ENHANCED ATFM OPERATOR'S MANUAL

CAMU provides air traffic flow management through airspace capacity management within South Africa, built on leading edge technology, supporting traffic growth by optimising capacities, upholding environmental and safety concerns, with highly skilled, people through collaborative decision making processes with the entire

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1.0	1 Mar 2010	Initial release	Armando de Olim	Armando de Olim
2.0	1 Apr 2010	Appendix A (ver2.2) CAMU Web User's Guide	Metron Aviation	Armando de Olim

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1. INTRODUCTION

1.1. Purpose

The Enhanced Air Traffic Flow Management (ATFM) Operator's Manual has been prepared with the main object of providing an operational description of the Central Airspace Management Unit (CAMU) Enhanced ATFM Procedures and of the related actions, information and message/web exchange.

1.2. Applicability

It is aimed at the aviation community who will be involved in the ATFM process including but not limited to Aircraft Operators (AOs), Aerodrome Operators, Flow Management Positions (FMPs), and ATS Units operating within the South African National Airspace.

1.3. Validity

Applicability of the document is from the 03 May 2010.

1.4. Amendments

This document is usually updated once a year. Major changes are promulgated by an Aeronautical Information Publication (AIP).

2. ESTABLISHMENT OF ATFM PROCEDURES

The responsibility for the management of air traffic flow and capacity management within South African sovereign and delegated airspace resides with the Central Airspace Management Unit (CAMU) which is established at the Johannesburg ATC Centre. The unit's responsibility includes, apart from managing the functions of the slot allocation program, the management of the flexible use of airspace (FUA), facilitating military exercises and operations, special and unusual events and any other activity which might require the use of airspace for a particular time period. The unit is also responsible for the re-routing of traffic, affected by adverse weather and temporary restricted or special use airspace in consultation with the aviation community in a collaborative decision making (CDM) process. In addition they will balance demand against capacity using the ATFM system after CDM with the appropriate aviation community members.

Air traffic flow and capacity management is a vital part of air traffic management in exploiting the full capacity of the air transport system without running the risk of infringing upon safety caused by overload situations. In future the management of ATC capacity will become equally important as managing the traffic flows.

From the 1 March 2010, the enhanced air traffic flow management (ATFM) service will commence within South African sovereign and delegated airspace. The service will be provided from the CAMU, which is supported by Flow Management Positions (FMP) established in certain control centers.

The objectives of the enhanced ATFM services are to:

- Reduce ground and en-route delays;
- Maximise capacity and optimise the flow of air traffic;
- Provide an informed choice between departure delay, re-routing and/or flight level selection;
- Alleviate unplanned in-flight rerouting;
- Assist ATS Units in planning for and managing future workload in the light of forecast increased traffic flows within South Africa;
- Assessing the impact of FUAs and TSAs on the air traffic control system;
- Provide improved solutions around predicted severe weather;
- Balance the demand and capacity of ATC sectors;
- Determine the necessity for an airspace/ground delay program and other traffic management initiatives (TMIs) and enact on them; and;
- Enabling aircraft operators to operate as close to their preferred trajectories.

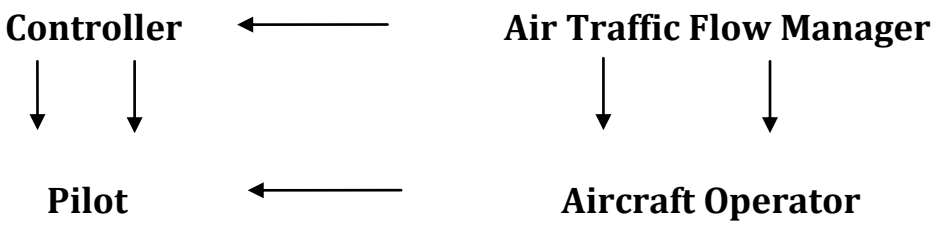
The ATFM procedures in this handbook have been established using the following documents as reference:

SA AIP S004/10, in addition to the general description above is in conformance with the procedures set out in ICAO DOC 4444 - Air Traffic Management. They form t he basis for operating procedures specific to the CAMU.

Procedures specific to the CAMU that are in line with policy and strategy developed and approved by the SACAA. These include Letters of Procedures (LOP) between ATS Units and the CAMU and Service Agreements between the CAMU and AOs, Aerodrome operators.

2.1. The difference between Air Traffic Control (ATC) and ATFM

All air traffic controllers, including air traffic flow managers, strive to provide a safe, orderly, and expeditious flow of traffic on essentially a first come first served basis. The differences lie in the scope, time parameters, tools, equipment, and the communication processes. The separation of air traffic is the responsibility of air traffic controllers, utilizing the tools at their disposal. The normal communication process is:



3. AIR TRAFFIC FLOW MANAGEMENT (ATFM)

3.1. Objectives

ATFM is a service with the objective to enhance the quality of service and the performance of the ATM system, by balancing the demand against capacity, by optimising the use of available resources and coordinating adequate responses.

3.2. Responsibility for ATFM Measures

The CAMU, in co-operation with the Flow Management Positions (FMP), including regional ACCs, is responsible for the execution of ATFM measures within the Johannesburg, Cape Town and Johannesburg Oceanic FIRs.

3.2.1. ATS line of communication and decision making

In general, the ATS Units' management/supervisory/FMP coordinates directly with the CAMU. After appropriate CDM has been carried out, the CAMU has final approval authority for all national air traffic management initiatives (TMIs).

3.3. ATFM Phases

ATFM has 3 phases:

3.3.1 **Strategic Flow Management** takes place two days or more prior to the day of operation and includes research, planning and coordination activities. This phase consists of analysing the evolution of the forecast demand, historical data analysis and the identification of potential new problems and in evaluating possible solutions.

