisions (TV)

The ATFM operations within ATNS requires SMART Flat-bed Televisions to project airspace situations, weather, slots, flow control bar graph charts, etc. on these. There is a further requirement to project a live demonstration and presentation of the above mentioned for inauguration purposes on a big TV. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.5.1 TV Basic Requirements

- a) The TVs shall be wall mounted. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The TVs shall connect to the workstations through wireless video streaming. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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- c) There shall be no visible video quality impairments and delays introduced on the TV screens during the wireless video streaming. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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- d) TV monitors will feature energy saving (low consumption) functions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.5.2 TV Specifications

Minimum specifications (unless otherwise advised by the ATFM Systems supplier) shall include:

- a. 4 x High Contrast LED Smart TV, 65-inch, UHD, 4K, 120Hz, Wi-Fi, HDMI 2.1 (or the latest HDMI protocol version available)
- b. 1 x Very High Contrast Smart TV, QLED Series-7 HDR12X, 85-inch, UHD 3840x2160 resolution, 4K@120 Hz refresh rate, HDMI 2.1 (or the latest HDMI protocol version available), Wi-Fi 5 (802.11ac technology or equivalent/better).

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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9.6 Network and Firewall Specifications

- A. A 1GB LAN Backbone shall be provided. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- B. All network switches and routers shall be supplied with dual power supply units. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- C. Redundant LAN connecting servers shall be provided for the CWS positions and local User workstations. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
--

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- D. The ATFM Main System shall be equipped with one redundant FAST/Gigabit Ethernet LAN interface for the connection to the redundant operational LAN. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- E. A bidder proposed network configuration and layout shall be incorporated in the ATFM System design and detailed on a network diagram with all components clearly indicated and detailed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- F. The network design shall incorporate the existing ATNS WAN, however new network components (switches and routers) shall be proposed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- G. Existing fibre links shall be used between the Operational Equipment room and the DR (SSS) Equipment room. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.6.1 Routers Specifications

- The network routers shall support at least 10/100/1000 Gigabit Ethernet.
- The network routers shall have at least 2 RJ-45 ports (with expansion slots should additional ports be required).
- The network routers shall support IPv4 and IPv6 protocols.
- The network routers shall be rack mountable.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.6.2 LAN Switches Specifications

- The network switches shall be managed.
- The network switches shall support at least 10/100/1000 Gigabit Ethernet.
- The network switches shall have at least 24 ports.
- The network switches shall have at least 2 SFP (small form factor pluggable) modules.
- The network switches shall have a CLI (command line interface) and web interface.
- The network switches shall be rack mountable.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.7 Equipment Racks Deployment

- A. The servers and network equipment shall be installed in 19", 42U racks to be housed in the existing equipment room(s). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The equipment racks shall be equipped with suitable cooling fans or allow for efficient natural air-flow for heat extraction. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The equipment racks shall make provision for cooling of equipment through the floor. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The preferred colour of the racks is RAL7021 (black grey). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. Each rack shall be earthed and connected to the site earth. All equipment within the racks shall be appropriately earthed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The equipment racks shall make provision for access to the equipment for maintenance purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. Each rack shall be provided with a Static Switch, connected to the main and backup power supply in a secure way. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. Each rack shall be provided with surge protected PDU's (Power Distribution Unit) that contains International Electrotechnical Commission (IEC) C13 sockets and at least two (2) IEC Type C (Europlug/Two pin plug) sockets. The number of C13 sockets shall be calculated based on the proposed equipment deployment in the racks with a minimum of two (2) spare sockets. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. The equipment racks shall incorporate a cable management system for routing of cables. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. All panels, connectors and cabling shall be clearly labelled and documented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8 Consoles and Furniture

9.8.1 Existing configuration

The existing console layout and configuration are depicted in the figure below. (I)

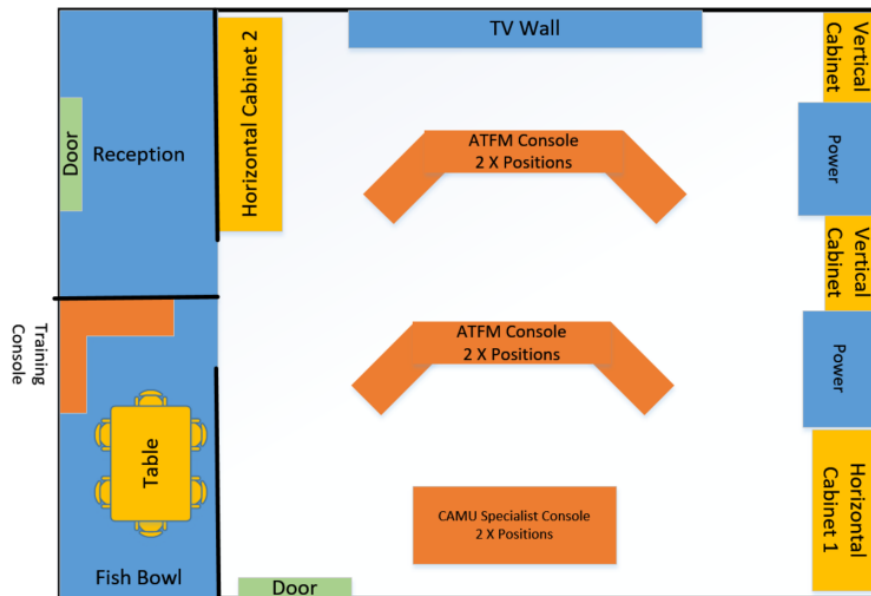


Figure 18: Existing layout and configuration

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

The approximate dimensions of the boardroom and office are provided in the figure below. (I)

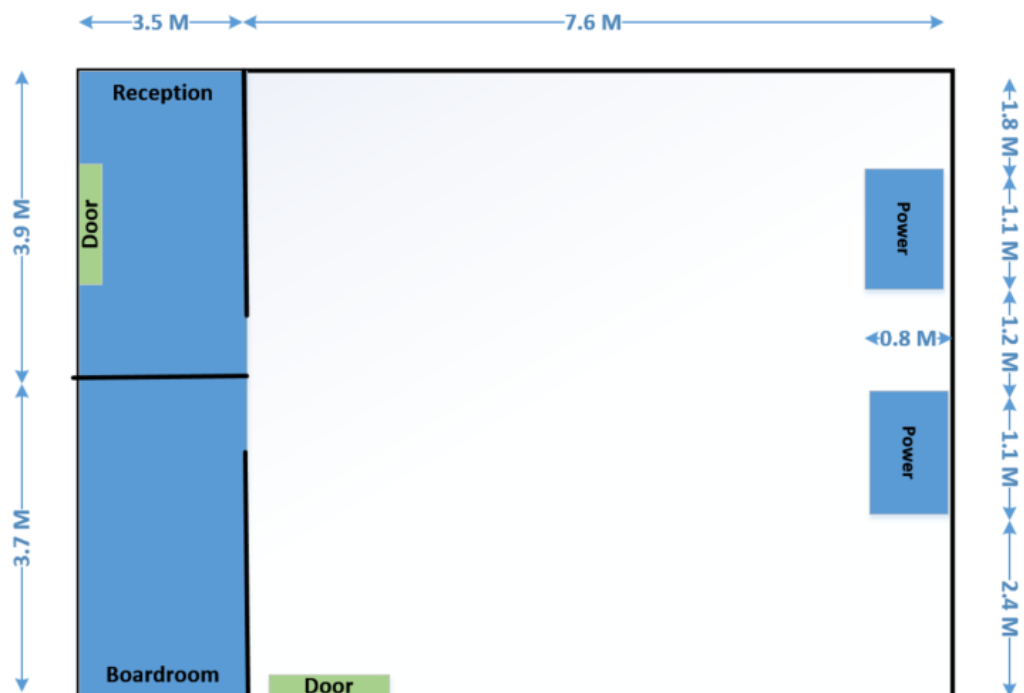


Figure 19: Approximate Dimensions

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.1.1 Current ATFM Consoles

Two ATFM consoles are deployed in the existing space. (I)