3.3.2 **Pre-Tactical Flow Management** is applied during two days prior to the day of operation and consists of planning and coordination activities. This phase analyses and decides on the best way to manage the available capacity resources and on the need for the implementation of flow measures. One output is the Daily Airspace Plan (DAP) published via the ATNS website (www.atns.co.za/atfm/dap), or by sending a blank email to dap@atns.co.za and copy will be returned to you and forwarded via email to subscribers.

3.3.3 **Tactical Flow Management** is applied on the day of the operation. This phase updates the DAP according to the actual traffic and capacity. The management of the traffic is made through ATC slot allocation and/or ad-hoc rerouting.

3.4. Areas subjected to ATFM

The ATFM adjacent area is the area, adjacent to Johannesburg, Cape Town and Oceanic FIRs; this includes all the regional airspaces adjoining South Africa. Flights originating from this area may be subject to ATFM measures when entering the South Africa area.

The CAMU may apply ATFM Measures to flights which:

Depart, or arrive: Johannesburg (FAJS), Cape Town (FACT), Durban (FADN), Bloemfontein (FABL), Lanseria (FALA), George (FAGG), Port Elizabeth (FAPE), East London (FAEL), and Kruger Mpumalanga Intl Airport (FAKN). Other aerodromes and airspaces within the Johannesburg and Cape Town FIRs may be subjected to ATFM as well;

and/or;

Entering the Johannesburg and Cape Town, Oceanic FIRs after departing from an adjacent Flight Information Region (FIR) within the ATFM adjacent area.

3.5. Traffic Management Initiatives (TMI)

When conditions dictate that a TMI be instituted they could take the form of the following: (refer Chapter 4: Traffic Management Initiatives)

- **Ground Delay Programs (GDP)** may be instituted so as to delay the flights on the ground and avoid excessive airborne holding or re-routings;
- An **Airspace Flow Programs (AFP)** may be institute for an airspace constraint. When an Airspace Flow Program (AFP) is declared, the area subjected to the program will be called a flow constraint area (FCA);
- A **Ground Stop (GS)** may be declared at an aerodrome when adverse conditions or major ATS outages cause demand to exceed capacity to such a degree that gridlock occurs at an aerodrome;
- **Level capping**, and;
- **Rerouting of aircraft**.

When an Aircraft Operator (AO) would benefit from a reroute or level capping in-lieu of a departure delay then a rerouting proposal (RRP) would be offered. Aircraft Operators would be required to respond by the time indicated in the message, to take advantage of the RRP.

3.6. Information on ATFM Measures

Information on ATFM measures will be distributed by the CAMU via the following methods:

3.6.1. Bi-annual Airspace Operations Plan

The Bi-annual Airspace Operations Plan (AOP) document provides a consolidated view of the forecast seasonal ATFM situation which includes the traffic and capacity forecast, bottleneck identification and description of the associated ATFM and Traffic Management Initiatives (TMI). The AOP is the final result of the operations planning process which consolidates inputs from the aviation community involved in airspace management operations (i.e. ATS Units, Aerodromes, Airspace Users, Military, etc.). The AOP is published biannually by the CAMU – with summer and winter releases. Each release can be updated twice per season. The first AOP will be available on the 1st March 2010.

3.6.2. The Daily Airspace Plan (DAP)

The Daily Airspace Plan (DAP) is produced the day prior to the day of operation. The Daily Airspace Plan (DAP) will provide a summary of planned ATFM measures for the 24 hours period. It is updated regularly. The current day's Daily Airspace Plan (DAP) is the result of up to seven days of research, and historical data analysis within the CAMU ATFM system. The Daily Airspace Plan (DAP) published via the ATNS website (www.atns.co.za/atfm/dap), or by sending a blank email to dap@atns.co.za and copy will be returned to you and forwarded via email to subscribers.

3.6.3. The ATFM Flow Advisory Message (FAM)

The Flow Advisory Message (FAM) providing information to ATS Units, Aerodrome Operators and Aircraft Operators about the implementation, revision, compression, and cancellation of a Ground Delay Program (GDP), Ground Stop (GS) and Airspace Flow Program (AFP) will be transmitted. Except for the cancellation of a Ground Delay Program (GDP) or Airspace Flow Program (AFP), the FAM may include the following items:

- Aerodrome or Airspace;
- Delay Assignment Mode;
- Time frame;
- Program Type. (Optional);
- Program Rate;
- Flights Included; (Optional, will be available on CAMU Web and on message exchange)
- Scope;
- Additional ATS Units Included;
- Exempt ATS Units;
- Delay Assignment Table Applies To. (Optional);
- Maximum Delay or Delay Limit. (As appropriate);
- Average Delay. (Optional);
- Reason;
- Remarks.

The Daily Airspace Plan (DAP) and Flow Advisory Message (FAM) will be transmitted via AFTN and/or emailed to ATS Units and those Aircraft Operators and Aerodrome Operators who wish to be included in the address list.

FAM	Flow Advisory Message
EVENT: GDP - FAJS	Ground Delay Program at FAJS
EVENT_START_TIME	Starting time of the GDP,
201002011200	YYYYMMDDhhmm
EVENT_END_TIME	End time of GDP
201002012059	YYYYMMDDhhmm
START_PROGRAM_RATE	Between 1200-1900 – Aerodrome Dep rate
1200-1900 ADR 30	Between 1200-1900 – Aerodrome Arr rate
1200-1900 AAR 30	ATS Units that are exempted from the program
ATS UNITS EXEMPTED: NIL	Flights included – refer CAMUWEB
FLIGHT INCLUDED: LIVE ON CAMU WEB	Average delay of the GDP
AVG DELAY: 8 MIN	Comments – reason
COMMENTS EXCESSIVE DEMAND FAJS	Regulation cause – refer to Annex 2
REG_CAUSE WD89	

Figure 3-1 Sample of a FAM for a GDP at FAJS

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FAM
EVENT: AFP FCA02
EVENT_START_TIME 201002041100
EVENT_END_TIME 201002041300
START_PROGRAM_RATE
1100-1300 AAR 04
ATS UNITS EXEMPTED: NIL
FLIGHT INCLUDED: LIVE ON CAMU WEB
AVG DELAY: 13 MIN
COMMENTS EXCESSIVE DEMAND FAJA ACC
SOUTH
REGCAUSE: CE81
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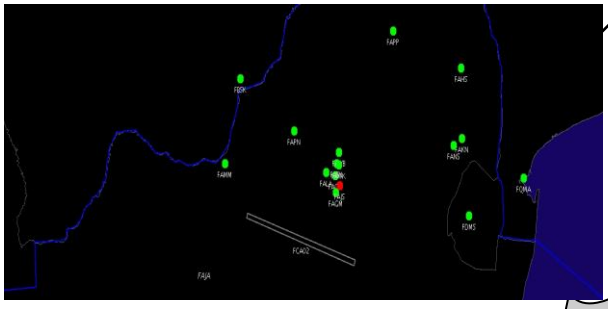

Basic map illustrating the FCA

(Only when sent by email)

Figure 3-2 Sample of a FAM for an AFP – FCA02

3.6.4. Collaborative Decision Making (CDM) Teleconference (Telcon)

Collaborative Decision Making (CDM) allows decisions to be taken, after collaboration of relevant aviation community members, on the basis of the most comprehensive, up-to-date and accurate information. This in turn will facilitate decisions about flights to be made according to the latest information available, thereby enabling the flight trajectory to be dynamically optimised to reflect near or real-time events. This CDM process is a key enabler of the ATFM process allowing the sharing of all relevant information between aviation community members so that the best gate to gate trajectory of flights can be achieved. This will enable the community members to update each other continuously on events within the strategic to tactical phase.

To be efficient and to reach the required objectives, CDM should have the following characteristics:

- an inclusive process;
- a transparent process; and;
- a process that builds trust within the aviation community.

The principles of CDM have been implemented in the CAMU day-to-day operations, planning and developments with active involvement of appropriate members of the aviation community. An ATFM CDM Telephone conference (Telcon) with all relevant ATS Units and appropriate aviation community members will be held at various times to discuss current daily airspace plan (DAP), weather impact, flow rates, flexible use of airspace (FUA), post event discussion, inputs from ATS Units regarding staffing, consolidation of ATC sectors, anticipated traffic management initiative (TMI), equipment, anticipated traffic volumes, constraints, current configuration and aerodrome arrival rates (AAR), anticipated configuration and aerodrome arrival rates (AAR), aerodrome departure rates (ADR), special events, military activities that impact ATFM, and flow constraint areas (FCA) – current and anticipated.

3.6.4.1. Planning and Review of ATFM Situation CDM Conferences

Each day at 0500 UTC the ATFS briefs attendees to the daily telcon on the current ATFM situation in South Africa and prospects for the rest of day based upon the plan the CAMU has constructed that day. Follow up telcons may occur at ad hoc intervals depending on circumstance. Special meeting may be scheduled due to special events or situations. Occurrence of these special conferences will be advised by AFTN, email, or other methods.

3.6.4.2. The CDM "System Approach"

The "system approach" is a management approach that considers the impact of individual actions on the whole national airspace. ATFM personnel facilitate a "system approach" in managing traffic. They consider who or what may be impacted and focus on a coordinated effort to ensure equity in the delivery of air traffic services. A system approach is taken in collaborative decision-making activities with the system stakeholders (stakeholders include air traffic control, airlines, general aviation,

aerodrome authorities, South African Weather Services or any other participants in the aviation community).

3.6.5. CAMUWEB

CAMUWEB is an important part of the enhanced ATFM system, as it allows AOs, aerodrome operators and ATS Units, access to information about TMIs. AOs will be able to view flight details and manage their own ATC slots during a TMI. ATS Units and aerodrome operators will be able to view all flights arriving and departing from their aerodrome. Please refer to Appendix A: CAMUWEB User's handbook for detailed information.

3.7. Air Traffic Flow Management Position

The Air Traffic Flow Management (ATFM) position within the CAMU is manned by Air Traffic Flow Specialists (ATFS) who have Principle Air Traffic Control experience and was established to further enhance CDM and its practical application in ATC operations. In pre-tactical flow management they manage the preparation of the Daily Airspace Plan (DAP). For all ATFM operations, the ATFS is the point of contact with the aviation community concerning ATFM measures.

ATFS will play an important role during special events and in the event of crisis situation in South Africa whereby they will lead coordination with the aviation community.

Through the daily activities of the CAMU, the ATFM position is the focal point for strategic, pre-tactical and tactical information for the airspace and about ATFM situations in South Africa. The ATFS will liaise with all relevant aviation community members, aerodrome operators and ATS Units, proposing and implementing ATFM developments. The ATFS will continue to monitor the national airspace system and amend or implement TMI's as required, continually ensuring demand is balanced against capacity and the equity for all airspace users.

4. TRAFFIC MANAGEMENT INITIATIVE

4.1. Overview

This chapter explains terms, techniques, and programs associated with Air Traffic Flow Management in the South African National Airspace (NAS). As flight operations personnel and pilots, the effects of Traffic Management Initiatives (TMI) will be experienced in highly congested airspace, which may be caused by traffic volume, special events, system failures or weather conditions.

Knowing how to access relevant information and understanding air traffic management initiatives will aid in planning flights, avoiding needless delay, and assisting in gaining full access to the NAS. Customers may have dedicated resources for coordinating with the CAMU personnel, but, as will be demonstrated, not only airlines or large general aviation company gain benefit from understanding how air traffic management initiatives may affect flights.