Figure 20: Photos of two (2) current ATFM consoles

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.1.2 Current Controller/Training Console

One operator/training console is deployed in the boarding room. This console acts as an additional operator console but is also used as a training console. (I)



Figure 21: Photos of current Controller/Training console

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.1.3 Current CAMU Specialist Console

One CAMU Specialists Console is deployed in the existing space. (I)



Figure 22: Photo of current CAMU Specialist console

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.1.4 Current Boardroom

The current boardroom contains the boardroom table and training/operational positions. (I)



Figure 23: Photo of current Boardroom

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.2 New Console Configuration

All dimensions provided in this section shall be verified by the contractor. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.2.1 General Requirements

a) The design of the consoles shall cater for and include: (D)

- Cable Management system,
- Table top workspace,
- Computer equipment cabinet with slides and maintenance access,
- Power distribution system,
- Durable finish,
- Airflow,

- Ergonomic design.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The consoles shall have a Power Distribution Unit (PDU) at each position. The Bidder shall include the position of the PDU on the console design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The PDU shall have at least one (1) International Electrotechnical Commission (IEC) Type M (South African standard 3 pin) socket and two (2) IEC Type N (New 3 pin standard) sockets. The Bidder shall provide full details of the PDU offered. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The console design and proposed layout shall make optimal use of the existing floor space to accommodate all the consoles in the office space, thus the boardroom will not be used for operational deployments. The Bidder shall include a special design drawing. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.2.2 ATFM System Console Requirements

- a) The ATFM System main operational centre shall be furnished with new consoles to cater for the following ATFM positions as well as catering for non-ATFM existing equipment to support ATFM operations. The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- b) Existing consoles shall be removed and replaced with the new consoles. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- c) The new consoles shall accommodate the following positions to support the operation of the ATFM Main System:

- 4 X Controller positions (can also act as a training position)
- 1 X Flight Plan Management position
- 4 X CAMU Specialist positions (None ATFM)

The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- d) The new consoles shall accommodate the following positions to support the operation of the ATFM training system in the ATA and the Disaster Recovery (DR) system in the SSS Building:

- 2 X Controller/Training Positions to be deployed in the ATA
- 1 X Flight Plan Management position to be deployed in the ATA
- 2 X Controller/Training Positions to be deployed in the SSS
- 1 X Flight Plan Management position to be deployed in the SSS

The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

9.8.2.3 ATFM Main System Console-1

- a) The design of the console shall cater for two (2) ATFM controller positions and existing systems hardware. The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

b) The console shall be able to accommodate the following equipment:

- 2 x ATFM System CWS computers with each a dual screens, mouse and keyboard,
- 1 x DAID computer with screen, mouse and keyboard,
- 1 x SAWS (TITAN) desktop touchscreen unit,
- 1 x VCCS (old) desktop touchscreen unit,
- 1 x VCCS (new) desktop touchscreen unit,
- 1 x Office computer with screen, mouse and keyboard,
- 2 x Desktop Telephones.

The Bidder shall indicate how this is supported in the console design and layout with consideration of the dimensions provided in paragraph 9.8.2.8. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.2.4 ATFM Main System Console-2

a) The design of the console shall cater for one (1) ATFM controller position and existing systems hardware. The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

b) The console shall be able to accommodate the following equipment:

- 1 x ATFM System CWS computers with dual screens, mouse and keyboard,
- 1 x VCCS (old) desktop touchscreen unit
- 1 x VCCS (new) desktop touchscreen unit
- 1 x AIS computer with screen, mouse and keyboard,
- 1 x Office computer with screen, mouse and keyboard,
- 1 x TopSky computer with dual screens, mouse and keyboard

The Bidder shall indicate how this is supported in the console design and layout with consideration of the dimensions provided in paragraph 9.8.2.8. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.8.2.5 ATFM Main System Console-3

- a) The design of the console shall cater for one (1) ATFM controller position and one (1) ATFM Flight Plan Management position. The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) The console shall be able to accommodate the following equipment:

- 1 x ATFM System CWS computer with dual screens, mouse and keyboard,
- 1 x ATFM System Flight Management (FMWS) computer with a screen, mouse and keyboard.

The Bidder shall indicate how this is supported in the console design and layout with consideration of the dimensions provided in paragraph 9.8.2.8. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

9.8.2.6 Non-ATFM System Console-4

- a) The design of the console shall cater for four (4) non-ATFM positions. The Bidder shall indicate how this is supported in the console design and layout. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) The console shall be able to accommodate the following existing equipment:

- 1 x VCCS (old) desktop touchscreen unit
- 1 x VCCS (new) desktop touchscreen unit
- 2 x Office computers with each a screen, mouse and keyboard,
- 2 x Desktop Telephones

The Bidder shall indicate how this is supported in the console design and layout with consideration of the dimensions provided in paragraph 9.8.2.8. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.8.2.7 ATFM ATA and SSS Consoles

- a) The consoles for the ATA and the SSS shall be similar to the ATFM Main System Console 3 design with the exception that it shall cater for two (2) ATFM controller positions and one (1) ATFM Flight Plan Management position. The Bidder shall indicate how this is supported in the console design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) Each console shall be able to accommodate the following equipment:
- 2 x ATFM System CWS computer with dual screens, mouse and keyboard,
 - 1 x ATFM System Flight Management (FMWS) computer with a screen, mouse and keyboard.

The Bidder shall indicate how this is supported in the console design. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

9.8.2.8 Existing Systems Re-deployment

- a) The console design shall include the space requirement for existing systems based on the following: (I)

System	Hardware Dimensions	
DAID system	Computer Tower	(45 x 17 x 45) cm (Depth, Width, Height)
	Screen	(30 x 24) cm (Width, Height)
	Keyboard	(46 x 17) cm (Length, Depth)
	Mouse	Standard 3-button
SAWS system	Computer	(45 x 17 x 45) cm (Depth, Width, Height)
	Screen	(38 x 32) cm (Width, Height)
VCCS (old)	Touch screen	(30 x 24) cm (Length, Depth)
VCCS (new)	Touch screen	(48 x 25) cm (Length, Depth)
AIS system	Computer Tower	(45 x 17 x 45) cm (Depth, Width, Height)
	Screen	(57 x 36) cm (Width, Height)
	Keyboard	(46 x 17) cm (Length, Depth)

	Mouse	Standard 3-button
TopSky System	Computer	(45 x 17 x 45) cm (Depth, Width, Height)
	Screen	(53 x 35) cm (Width, Height)
	Keyboard	(46 x 17) cm (Length, Depth)
	Mouse	Standard 3-button
Office computer	Computer & Screen	(50 x 35) cm (Width, Height)
	Keyboard	(46 x 17) cm (Length, Depth)
	Mouse	Standard 3-button
Telephone	Desktop	(21 x 21) cm (Length, Depth)
	Portable Docking Station	(21 x 0.65) cm (Depth, Width)

Table 5: Existing Systems Hardware

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.3 Console Chairs

- a) Twelve (12) console chairs shall be provided. The Bidder shall confirm that the quantity has been included in the price schedules. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The chairs shall be a suitable operator chair in the executive chair range. The Bidder shall provide full details on the offered chairs. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The console chairs shall have the following characteristics:

- Five star nylon or metal base,
- 60mm dual casters,
- armrests,
- a vertical backrest,
- a horizontal seat surface,
- vertically adjustable, and
- a 360 degree swivel.