4.1.1. Exemption from a Traffic Management Initiative (TMI)

TMI choices can be offered to pilots/aircraft operators that allow decisions based on best business options (e.g., should it be decided to fly later or should the decision be taken to reroute around the constraint).

4.1.2. Compliance with traffic management initiatives

All operators have the right of refusal of a specific clearance and may elect an alternative. Alternatives include, but are not limited to ground delay, diversion to other aerodromes or request to stay on the filed route.

4.1.3. Compliance with a TMI

Air traffic controllers and Air Traffic Flow Management specialists strive to ensure TMI compliance. In special circumstances they may request exemptions for certain aircraft. In the case of Ground Delay Programs (GDP) or Airspace Flow Programs (AFP), the CAMU monitors compliance with the Airport Flow Tool (AFT). The AFT is a computer program used by the CAMU to monitor aerodrome capacity, demand balance, model TMIs, and evaluate alternative approaches to managing the traffic.

4.1.4. NAS information

The CAMU website, www.camu.co.za , provides near real-time status information about the NAS.

4.2. BASIC AIR TRAFFIC MANAGEMENT TECHNIQUES & TERMS

4.2.1. Miles-in-Trail (MIT)

Miles-in-trail describes the number of miles required between aircraft departing an aerodrome, over a fix, at an altitude, thru a sector, or route specific. MITs are used to apportion traffic into a manageable flow, as well as provide space for additional traffic (merging or departing) to enter the flow of traffic. For example, standard separation between aircraft in the area control environment is ten (10) nautical miles. During a weather event this separation may increase significantly.

4.2.1.1. Delays attributed to MIT

Normally MIT is implemented in response to a specific situation. For example, the CAMU has implemented a 30 MIT restriction on aircraft departing FAJS via UQ22 that will affect 10 aircraft in a one-hour time frame.

4.2.2. Minutes-in-Trail (MINIT)

Minutes-in-trail describe the minutes needed between successive aircraft. It is normally used when aircraft are operating in a non-radar environment or transitioning to/from a non-radar environment. It may also be used if additional spacing is required due to aircraft deviating around weather.

4.2.2.1. Departure flow rates

During tactical traffic management CAMU may declare flow rates for certain routes and aerodromes. For example, - traffic departing from FACT to FAJA TMA must depart five (5) minutes apart.

4.2.3. Airborne Holding

Planned airborne holding is used to manage a particular situation. At other times, airborne holding is in response to a situation and is unplanned.

4.2.4. Sequencing Traffic Programs

Sequencing programs are designed to achieve a specified interval between aircraft. They may be software generated or determined by Air Traffic Flow Management personnel. There are different sequencing programs to accommodate different phases of flight. The Maestro arrival program assigns an arrival time to achieve a constant flow of traffic into FAJS and FACT or over a common point.

4.2.5. Level Capping

4.2.5.1. Using altitude to manage traffic flows

Altitude is used to segregate different flows of traffic or to distribute the number of aircraft requesting access to a specified airspace sector. For Example, flights that operate between FAPP and FAKN might be level capped below flight level 195 to reduce traffic inside FAJS Area North East airspace.

4.2.5.2. Definition of "capping"

"Capping" is a colloquialism for planning to hold aircraft at altitudes lower than their requested altitude until they are clear of a particular area. It is used during constrained situations in the NAS and enables aircraft to continue to depart while remaining "underneath" a constrained airspace.

4.2.5.2. Notification of being "Capped"

CAMU may send the Airline Operator a Rerouting Proposal (RRP) pre-tactically and advise of the restriction. Tactically, the air traffic controller will advise in the clearance to "expect" a final altitude lower than the requested altitude, based on the appropriate altitude for the direction of the flight.

4.2.5.3. Fuel considerations

Each pilot in command has the option to refuse a clearance for safety reasons. If a pilot cannot comply with a clearance, ATC is to be advised. At that time, different options may be presented, including the option of taking a delay on the ground until the situation in the airspace is resolved.

4.3. ADVANCE AIR TRAFFIC MANAGEMENT INITIATIVES

4.3.1. Ground Delay Programs (GDP)

A Ground Delay Program (GDP) is an air traffic flow management procedure where aircraft are delayed at their departure aerodrome in order to manage demand with capacity en-route or at their arrival or departure aerodrome. Flights are assigned ATC departure slots times called calculated take off time (CTOT). Ground Delay Programs will normally be implemented at aerodromes where capacity has been reduced because of weather conditions, ATS failures or when demand exceeds capacity for a sustained period.

They are implemented to ensure the demand in a particular piece of airspace or at an aerodrome is kept at a manageable level, to preclude extensive holding and to prevent aircraft from having to divert to other aerodromes.

4.3.1.1. Process of the GDP

The CAMU ATFM System uses software called Airport Flow Tool (AFT) that compiles scheduled flight information and flight plans to calculate and then display graphically the known demand airspace sectors and for arrival and/or departures at aerodromes. When an average of demand versus capacity is noted, a GDP is modelled through the AFT software. AFT assigns departure and arrival "slots" to aircraft based on the available capacity and flight arrival times, and adds delay in sequential order until demand equals capacity.

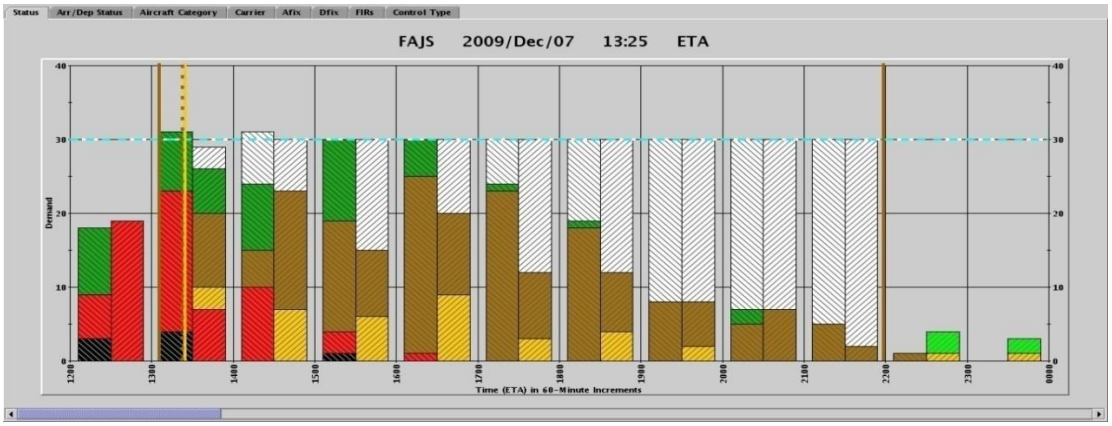

Figure 4-1 Demand Graph from Airport Flow Tool illustrating demand and capacity

FAJS demand graph (Figure 4-1) before a GDP was issued for thunderstorm activity. Note the airport arrival rate is 30 (blue line) and the demand has peaks and valleys.

The figure (Figure 4-2) below is the FAJS demand graph after the GDP was issued. The GDP starts at 1300UTC with the airport arrival rate of 23 and departure rate of 20 until 1700UTC then the rate increases to 30 for the remainder of the program. The demand is levelled out.

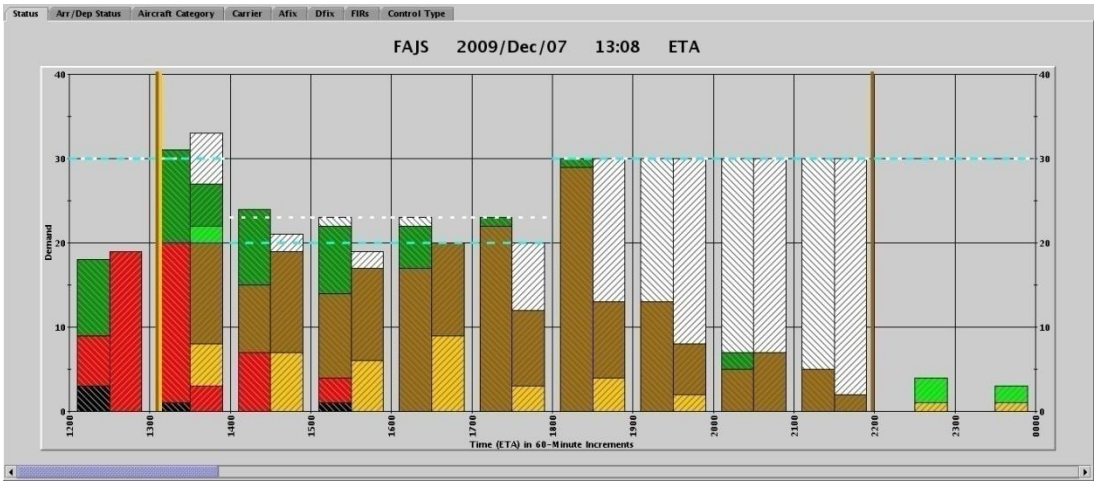

Figure 4-2 Demand Graph from Airport Flow Tool illustrating demand and capacity after GDP

All aircraft that have a filed a flight plan to a GDP aerodrome that are known to the AFT software are assigned a calculated take off time (CTOT, see definitions below), although not all aircraft will receive a delay.

Aircraft that are not in the original list of flights when the program is implemented will also receive a delay. Their delay will be equal to the average Delay Assigned (DA, see definitions below) to all other flights arriving in the 15-minute time interval that their flight is requesting to arrive.

4.3.1.2. Definitions of terms used in a GDP.

Calculated Takeoff Time (CTOT):

The runway release time ("wheels up") assigned to an aircraft in a GDP. CTOTs appear on the appropriate CAMU Web Page located in the towers and terminal facilities.

Delay Assignment (DA):

The delay that is assigned to an aircraft during a GDP.

Aggregate Demand List (ADL):

The traffic in the NAS that was known at the time the list was generated from the Airport Flow Tool (AFT)

Program rate:

The number of aircraft that the GDP is to provide to the aerodrome, for each hour. The program rate may not be the same as the arrival rate. In some instances, the traffic is slowed for en-route sector complexity, caused by weather, even though the arrival aerodrome is not constrained.

Aerodrome Arrival Rate (AAR):

The number of aircraft an aerodrome can accept in a one-hour time frame.

The AAR is determined by taking into consideration the runways in use, weather conditions, aerodrome facilities and NAVAID limitations etc.

Aerodrome Departure Rate (ADR):

The number of aircraft an aerodrome can release in a one-hour time frame

The table below illustrates the AAR for FAJS based on ground speed versus distance between flights, the greater the ground speed and the less the distance between flights results in a higher AAR. Figures in red indicate AARs.