The Bidder shall include the offered console chair specifications to support the requirements. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The console chairs shall have a minimum of seven (7) year guarantee. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The console chairs shall be capable of being used for a 24x7 (24 hour a day x 7 days a week) shift position. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The console chairs shall have armrests which are removable and adjustable. The preferred adjustable range shall be between 190mm and 280mm above the compressed seat surface and at least 200mm in length. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The console chairs shall have a weight capacity of at least 150 kg. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The console chairs vertical back rest shall provide lumbar, thoracic and cervical spine support for the duration of the shift, and should be adjustable to suit the unique needs of

multiple users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The backrest of the console chairs shall be capable of forward and backward tilting with a lock function. The backward tilt should be at least 30 degrees with respect to the vertical position. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The console chairs shall incorporate perforated or ventilated materials to promote dissipation of natural body heat and drying of sweat. Cushioned areas shall be constructed from materials that resist sweat absorption. Preference will be given to a mesh back. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) The cushioning of the proposed console chairs shall have the following qualities, including but not limited to:
- Have flat, firm shape with enough softness to deform;
 - Have resilient material under the cushion to absorb shocks;
 - Support body weight, primarily around the two bony points of the pelvis; and
 - Avoid applying pressure under the thighs.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) The console chairs shall consist of a minimum of 50% recycled content. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) The console chairs shall have a head rest. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- n) The console chairs shall be vertically adjustable by means of a gas cylinder. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- o) The console chairs shall have a self-adjusting synchro tilt mechanism. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- p) The console chair shall be an ergonomically certified chair. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- q) The console chair shall be black in colour. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.8.4 Furniture

- a) The FAOR Main ATC Centre shall be furnished with the following furniture to support the operation of the ATFM Main System:

- 1 X Boardroom table (6-seater)
- 6 X Boardroom chairs
- 2 X Storage cabinets (Vertical)
- 2 X Storage cabinets (Horizontal)

The Bidder shall confirm that the quantity has been included in the price schedules. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

9.8.4.1 Boardroom Table

- a) The boardroom shall be equipped with a 6-seater boardroom table and associated chairs.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- b) The dimensions of the boardroom are 370 x 350 cm. (I)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]	

- c) The dimensions of the boardroom table shall be a minimum of 180 x 90 (cm), however the offered boardroom table dimensions shall take the available space and comfort of 6 seated persons into consideration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- d) The boardroom table shall be constructed from durable material with an expected life of 10 years. The Bidder shall provide full details to support compliance to the requirement.
(D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The top surface of the conference table shall have a thickness of at least 32mm. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The conference table shall be rectangular shaped. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The conference table shall have a Power Distribution Unit (PDU) in the centre of the table.
(I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- h) The PDU shall have at least two International Electrotechnical Commission (IEC) Type M (South African standard 3 pin) sockets, two IEC Type N (New 3 pin standard) sockets and two RJ45 ethernet plug points. The Bidder shall provide full details of the PDU offered.
(D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The cables in the boardroom shall be routed from the wall skirting to the PDU connection points. The cables shall be routed in the existing computer flooring. Cable management

and cable trays shall be provided. The Bidder shall provide full details on the cable management and cable trays offered. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The conference table shall have a cable management system so that the cables can be routed neatly underneath the table. The cable management system shall allow for separation of power and communication cables. The Bidder shall provide full details on the cable management system offered. (D)



Figure 24: Photo of current Boardroom table

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.4.2 Boardroom Chairs

- a) The boardroom shall be supplied with 6 boardroom chairs. The Bidder shall confirm that the quantity has been included in the price schedules. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The boardroom chairs shall have armrests which can easily slide under the conference table when the chair is at its lowest vertical adjustment setting. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The boardroom chairs shall have at least 5 castors. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The boardroom chairs shall have a weight capacity of at least 150 kg. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The backrest of the boardroom chairs shall be capable of forward and backward tilting with a lock function. The backward tilt should be at least 30 degrees with respect to the vertical position. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The boardroom chairs shall incorporate perforated or ventilated materials to promote dissipation of natural body heat and drying of sweat. Cushioned areas shall be constructed from materials that resist sweat absorption. Preference will be given to a mesh back. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The cushioning of the proposed boardroom chairs shall have the following qualities, including but not limited to:
- Have flat, firm shape with enough softness to deform;
 - Have resilient material under the cushion to absorb shocks;
 - Support body weight, primarily around the two bony points of the pelvis; and
 - Avoid applying pressure under the thighs.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) The boardroom chairs shall consist of a minimum of 50% recycled content. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) The boardroom chairs shall be vertically adjustable by means of a gas cylinder. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) The boardroom chairs shall be an ergonomically certified chair. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) The boardroom chairs shall be black in colour. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.4.3 Storage Cabinets

- a) The storage cabinets shall be constructed from recyclable material. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- b) The storage cabinet shelves shall be height adjustable to at least 3 different levels. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The side panels and the shelf of the filing cabinet shall have a thickness of at least 25mm. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The top surface of the storage cabinet shall have a thickness of at least 32mm. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The base of the storage cabinet shall have a thickness of at least 50mm. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.4.4 Vertical storage cabinets

Two (2) vertical storage cabinets shall be provided. (I)



Figure 25: Photo of current vertical cabinets

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

9.8.4.4.1 Vertical Cabinet 1

- a. The vertical cabinet 1 shall have dimensions of approximately 96 X 62 X 152 (cm) (Width X Depth X Height) and shall fit in the available space of 124 X 80 (cm) (Width X Depth). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The cabinet shall be fitted with at least four (4) adjustable shelves. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The cabinet shall have two lockable doors. The Bidder shall provide full details to support compliance to the requirement. (D)



Figure 26: Photo of current vertical cabinet 1

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.8.4.4.2 Vertical Cabinet 2

- a. The vertical cabinet 2 shall have dimensions of approximately 78 X 62 X 152 (cm) (Width X Depth X Height) and shall fit in the available space of 78 X 80 (cm) (Width X Depth). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- b. The cabinet shall be fitted with at least four (4) adjustable shelves. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- c. The cabinet shall have two lockable doors. The Bidder shall provide full details to support compliance to the requirement. (D)



Figure 27: Photo of current vertical cabinet 2

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

9.8.4.5 Horizontal storage cabinets

Provision shall be made for the supply of two (2) horizontal storage cabinets. (I)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]

9.8.4.5.1 Horizontal Cabinet 1

- a. The horizontal cabinet 1 shall have dimensions of approximately 184 X 60 X 78 (cm) (Width X Depth X Height) and shall fit in the available space of 240 X 80 (cm) (Width X Depth). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The cabinet shall be fitted with at least four (4) adjustable shelves. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The cabinet shall have four (4) lockable doors. The Bidder shall provide full details to support compliance to the requirement. (D)



Figure 28: Photo of current horizontal cabinet 1

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.4.5.2 Horizontal Cabinet 2 - Bottom

- a. The bottom part of horizontal cabinet 2 shall have dimensions of approximately 260 X 60 X 76 (cm) (Width X Depth X Height) and shall fit in the available space of 270 X 80 (cm)

(Width X Depth). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The bottom part of the cabinet shall be fitted with at least 2 adjustable shelves. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The bottom part of the cabinet shall have three (3) lockable doors. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

9.8.4.5.3 Horizontal Cabinet 2 - Top

- a. The top part of horizontal cabinet 2 shall have dimensions of approximately 130 X 37 X 124 (cm) (Width X Depth X Height) and shall fit in the available space of 270 X 80 (cm) (Width X Depth). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b. The top part of the cabinet shall be fitted with at least 2 adjustable shelves. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The top part of the cabinet shall have two (2) lockable doors. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	



Figure 29: Photo of current horizontal cabinet 2

9.9 Air Conditioning System

- A. The ATFM System's equipment shall be installed in existing locations serviced by existing air-conditioning. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

10 SYSTEMS MANAGEMENT, SUPPORT AND MAINTENANCE

10.1 Technical System Control, Monitoring and Supervision (CMS)

- A. An SNMP based technical monitoring, control and supervision (MCS) GUI tool that presents a visual layout (Dashboard – Refer to ATFM Replacement Volume 2 Appendix, Section 4, Appendix D: Dashboard examples) of all systems (including remote and external virtual systems/positions) and their associated components, including drill down options to sub-component and devices level, shall be provided for the control, monitoring and supervision of each ATFM System's (Main, ATA, DR, remote positions/workstations) functional and technical aspects. Refer to an example in Figure 30 showing ATNS requirement aim and concept. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. This MCS tool, for all System-Components (refer to definition), shall track, and shall continuously log (in a database) against date and time stamps, all statuses and performances, and shall provide a live presentation of all node and systems' System-Components. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The ATFM Systems shall implement a consistent system monitoring, control and supervision management software framework for the unified management of all ATFM System-Components per system in one application. This shall include tools for the:
- System
 - Network
 - All types of all system Databases
 - Interfaces
 - Reports

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The MCS shall gather status, failure and fault information from the ATFM sub systems, performs processing and storage, management of system and device components, and display the information at the technical operator workstations in a systems layout manner. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. Each system's associated System-Components (Refer to definition) such as node applications; user applications and programs; application and program CSCI's; node internal/external components and hardware devices plus all their associated interfaces; all system network devices and interfaces; all system physical and logical databases and storage spaces, statuses and interfaces data quality, integrity and performance, as well as their availability statuses shall:

- a) be monitored,
- b) be user controllable and manageable,
- c) be supervised,
- d) raise audible alerts when downgraded in any which way,
- e) raise visual (flashing and colour coded) alerts when downgraded in any which way,
- f) enable the user to acknowledge the flashing and audible alert but not the colour coding,

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The MCS shall be applied for local and for external users monitoring and control, providing an efficient top-level maintenance management solution. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The following additional items for each node and interface devices (including network equipment) for all ATFM Systems (Main, ATA, DR) shall also be monitored and logged in a database as follows:

- a) Uptime – number of days

- b) Automatic and manual Shutdowns and Reboots – dated and timestamped
- c) Manual and automatic main applications Stops and Restarts – dated and timestamped
- d) Automatic and manual interfaces disconnections and re-connections – dated and timestamped.
- e) Dates and timestamps shall be logged according to the ISO 8601 date and time standard and shall be in the format yyyyMMdd HH:mm:ss.SSS
- f) All operating and API related commands executed by every human-user shall be stored for all technical users.
- g) All CDC, CSCI, threading, local and external communications, data exchanges on a node for all its application software components' disconnections, re-connections, failures, recoveries, and normal interaction and message exchanges shall be logged.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. All system monitoring, control and management events shall be logged in a relational postgres/sql or oracle/sql database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. A software tool shall be made available to pull reports on all the above through a user specified day or date period. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The main Application Program Instances (APIs) and client APIs statuses of all nodes for each ATFM System (Main, ATA, DR) shall form part of the MCS GUI Tool's monitoring, control and supervision. These shall also include all main operator (Operational and Technical) Desktop APIs such as Web browser, email program, office related programs, Enterprise manager, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. The statuses of all logical and physical links, their data (integrity, availability and quality), as well as for all system nodes, shall be available to be viewed on operational HMI positions through a selection from a drop down menu, as well as through a coloured pop-up indication on the main display when any status other than "NORMAL" is present and shall allow for acknowledgement. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. The MCS shall present a visual and graphical layout of all systems (including remote and external virtual systems/positions) and their associated hardware and software logical components. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- M. The hardware and software components (System-Components – refer to definition) shall include, but not be limited to, drill down menu (or mouse click selection) options to sub-components, interfaces, network and computer hardware devices level, physical and logical connections of all interfaces and interconnections to internal and external devices and components, services, per computer and its associated devices as well as all network interconnections and devices. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- N. The drill down menu options defined above shall also include links and interfaces from ATFM internal system components as well as from external systems linking to the ATFM Systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- O. For the System-Components each shall be manageable through the control, monitoring and supervision of each for all the ATFM systems and subscribed clients/Stakeholders. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- P. The MCS management framework shall support as a minimum:
- the management of the system configuration;
 - the management of system functions (re-initialisation, reboot, stop, start, halt, shutdown, etc.);
 - the monitoring, logging, retrieval, and inspection of faults and erroneous situations encountered;
 - the gathering of statistics;
 - the management of security and access controls.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- Q. The ATFM System shall implement protective mechanisms when the internal resources are reduced to a minimum. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- R. The ATFM System shall however still respond to operator commands when the protective mechanisms are active. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- S. The MCS tool shall track and shall continuously log (in a Dynamic Database) all statuses and shall provide a live presentation of the statuses of all system and computer resources, components, and associated sub-components of each, including their performance. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- T. Each computer's hardware System-Components statuses, as well as capacity and usage (where applicable) and performance, to be monitored and presented on the MCS via drill-down menu selections shall include, but not be limited to:

- a) PSUs – both in the DUAL PSU redundancy configuration
- b) RAM
- c) CPUs – All if multiple CPUs
- d) FANS – including CPU, PSU, RAM, GPU fans where applicable
- e) NIC – Onboard and PCI/EPCI NICs – active/passive/data transfer
- f) HDDs – all drives including RAID storage arrays where applicable.
- g) Video/Graphics CARDS – GPU and VRAM
- h) Audio (Sound)
- i) Temperatures of applicable devices
- j) Plugged/Connected devices

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- U. The colour coded status indications for the pre-mentioned monitoring and supervision items to be presented on the technical MCS GUI tool as well as for the HMI operational positions where applicable shall include (not limited to) the items in Table 6

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]

Table 6: Colour Code of Status Indicators

Status Colour	Description of Colour Status Meaning
GREEN	All normal
YELLOW	Physically normal, but logically downgraded.
AMBER	Physically and logically normal, data quality downgraded.
RED	Physically and logically downgraded.
TURQUOISE	Unknown status
MAGENTA	Not configured

- V. The MCS tool shall cater for screen recording software (Screen Recorder) to record screen events and user actions. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- W. The Screen Recorder shall be manually activated by the TGU and TSAU when required and shall not run as a system API continuously. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

10.2 Control

- A. The MCS shall enable the operator with the appropriate access rights to:
- Stop and restart software applications running on a computer (individually or globally).
 - Actively attach and detach monitored external lines.
 - Start each online computer in an offline-defined configuration.
 - Globally restart or shutdown all online computers of the ATFM System.
 - Stop and restart software applications running on a computer (individually or globally).
 - Switch between Master and Slave computers.
 - Flag system degradations, errors, all system relevant component failures including internal and external interfaces, and non-operational conditions.
 - Attach and detach monitored external lines, relevant application components, and interfaces.

- i) Monitor and manage all SNMP-capable devices attached to the network.
- j) Discover IP addresses of computers on reachable networks and resolve against host names.
- k) Maintain a 5-year MCS System-Components log and storage on a RAID-6 SAN servers.
- l) Request updated status information from the System Control and Monitoring (SCM) application.
- m) Access the database management tool.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