	AIRPORT ARRIVAL RATE [AAR] TABLE Average Distance Between Aircraft on Final CAP/HR = GS DIS											
	Staggered Parallel Approach FAJS Rwy03				Normal							LVPs
G/S on final approach	3NM	3.5NM	4NM	4.5NM	5NM	5.5NM	6NM	6.5NM	7NM	8NM	9NM	10NM
100	33	29	25	22	20	18	17	15	14	13	11	10
110	37	31	28	24	22	20	18	17	16	14	12	11
120	40	34	30	27	24	22	20	18	17	15	13	12
130	43	37	32	29	26	23	21	20	18	16	14	13
135	45	38	34	30	27	24	22	21	19	17	15	13.5
140	46	40	36	31	28	25	23	21	20	18	16	14
145	48	41	36	32	29	26	24	22	21	18	16	14.5
150	50	43	37	33	30	27	25	23	21	19	17	15
155	51	44	38	34	31	28	26	23	22	19	17	15.5
160	53	45	40	35	32	29	26	24	23	20	18	16
165	55	47	41	36	33	30	27	25	24	21	18	16.5
170	56	48	42	38	34	31	28	26	24	21	19	17
175	58	50	43	39	35	32	29	27	25	22	19	17.5
180	60	51	45	40	36	33	30	28	26	23	20	18
185	60	53	46	41	37	34	31	28	26	23	21	18.5
190	63	54	47	42	38	35	32	29	27	24	21	19

Table 4-1 Sample table used to determine AAR for FAJS

Key: GS – Ground Speed, CAP – Capacity, HR – Hour, DIS – Distance in NM

4.3.1.3. Information detailing current GDPs

When a GDP is implemented, the CAMU details the parameters of the program(s) and issues an advisory and can be found at http://www.camu.co.za. Current programs are also included in the daily airspace plan on the ATNS web at www.atns.co.za/atfm/dap. Each line details the program aerodrome, the start and end times of the program, flights included, scope*, reason, average delays (AVG), airport arrival rate (AAR), program rate (PR), and the corresponding advisory number with hyperlink.

*Scope refers to the distance or ATS Units included in the GDP. While the program may not cause all flights to be delayed, all flights will receive a CTOT. Flights outside of the scope will receive a CTOT closely matching their proposed departure time.

4.3.1.4. CTOT information

CTOTs for a GDP may be accessible through the CAMU webpage by entering the tail number and date of flight, at www.camu.co.za. Slot Allocation Message (SAM) is also sent to the Aircraft operator which includes the CTOT. In addition, operators may also view their CTOT via the ATNS's File to fly website, www.atns.co.za.

4.3.1.5. The process for implementing Traffic Management Initiatives (TMI)

Air traffic Flow management specialists monitor the NAS for high demand sectors/aerodromes/entry exit beacons on a continuous basis. When concern is raised about a traffic situation at a specific sector/aerodrome/entry exit beacon (s), CDM is held among impacted ATS Units, the CAMU, the aerodrome authorities and the aviation community to discuss alternatives and modelled scenarios.

An advisory may be issued when a GDP is being proposed but not yet implemented. If the decision is made to implement a GDP, then CTOTs will be sent to operators of flights concerned, the CAMU Web page, and an advisory is issued that states a GDP has been implemented. You may find more information about advisories via the CAMU Web www.camu.co.za .

4.3.1.6. Affect of GDP procedures on aircraft operators

All aircraft operators are expected to depart at the CTOT. Each aircraft operator needs to arrange his taxi in a manner consistent with meeting the CTOT. If an aircraft is late, aircraft operators are required to view the CAMU Web page to get a new CTOT and pass it to the pilot. Operators are encouraged to release slots as soon as they are aware that they will not make their CTOT, this will enable other operators to use the released slot.

4.3.1.7. How do I know what my CTOT is?

You may go to CAMU Web, www.camu.co.za , to obtain your latest CTOT that is in place for your arrival/departure aerodrome, when there is a TMI. In addition you will be sent a Slot Allocation Message (SAM) or Slot Revision Message (SRM) via, AFTN, or e-mail. Failing that you may contact the CAMU or the ATC tower.

4.3.1.8. Changing of a CTOT

A CTOT can be changed, based on changing conditions at the GDP aerodrome e.g. changing weather conditions or changes in the airport arrival/departure rate. Aircraft operators may substitute their aircrafts' CTOTs to meet their schedule objective on the CAMU Web Page.

4.3.1.9 Notification of a change in CTOT

Aircraft operators will receive a Slot Revision Message (SRM) via the e-mail or SMS, they will also be able to go to the CAMU web for updates. Pilots may contact the departure/arrival aerodrome's control tower to establish their CTOT.

4.3.1.10. VFR Clearances

Air traffic controllers are required to provide VFR aircraft with the appropriate delay assignment before providing the pilot with a clearance to the ground delayed aerodrome. Operators are to check the CAMU Web prior to departure to see if a GDP is in place. This information is also available from the departure ATS Unit, to get the CTOT prior to departure.

4.3.1.11. Time outside of the parameters for the GDP

GDPs are based on original scheduled arrival/departure times. In the case of a GDP being in place for an arrival or departure aerodrome the estimated elapsed time (EET) and average taxi time is considered in determining the appropriate departure time. The CTOT may be assigned after the times listed in the GDP. In some cases the CTOT is after the program time because excess demand will flow over into subsequent hours, but must still be managed to ensure the balance between capacity and demand. If your flight was estimated to arrive near the end of the GDP, the flight may be assigned a CTOT that puts the arrival time after the GDP has ended.

4.3.1.12. Procedure to change departure time

Pilots should contact their operations who will in turn request a new slot via the CAMU Web or contact CAMU if they need to change their departure time, however, this may not necessarily change the CTOT.

4.3.2. AIRSPACE FLOW PROGRAMS (AFP)

An AFP is a traffic management initiative that identifies constraints in the en route system, develops a real-time list of flights that are filed into the constrained area, and distributes Calculated Take Off Times (CTOT) to gauge the demand through the area.

4.3.2.1. Process of the AFP?

If an AFP is issued and a flight is included, a CTOT will be issued. Meeting the CTOT is important because it allows traffic managers to properly gauge flights through the constrained area being controlled by the AFP. When an AFP is issued, the CAMU will send an Advisory that will be emailed to AOs. The AFP will also appear on the CAMU Web site. At aerodromes with an aerodrome traffic control tower, controllers will provide the CTOT if not received it via the SAM/SRM message, web page, when the pilot calls for clearance. If departing from an aerodrome without a control tower, the CTOT can be determined for the flight by checking the CAMU website at www.camu.co.za. This website will provide information regarding the location and reason for an AFP. It will also provide a "Look Up" function to determine if your flight has received a CTOT.