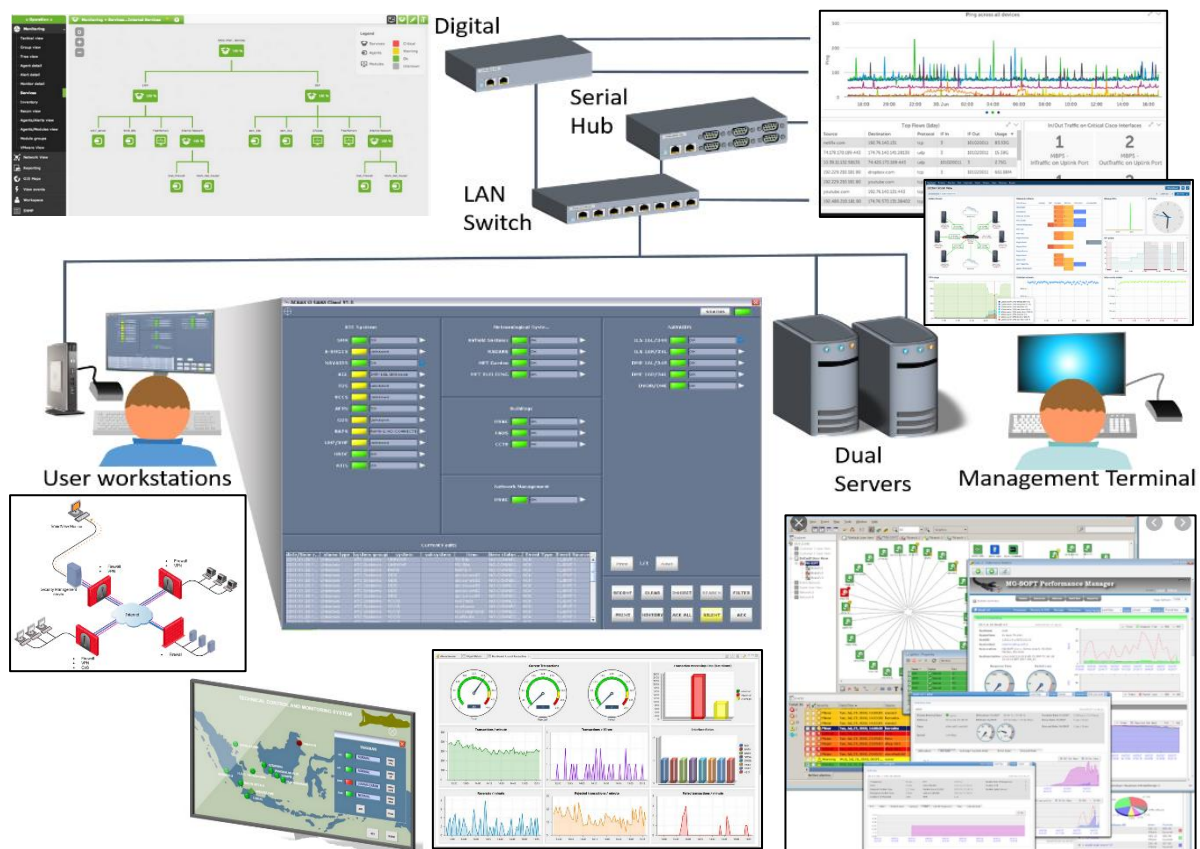


Figure 30: Example of ATNS MCS Requirement Aim.

10.3 Network Monitoring and Management

- A. The network monitoring and management software tool (NMMS) shall be integrated into the MCS and shall be specifically tailored for all of the ATFM System components on the network. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- B. The NMMS shall involve all associated network components and shall be user administrator configurable for further customization and future additions to the system network or system itself. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]	
[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]	

- C. The NMMS shall be a HTML or web-based tool or similar. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The NMMS shall be capable of presenting graphical and text-based analysis of historical and current network traffic which shall be selectable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The NMMS shall be capable of detection of threat hunting and shall provide audible and visual alerting accordingly. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The NMMS shall be capable of continuously and actively display and log historical and current network traffic analysis in graphical or text format selectable by the user. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The tool shall provide real-time network performance analysis continuously with associated colour displays and alerts if congestion or other performance issues are detected also configurable by the user. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- H. Performance monitoring and logging shall include, but not limited to, analysis, testing, fault diagnostics and troubleshooting, availability, discovering, tracking and reporting of the following but also not limited to:
- Bandwidth consumption,
 - Data transfer network load,
 - Unauthorized high bandwidth consumption like streaming,
 - Show connections and bottlenecks,
 - Network components availability,
 - Critical path visualization,
 - Intelligent mapping,
 - Advanced alerting,
 - Packet inspections and analysis,
 - SNMP monitoring/ scanning/ testing/ and trap receiving,
 - Network latency for connections,
 - Links and interfaces from ATFM internal system components as well as from external systems linking to the ATFM System.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- I. A Dynamic Database storage space shall be made available on the NMMS to retain all logged data for a 1-year period which shall also include saved reports. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- J. The NMMS shall allow users to pull customised reports for analytical and statistical purposes via selection of each item/component for each associated category of all of the aforementioned items although not limited to these. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- K. It shall be possible to export statistical and analytical reports to external USB devices of historical and current network traffic analysis for reporting purposes must be possible in Excel format or Windows based office software readable formats allowing for easy report incorporation – formats selectable by user for export. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- L. System mapping and critical path visualization must display a graphical layout using colour codes and must include a graphical presentation of all network components and system computers with IP addresses and hostnames. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.4 CWS Data Recording and Replay

- A. Every CWS shall provide for all relevant screen information to be recorded 24/7 for replay purposes including all user actions (mouse pointer included) and their results, all open windows, all screen events (automatically and manually created events), etc. and shall be stored on the CWS in a dedicated Common Database storage space as well as on a Dynamic relational database SAN server. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. CWS recordings shall periodically and automatically be stored to the SAN storage server. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. It shall be possible for TSAU to perform manual backups and restores of recordings from the SAN server. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. For retrieval and replay of recorded screen information and recorded screen data a Replay Tool (REPT) shall be provided. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- E. The Replay Tool shall be made available on all CWS and MCS workstations and shall be launched when selected after a username and password were entered. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- F. The REPT shall cater for replay data to be retrieved from the workstation for a 30-day period as well as from the SAN storage drives for a period of 360-days selectable on the replay tool. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- G. The REPT shall have the following capabilities on every CWS (unless a separate REPT recording and replay workstation position is provided for this purpose to replay and record every workstation's screen information):
- The REPT shall be username and password protected.
 - The REPT shall provide for high resolution video recordings and playback.
 - Operator actions and associated event results including mouse pointer positions and alarms shall be recorded.

- d) The REPT shall have a screenshot capture capability during replays which shall be printable in colour as well as be exportable to the desktop and USB devices where the replay takes place.
- e) Snippet movie video capturing for a specific time period during replay which shall be exportable to the desktop and USB devices.
- f) Movies and screenshots shall be in a standard format allowing for playing of the videos and viewing of screenshots on a Windows computer without additional and special movie playing and screenshot viewing software requirements. For example .AVI and .MP4 formats.
- g) The REPT shall have the capability to replay a specific CWS screen recording that shall be selectable by the user.
- h) The REPT shall have a slider capability for replays allowing the user to action fast forward and fast backward viewing choices.
- i) The REPT shall have replay pause/play/stop capabilities.
- j) The REPT shall have slow speed/fast speed replay capabilities.
- k) The REPT shall have the capability to allow the user to specify a start and end time for retrieval of a listing of the recorded data during the specified period.
- l) The REPT shall allow the user to select on the list of recordings presented for the specified period through highlighting the required recording files to replay.
- m) The REPT replays shall be responsive, smooth and shall not have any considerable lag during replays as well as during forward and backward viewing actions.
- n) The REPT shall allow for an exact replay of all user actions and screen events while providing the option for the user to select certain additional display items such as maps and vectoring during the replay sessions.
- o) The REPT shall have a zoom-in/out capability during replay.
- p) The REPT shall capture user actions and screen events for both HMI screens per CWS that shall operate in an extended desktop display configuration.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.5 User Events Recording

- A. The ATFM System shall allow for the recording of all user actions performed whether a subscribed user (for e.g, according to defined roles and airline/web user designators, etc.) or whether any of the user levels described in Section 7.2.5. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- B. It shall be possible to retrieve which user, whether from a local or remote Web application or from a CWS, CMS, FPMW workstation, has manually altered and manipulated for example the flight/CTOT data, which user has modelled or ran a GDP or AFP, which user stopped/started a node, which user pulled reports, which user played back what time period for which position, etc. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- C. The user events recordings shall be date and time stamped with all other relevant information required to identify which user has performed/launched/executed what function or action. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

10.6 Connections and Links Monitoring

- A. The ATFM Systems shall provide an audible and visual alert to (Controller Working Positions) CWP positions when a physical or logical connection or link fails. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- B. The audible alert shall be user acknowledgeable while the visual alert shall remain until the problem is resolved and the interface connection and link restored. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- C. Immediately after a logical or physical link or connection failure is restored, the ATFM System shall automatically re-connect and re-establish communication as well as automatically start processing received data again. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.7 System Backup

- A. The ATFM System shall cater for two data backup SAN RAID-6 storage servers; one operational SAN for the MAIN System and a backup SAN server for the DR System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. SAN to SAN replication shall be provided between the two backup SAN storage servers to duplicate the data in real-time. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. The MAIN System shall backup all data to the MAIN System SAN with periodic intervals of 5 to 15 minutes depending on the type of data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- D. The ATFM System shall include the functions, tools and procedures to manually generate a backup of all operational databases, configurations and software. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- E. The performance of the hardware shall be adequate to accommodate the application. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.7.1 System Archiving

- a) The archiving storage capacity for the two backup SAN storage servers shall be sufficient to accommodate 5 years of data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The ATFM System storage data types, including CWP user and event action recordings shall cater for a storage capacity of at least 6 months on the server and/or position itself. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The ATFM System shall include the function and mechanism to archive SAN data to an appropriate external storage system (e.g. external USB hard drive). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The ATFM System shall cater for the function to retrieve and replay archived operational data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- e) The ATFM System shall ensure that all archived data will be replayable regardless of the current software version. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.7.2 SAN and RAID Storage Space

- a) Dynamic, Centralised and Cloud storage databases shall reside on SAN drives in at least a RAID-6 configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The SAN drives shall be provided in a full redundant configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) It shall be possible to restore any of the SAN storage servers from the remainder SAN storage (split volume or separate SAN server), in the dual computer configuration, in the event of a failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The primary SAN storage server shall periodically send “alive” or heartbeat messages to each other to determine operational statuses. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The primary SAN storage server shall ensure synchronisation between itself and the secondary SAN storage server to ensure consistency of data between the split volume or two SAN servers. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.8 Fault and Error Handling

- A. The Main System shall implement continuous supervision of the health state of all its components. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The Main System shall implement fault and error management and shall log all faults and errors in appropriate logs for a configurable period (minimum retention period of 3 months (90 days)). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- C. Different fault and error handling mechanisms shall be implemented for all components of the software for logging.
- Normal operational software alarms shall be written to an alarms log.
 - In the event of operational software failure, the failure core/dump information, shall be written to a core/dump log;

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- D. The Main System shall automatically take action (e.g. switchover or re-assign resources) upon the detection of a fault. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- E. The Main system shall take the following action with regards to any software failure detected:
- a) Automatically restart the application software;
 - b) In case of automatic restart failure, prompt for manual restart of the application software;

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- F. The Main system shall take the following action with regards to any hardware failure detected:
- a) In case of main server failure (main/standby configuration), automatically switchover the application software from the main server to the standby server;
 - b) In case of host failure (virtual configuration), automatically migrate/relocate all virtual machines on the failed host to other hosts in the environment;
 - c) The Main system shall not perform any automatic action in case of a complete system (operational system hardware) failure. Manual intervention shall be required to perform a failover to the DR system;

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
-----------------------------------	--

<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- G. The Main System shall be able to perform an automatic re-initialisation with full recovery (e.g. restart of the affected system components) as part of its fault and error management process, upon detection of a fault. The maximum number of automatic restarts shall be configurable

(to prevent infinite restart loops). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

H. The Main System shall cater for the following restart options in the event of a manual reinitialization (restart):

- a) Restart with full recovery (no information is lost);
- b) Restart without the day's information;
- c) Restart with no recovery.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

I. There shall be no loss in information during a switchover from the primary to the standby server. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

J. The system shall have a restart time of less than 5 minutes to become operationally available and usable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.9 Server Management and Redundancy

10.9.1 GDG/AFT Servers

- a) Servers shall be implemented in a dual Master and Slave computer Computation Redundancy Mode (or equivalent or better) (CRM) configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Both the master and slave AFT and GDG servers shall receive all data and information from all system components and external systems simultaneously and process all data in parallel. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Only the master AFT server and master GDG DB instance server shall output data to the relevant system software components and applications, as well as receive data and sent data to all external systems where applicable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The Master GDG server shall correlate the data of the slave GDG database instance, and shall update it continuously if, when, and where necessary, to ensure consistency between the two GDG database instances. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The two GDG database instances shall acknowledge the status of one another through periodic heartbeat messaging. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Master to slave AFT and GDG switchovers shall be transparent to the users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Master to slave AFT and GDG switchovers shall be automatically initiated when a failure or discrepancy is detected in the current master computer AFT application or GDG database instance, or some other failure, and it shall be seamlessly performed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) There shall be an automatic and pertinent prevention measure in place to prevent possible GDG database instance corruption during or when a switchover is initiated. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) In the event of a switchover, if the slave GDG server/database is prevented from taking over as the new master for whatever reason, there shall be a failsafe implemented to prevent conflict between the two databases on who is the master. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) In the event of a manual intervention, it shall always be possible for technical staff to determine, through selection, which GDG database shall be the new master even if it means that an aged (not older than 30 minutes) copy of the database shall be available to bring the previous GDG master, or to bring the selected to-be-new master database online again using the aged copy. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- k) The system shall always cater for a copy of the master and slave GDG databases to be available within a 30-minute aged time period for restoration in case a failure of one database occurs due to corruption or other failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- l) If one GDG database is restored using the aged copy, and the other database is still running, the new slave GDG database shall be updated to be once again consistent with that of the running GDG database instance. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- m) In case a hardware or other abrupt failure occurs on the server running the master GDG database instance, the slave GDG server shall automatically and seamlessly take over as the new master GDG database instance. Incomplete messaging threads that were taking place during the time of failure between the two instances shall be discarded and ignored not to prevent the slave GDG database instance to become the master due to incomplete update threads or other incomplete message exchanges between the two GDG database instance at the time of failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.9.2 Web Application servers

- a) Both the master and slave Web application servers shall receive all data and information from all relevant system components simultaneously and process all data in parallel. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Computation Redundancy Mode (or equivalent or better) (CRM) shall be implemented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Only the master Web application server shall communicate with the ISP provider interface. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Only the master Web application server shall communicate with the master AFT and Master GDG components. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The Master shall correlate the data of the slave server, and shall update the associated database continuously if, when, and where necessary, to ensure consistency between the two servers' processing. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) A fully restorable copy of the master and slave web application databases shall be periodically saved (30 to 60-minute intervals) and shall be usable to restore any of the

two database instances manually. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) The two servers shall acknowledge the status of the other through periodic heartbeat messaging. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Master to slave switchovers of the Web application server computers shall:
- Be transparent to the users.
 - Be automatically initiated when a failure or discrepancy is detected in the current master computer application, hardware, or due to some other failure/discrepancy, and it shall be seamlessly performed.
 - Allow for the new master web application server to automatically connect to the ISP interface without human involvement.
 - Allow for the new master to automatically establish communication to the master AFT and GDG components.
 - Allow for the web application database to be automatically switched over to that of the new master web application database and automatically establish all relevant communication channels.
 - Allow for an automatic and pertinent prevention measure in place to prevent possible database corruption during or when a switchover is initiated.
 - In the event that the slave is prevented from taking over as the new master for whatever reason, there shall be no battle arising between the two databases fighting over who shall be the master when the service is restored on the previous master server.
 - Allow for manual intervention by technical staff to determine, through selection, which database shall be the new master even if it means that an aged (30-60 minutes) copy of the database shall be available to bring the previous master, or to bring the selected to-be-new master database online again using the aged copy.
 - Always cater for a copy of the master and slave databases to be available within a 30 to 60-minute aged time period for restoration in case a failure on one database occurs due to corruption or other failure.