It is important to check the CAMU website (before departure) to determine if the flight is included in an AFP. Depending on the severity of the constraint leading to AFP, the following may apply:

- be assigned airborne holding to provide the delay necessary for
- the flight to arrive; or
- be rerouted to avoid the AFP altogether; or
- need to land to absorb the delay; or
- be allowed to enter the AFP with minimal delay.

There is a window of time in which to depart and so as not miss the CTOT. Flights are asked to depart as close to the CTOT as possible. ATS Unit, flights may depart 5 minutes before the CTOT and up to 10 minutes after to assist with the tactical issues at aerodromes. Outside of the 15 minute window, the following options are available:

- Accessing the CAMU web site to obtain a new CTOT
- At aerodromes without a control tower, you may:

    1. Access the CAMU web site to obtain a new CTOT.
    2. Contact the overlying ATC tower or the CAMU.

Should an operator not want to accept the delay then the following options are available:

- Contact the CAMU to calculate a re-route out of the AFP. If there is another acceptable route available that would take the flight out of the AFP, a Rerouting Proposal (RRP) will be sent should the operator accept the re-route then a re-filing of the flight plan is required. Once the flight plan is re-filed an SRM/SLC will be issued.
- Make a stop enroute. In severe cases the pilot may elect to land at an intermediate aerodrome to provide the delay necessary for the flight to arrive at the AFP controlled time of arrival. If flight plan is filed into an existing AFP, the flight will be treated as a "popup", the flight will be assigned a CTOT consistent with the delay received by other flights filed to enter the AFP at about the same time. If a flight plan is filed out of an AFP and into another, the flight will be

treated as a "popup". The flight will be assigned a CTOT consistent with the delay received by other flights filed to enter the AFP at about the same time. In addition, the flight will forfeit the arrival slot in the original AFP. If the flight is included in both an aerodrome ground delay program and an AFP, the CTOT for the ground delay program will take precedence.

It is recognised that the predicted demand through an AFP and the possible weather impacting the area may change substantially over time. When the conditions warrant, Air Traffic Flow Specialists will take steps to coordinate and implement revisions to the AFP. In a revision, AFP entry slots are recomputed so that demand is again metered to meet capacity and new CTOTs are sent via SRM and posted on the CAMU Web page.

4.3.2.2. Implementation of AFPs and coordination of all AFP decisions.

The ATFS in the CAMU will have oversight responsibilities for all AFPs.

4.3.2.3. Scope of AFPs

It is expected that AFPs will be utilised to manage airspace constraints throughout the NAS. They will also be used to manage situations such as increased traffic demand as a result of special events, as well as equipment failures which result in loss of capacity. This will provide traffic managers with an additional tool to manage geographic areas that experience periods of complex, high volume traffic.

4.3.2.4. AFP Arrival Rate

Based on the anticipated conditions, the ATFS will select an arrival rate based on guidelines developed through analysis of historical data. These guidelines will be refined over time. When 'ad-hoc' AFPs are developed, the arrival rate may be a set at the number of aircraft allowed to pass through the Flow Constraint Area (FCA) per hour or may be a percent reduction of known demand.

4.3.2.5. Flights that have an AFP CTOT, but are part of an aerodrome ground stop

The ground stop has the higher priority. If the ground stop is lifted and the AFP is still in place, the flight will get a new CTOT for the AFP along with a control type of RCTL (re-control).

4.3.2.6. Information on CTOT's issued for AFP's

ATS Units are currently unable to obtain AFP CTOTs information without contacting the CAMU. The CAMU Web will display up to date information on AFPs. The web page will show if your flight is included in the AFP.

4.3.3. GROUND STOPS (GS)

4.3.3.1 Definition of a Ground Stop

A Ground Stop (GS) is a procedure requiring flights that meet specific criteria to remain on the ground. The GS may be aerodrome specific, related to a geographical area.

4.3.3.2. Reason for a GS

Ground Stops are implemented when air traffic control is unable to safely accommodate additional aircraft in the system, in other words the demand is exceeding the capacity to such an extent that a GDP is inadequate and severe restrictions are required to manage the flow of traffic. They are most frequently used for:

- Severely reduced capacity situations such as:
- Weather below user arrival minima;
  - Severe weather reducing usable routes;
  - Major equipment outages;
  - Catastrophic events.
- Precluding extended periods of airborne holding.
- Precluding sectors from reaching saturation levels.
- Precluding aerodromes from reaching gridlock.

GS are normally reactive to the current situation, however, in some situations, they may be planned in advance. For example, weather is forecast to develop along the east coast. Aircraft may be released until the weather materializes, at that time, a GS would be issued to ensure additional aircraft are not released until the operational situation allows.

4.3.2.4. The process for a GS

When one of the circumstances as stated above are present or there is indication that they will occur the ATFS in the CAMU will institute a GS after doing various modelling exercises.

4.3.2.5. Current status or information on GS

GS information of 15 minutes or more is viewable on the webpage www.camu.co.za

4.3.4. ADAPTIVE COMPRESSION (AC)

4.3.4.1. Definition of Adaptive Compression

Adaptive compression is used to help ensure that all slots in a program are used. A background process at the CAMU will automatically:

- Monitor a GDP AFP for open slots.
- Identify those slots that are in danger of going unused.
- Move other flights earlier to take advantage of those open slots.

- Move the open slots later.
- Update the databases with the changes.
- Send notification (CTOT updates) to the aircraft operators about the changes via SRMs.

4.3.4.2. Benefits of Adaptive Compression

- Higher utilization of the aerodrome/airspace capacity.
- Aircraft Operators can be more proactive regarding constraints, restrictions, etc.
- Reduced workload for the ATFS /ATC.