- j. Allow for the new slave database instance to be updated by the master database instance to establish consistency between two instances.
- k. Provide for technical administrators to manually initiate a seamless switchover and shall have the same automatic and pertinent prevention measures in place for preventing possible database corruption during or when a switchover is initiated.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.9.3 FDP and Other Redundant Servers

- a) Both the master and slave servers shall receive all data and information from all relevant System Components and interfaces simultaneously and process all data in parallel. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) Computation Redundancy Mode (or better) (CRM) shall be implemented. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Only the master application server shall output data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) The Master shall correlate the data of the slave server and shall update the associated databases and other system components (CDCs, etc.) continuously if, when, and where necessary, to ensure consistency between the two servers' processing. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The Master and Slave servers shall acknowledge the status of the other through periodic heartbeat messaging. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) Master to slave server switchovers shall:
- Be transparent to the users.
 - Be automatically initiated when a failure or discrepancy is detected in the current master computer application, hardware, or due to some other failure/discrepancy, and it shall be seamlessly performed.
 - Allow for the new master server to automatically connect to physical and logical interfaces without human involvement.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10 Database Management

10.10.1 General

- [a] The ATFM System supplier shall provide procedures and manuals for each of the databases and database types deployed within the ATFM System to cater for, but not limited to, the following:
- Backup, restore, and disaster recovery – scheduled, from the DBMS tool.
 - Creation of a new DB - installation, tweaking, configuration and setup.
 - DB structure and hierarchy – table space names and content for each included
 - Database Management User Manual (DBMS tool – refer to Section 10.10.2)
 - Maintenance and Housekeeping
 - Report generation and queries

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [b] All databases, and associated DBMS tools, shall be made secure and shall utilise username and password protection before access is granted. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [c] All databases shall be secured according to the latest industry security measures as well as applicable security measures as depicted in Section 7.2. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [d] The ATFM System shall automatically manage the data storage space for all databases and database types to prevent a failure of the data storage function and loss of data due to inadequate storage space. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [e] The ATFM System shall cater for adequate storage to meet the retention period specified for each databases and database types. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [f] The ATFM System shall cater for automatic and manual backup capabilities on all databases and database types. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [g] The ATFM System shall cater for the restoration and recovery of all databases and database types from the backups defined in paragraph [f] above, through command line instructions as well as the associated Database Management GUI Tool. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [h] The ATFM System shall incorporate data loss prevention measures on all databases and database types to prevent any malfunction or failure resulting in a data loss. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.2 Database Management System (DBMS)

- a) All databases, local and/or virtual, shall be managed from a comprehensive and effective User-Friendly (refer to definition) Database Management System (DBMS) GUI tool (Can be separate DBMS GUI tools for the different types of databases or combined with MCS). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The management responsibilities for the DBMS (even if different database types have different GUI DBMS tools) shall incorporate the following for all relevant System-Components, but not be limited to:

- i. View all Historical and real-time information within the databases through query selection options from a drop-down list which was derived from the database table space names,
- ii. the processes applied to databases (such as access and modification for user related management),
- iii. View all the databases' logical structures (e.g. Table spaces and names plus descriptions for each),
- iv. creation of a database from scratch, rebuild and restore of the databases, cloning of databases,
- v. backup and archiving of databases,
- vi. monitoring of all relevant System-Components aspects of the databases, (e.g. performance, monitoring, statuses, storage space usage, etc.),
- vii. switching between primary and secondary databases,
- viii. clean-up of databases,

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) The DBMS (even if different database types have different GUI DBMS tools) shall also facilitate and cater for all additional administrative operations as per the System-Components definition and as per each DB's associated and relevant aspects thereof.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.3 Static Databases

Static databases refer to the storage space of offline system behavioural configuration and parameter data files used to define default ATFM functional and operational system components for behavioural and start-up configurations and initialisations. (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- [a] All Static databases shall initially be populated by the vendor with the latest operational data as existing within other systems such as the TopSky-ATC ATM system for consistency between the ATFM System and the other systems concerning relevant airspace aspects. (e.g.

Airspace volumes and sectors, maps, aircraft types and performances, etc.). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [b] The associated DBMS GUI tool for all Static DBs shall allow for semantic, syntactic, relationships, dependencies and other relevant validation checks to be comprehensively and effectively performed upon submission/loading of changes/updates before the administrator is able to deploy the updates to the ATFM System. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- [c] After deployment and activation of updates/changes to a Static DB on the operational system and a problem occurs or is detected, it shall be possible to switch between the current and previous Static database parameters without the requirement to re-distribute the previous database parameters. (Shall be an easy and smooth switch from the current to the previous). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.4 Dynamic Databases

Dynamic Databases refer to the continuously amended storage spaces for online and live system data that can automatically or manually be altered, updated, changed, collected, pulled, for real-time functional, tactical and/or historical data manipulation purposes which is accessed and populated by a single source or multiple sources. (e.g. GDG, Web application and other relational databases). (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- a) Two mirror-image relational database instances shall be provided, on two different computers, in a Master (primary) and Slave (secondary) configuration. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) The Primary/Master Database shall periodically update the Standby/Slave Database to ensure consistency between databases. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Both the master and slave Dynamic Databases shall receive all data and information from all system functional components and external systems simultaneously and process all data in parallel. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) Only the master GDG DB instance shall output data to the relevant system software components and applications, as well as to all external systems. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The Master shall correlate the data of the slave database instance, and shall update it continuously if, when, and where necessary, to ensure consistency between the two GDG database instances. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) The two database instances shall acknowledge the status of the other instance through periodic heartbeat messaging. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) Switchovers between the Master and Slave database instances shall be automatically initiated when a failure or discrepancy is detected in the current master node application or database instance, or some other failure, and it shall be seamlessly performed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- h) Switchovers shall be transparent to the users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- i) There shall be an automatic and pertinent prevention measure in place to prevent possible database corruption during or when a switchover is initiated. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- j) During switchovers, if the slave is prevented from taking over as the new master for whatever reason, there shall be no battle arising between the two databases fighting over who shall be the master. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	

<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- k) With manual intervention (command line and the DBMS), it shall always be possible for technical staff to determine, through selection, which database shall be the new master even if it means that an aged (not older than 30 minutes) copy of the database shall be available to bring the previous master, or to bring the selected to-be-new master database, online again using the aged copy. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- l) Therefore, the system shall always cater for a copy of the master and slave databases to be available within a 30-minute aged time period for restoration in case a failure of one database occurs due to corruption or other failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- m) If one database is restored using the aged copy (from command line and the DBMS), and the other database is still running, the new slave database shall be updated to be once again consistent with that of the running database instance without affecting the running database instance performance in any user noticeable way. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- n) Provision shall be made to enable technical administrators to manually initiate a seamless switchover from command line and from the DBMS and shall have the same automatic and pertinent prevention measures in place for preventing possible database corruption during or when a switchover is initiated. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- o) In case a hardware or other abrupt failure occurs on the server running the master database instance, the slave shall automatically and seamlessly take over as the new master database instance. Incomplete messaging threads that were taking place during the time of failure between the two instances shall be discarded and ignored not to prevent the slave database instance to become the master due to incomplete update threads or other incomplete message exchanges between the two database instances at the time of failure. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- p) A Data Guard or similar shall be implemented in order to ensure synchronisation of the data between the two DBs to ensure high availability, data protection and disaster recovery. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
--

- q) Data for Dynamic Databases shall be retained for at least a 5-year period and appropriate storage space shall be made available to prevent HDD or storage spaces to fill up. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]

[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]
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10.10.5 Common Databases

Common Databases are defined as any dynamic data storage space/location that shall be shared between application software versions without the requirement to copy it from one software version to another after software upgrades and shall therefore be independent of which software version is running. (I)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>
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The ATFM System shall deploy Common Databases based on the following requirements:

- a) The Common Databases shall reside on a dual computer configuration (mirror-image of one another). The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) These Common Databases shall be managed such that there shall be no need to copy the databases from one software version to another after software version upgrades. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) Provision shall be made to back-up and restore these Common Databases. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) These Common Databases shall be periodically and systematically cleaned up (cyclical files) according to date stamps of the files. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) The data/file retention period of each Common Database shall be 5-years and appropriate storage space shall be made available to prevent HDD or storage spaces to fill up. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

10.10.6 Centralised Databases

Centralised Databases refer to data stored in a Centralised logical or Virtualised relational Dynamic or Common Database that is accessible by external or remote users or systems from different locations. (I)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>
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- a) Centralised Databases shall be effectively protected against data corruption during user access/input/retrieval of data. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- b) All applicable aspects shall apply to Centralised Databases as depicted in Sections 10.10.4 and 10.10.5 for Dynamic and Common Databases, respectively, as and where applicable. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- c) Centralised Databases shall allow live and real-time access to authorised and subscribed users. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- d) Centralised Databases shall enhance performance by applying all data which represents an object (Folders, Documents, Users, Groups) to be stored in a flat table. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- e) Each flat table row shall include IDs, KEYS, a BLOB for the metadata and the security access control lists. These metadata shall not be accessible through standard SQL and it shall not be possible for the systems' standard reporting tools to access this metadata. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- f) All Centralised Databases shall be designed by applying all the latest optimisation and tuning methods, structures and configurations to enhance performance. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- g) All Centralised Databases shall form part of the concept as depicted in Figure 9. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.7 Operational Databases

Operational Databases refer to a temporarily local (to server or computer) storage space of dynamic data generated by the system or a user. (e.g. commands executed per user per node, FPL updates, MCS logs, traces, communication digital data signals, etc.) (I)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>	

- a) After a dual computer reboot/shutdown/halt was performed, all relevant Operational Databases shall be available, and automatically restored for continuation of processing from the point when the reboot/shutdown/halt occurred. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- b) After a dual computer application restart/stop was performed, all relevant Operational Databases shall be available, and automatically restored for continuation of processing from the point when the restart/stop occurred. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c) It shall be possible to backup the data of an Operational Database. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d) It shall be possible to retrieve 1-years' data from any Operational Database for analysis/trends/investigation purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8 Cloud Databases

10.10.8.1 Cloud Database Structure

- a. A Cloud database is similar to a Dynamic Database and shall be hosted by ATNS as a Virtualised DB to whom the internal and external Stakeholders (refer to definition) shall subscribe to. (I)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER MAY INSERT A RESPONSE WHERE APPLICABLE]</i>
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- b. The Cloud database management shall be the same as for the Dynamic Database described in 10.10.4. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- c. The basis of the cloud DB structure shall address the following levels and layers of architecture:
- i. End Users Usage – external layer
 - ii. User Cloud Application Management – Conceptual middleware layer
 - iii. DB Administration – conceptual layer
 - iv. Security – conceptual and physical middleware layer
 - v. Servers, Storage and Data Centre – Physical layer

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
<i>[THE BIDDER SHALL INSERT FULL RESPONSE FOR EVALUATION HERE]</i>	
<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- d. The basis of the DB management structure shall address the following levels:
- i. Customisation to accommodate the different user authentications and privileges addressing particular requirements for each user.
 - ii. Conceptual modelling to accommodate different DB views for different users.
 - iii. Information hiding to compel the different users to specific usage levels and parts of the DB.
 - iv. Security, privacy and cloud data access shall be addressed and managed by the TSAU and shall have the full flexibility to grant the above constraints and restrictions to the various users.
 - v. Composition of DB services for scaling, connecting and automation of workflows and shall be composed as such at every DB layer.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8.2 External Layer for Cloud DB

- a. This layer shall be presentable to the Stakeholders and shall include:
- Manageability of the various Stakeholder users which shall include record keeping, reporting, tracking of user events.
 - Security through authentication methods which shall include user IDs and passwords for authorised usage.
 - Transparency to users to support a centralised means of development which shall allow for flexibility, mobility, reduced effort of deployment and configuration of real-time APIs.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8.3 Conceptual Middleware Layer for Cloud DB

- a. This layer shall be applied to allow isolation and interoperability irrespective of the underlying databases at remote user workstations and the various systems' DB infrastructures. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8.4 Conceptual Layer for Cloud DB

- a. This layer shall be applied to provide the back-end logical structure of the entire DB and shall manage the internal processing of various types of data and data queries from different Stakeholders' underlying operating systems through management by the following elements:
- Programming techniques shall resolve differences between various types of queries and programming methods from the various and different Stakeholder systems when accessing and communicating with the Cloud-DB.
 - Query Processing and Optimisation shall manage Stakeholder queries and shall provide the results to the end-user in an accurate, efficient and high-performance real-time manner.
 - Security at this layer shall prevent data loss, unauthorised access to and mining of data and shall include multi-level security features and policies.

The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8.5 Physical Middleware Layer for Cloud DB

- a. This layer shall be applied to allow isolation and interoperability irrespective of the underlying operating systems at remote user workstations and various systems' infrastructures and shall manage this through interoperability management. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

10.10.8.6 Physical Layer for Cloud DB

- a. This layer shall be applied to provide the back-end representation of data and shall continuously monitor, update and configure the DB to achieve optimal scaling, high availability, multi- communication and effective resource allocations in the virtualised environment through at least the following elements:
- Backup and Replication to counter data loss
 - Partitioning shall be applied to balance and share the load to improve performance, scalability and availability of the Cloud DB in the multi-Stakeholder setup.
 - Storage shall be provided through a Cloud DB shared disk architecture to improve performance when data is accessed.
 - Indexing of DB files and certain API fields shall be applied to allow for easy access channels to the data from remote users and to improve scalability.
 - Load balancing shall be implemented to automatically take place to move load between servers for more efficient use of the hardware resources and to prevent overloading of a server.
 - Fault Tolerance management shall be built into the design of the Cloud DB setups to handle failures and ensure continuous operational availability through continuous control mechanisms, recovery methods and techniques, and deadlock detection methods.
 - Security at this layer shall be applied through data encryption/decryption methods to protect data privacy and integrity.

The Bidder shall provide full details to support compliance to the requirement. (D)

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10.11 Computer HDD Clone/Re-build Tool

- A. A system integrated tool must be provided as a separate server allowing for either or both cloning of the HDD for every computer on the ATFM System or/and for re-building a computer to a fully operational state including all associated configurations and applications and latest required data necessary to restore that computer back into immediate operation. The Bidder shall provide full details to support compliance to the requirement. (D)

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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- B. The tool must allow for re-building of a failed computer via the existing system LAN network without interfering with the rest of the system and its normal operation (Separate LAN can be applied for this purpose). The Bidder shall provide full details to support compliance to the requirement. (D)

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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- C. The tool must be a GUI based tool for ease of use. The Bidder shall provide full details to support compliance to the requirement. (D)

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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

- D. Re-building of computers with the supplied configuration tool shall configure all device drivers and system configurations for normal operation after a computer was rebuild. The Bidder shall provide full details to support compliance to the requirement. (D)

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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>

11 ENVIRONMENTAL AND SUSTAINABILITY REQUIREMENTS

The supplier of the ATFM System shall be required to demonstrate environmental responsibility in terms of:

- Product Safety
- Waste handling and disposal
- Energy Efficiency

11.1 Product Safety

- A. Materials used shall be harm free (e.g. non-flammable and non-explosive) and therefore composition of materials will not in any way be a risk to human health, should a person be in contact with these materials. The Bidder shall provide full details to support compliance to the requirement. (D)

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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

11.2 Waste handling and disposal

- A. The utilisation of resources and disposal of the existing equipment and waste during various stages of the project shall take into consideration and adhere to the ATNS Integrated Waste Management Policy. Certificates of disposal shall be submitted to ATNS's Corporate Sustainability & Environment department, for recording purposes. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The applicable national regulations (including the section 28: Duty of care, of the NEMA) and environmental bylaws shall be adhered to. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

11.3 Energy Efficiency

- A. As part of the bid process the supplier shall be required to provide the most energy efficient equipment available and details on the power consumption for each component of the

system shall be provided. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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<i>[THE BIDDER SHALL INSERT REFERENCE TO ADDITIONAL INFORMATION HERE]</i>	

- B. The supplier shall furthermore indicate what energy efficiency measures were considered in the equipment, and associated infrastructure selected and proposed. The Bidder shall provide full details to support compliance to the requirement. (D)

COMPLIANCE (C/PC/NC/NOTED)	
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