4.3.5. Rerouting Proposals (RRP)

The RRP can be issued due to several circumstances. The following RRP have direct impact on aircraft operators.

- RRP due to Airspace Constraints and/or ATC capacity;
- RRP due to Weather.

The RRP due to Airspace Constraints

The RRP due to airspace constraints includes restrictions on airspace sectorisation and configuration in general. A specific airspace could eventually be closed (e.g. TSA, etc) and now open at a given date and time (or vice-versa), allowing for a more efficient use of airspace by AO's and airspace users in general. CAMU may suggest a RRP to an AO for consideration to improve possible delay cause by traffic flows constraint.

4.4. FLOW CONSTRAINED AREA (FCA)

4.4.1 Definition of a FCA

Developed on an ad hoc basis, they are both three-dimensional volumes of airspace, along with flight filters and a time interval, used to identify flights. They may be drawn graphically, around weather, in the case of the ATFM tool they can be automatically drawn around weather or they may be based on a particular airspace/sector or element such as a VOR/FIX. They are used to evaluate demand on a resource.

4.4.2. Information on FCAs

When a FCA is declared, an AFP will be used to manage the constraints and a Flow Advisory Message (FAM) will be published and a SAM will be issued for relevant flights. The information will be displayed on the CAMU Web under initiatives.

4.4.3. Display of the FCA - graphically

The FCA will be shown in the FAM when viewed in an e-mail.

5 TACTICAL SLOT ALLOCATION PROCESS

Air Traffic Control Slot allocation is an ATFM measure established to balance the demand against capacity and to regulate traffic flows, thus making full and efficient use of the available system capacity. Tactical slot allocation takes place on the day of operation and replaces strategic, airport slot allocation. So as to ensure efficient usage of airspace and optimized flight trajectories, aircraft operators adhere to:

- strategic ATFM measures (e.g. strategic traffic routing/strategic airport slot allocation etc);
- general ATFM procedures including flight plan filing and CAMU web interaction requirements; and;
- current ATFM measures (e.g. specific measures applicable on the day in question) Aircraft Operators shall ensure that their crews are informed of, and adhere to ATC slots, issued by the ATFM service.

5.1. Initial slot allocation process for IATA coordinated airports

The process of airport slot allocation (as described in SAAIP ENR 19.6) will continue for coordinated airports. After receiving a strategic slot, AO's can expect to have reasonable assurance that they can depart or arrive at an aerodrome at the time allocated. This time is the time the aircraft is expected to be off blocks (EOBT) and the time expected to be in block (EIBT). As these slots are allocated strategically or pre-tactically and the situation often changes tactically and these times could change. AOs are to keep to their airport slots and contact the relevant towers for changes.

5.2. Slot allocation process

The implementation of ATFM slot management involves three major facets:

- Permanent strategic slot management at the three busiest aerodromes: FAJS, FADN and FACT as per South African ENR 19.6. This could be expanded onto other aerodromes during special events and when the traffic demand warrants it.
- ATFM Slot management (tactical slot management) for both departures and arrivals at FAJS; FACT and FADN. This could be expanded onto other aerodromes during special events and when the traffic demand warrants it.
- Collaborative integration of aircraft operators to enhance decision making.

The ATFM system internally purges its current pre tactical slot allocations for the coordinated aerodromes and loads in the data as the baseline for the upcoming day, normally at 0200 UTC.

The ATFM system interprets the schedule data and strategic slot allocations received from Official Airline Guide (OAG) and Score system respectively and will start an active Ground Delay Program (GDP). Based on the rate selected for each aerodrome, the ATFM system will also track the slots that are not currently allocated to flights; these are called unassigned slots. The resultant SAM/SRM messages from the slot assignments will be

queued by the ATFM system until 2 hours to the Earliest Off-Block Time (EOBT). However, the slot assignments are visible through the ATFM system, the CAMU Web site, and Enhanced Substitution Module (ESM), the latter, is a separate module which can be purchased by AO's. As AOs submit new flight plans during the day, the ATFM system will assign unassigned slots to flights that were not known at the time of the pre tactical import. These flights are considered "pop-ups", and they will be assigned any available slot as close as possible to their desired EOBT/EIBT on a first-come, first-served basis.

The CAMU Web site enables a subset of the ATFM system client capabilities, e.g. slot management and reporting capabilities. The CAMU Web site is password protected and will provide different views for different types of users. Through the CAMU Web site, the Aircraft Operator (AO) will be able to view their flights/slots and all unassigned slots for a particular controlling element. By providing visibility into the unassigned slots, the AO will also be able to generate a slot improvement if available through the CAMU Web site. The AO will be able to swap their current slot for an open slot based on their own schedule. The AO operator will be able to modify flight data, swap slots between two of its own flights, suspend flights or cancel a flight.

The following flight data fields are modifiable by the AO via the CAMU Web site: ·

- Earliest Estimated Take Off Time (EETOT) and Earliest Estimated Landing Time (EELDT);
- Controlled Time of Departure (CTD) and Controlled Time of Arrival (CTA);
- Assigned Slot (SLOT); ·
- Slot Hold Flag; ·
- Cancellation Status.

5.3. Slot management for arrivals and departures

The goals behind providing slot management on both the arriving and departing ends are twofold: to assure AO's a manageable departure slot especially when the aircraft is delayed and to more effectively manage scenarios where there is a large departure demand. However, the major risk in managing departure rates is if an equivalent or greater action is not taken with the arrival rates. The end result of this scenario is the surface of the aerodrome may become gridlocked with aircraft.

Due to the risk of surface gridlock, as mentioned previously, the ATFS will determine rates as an overall measure of aerodrome operations, including both departures and arrivals. The ATFM system will be programmed with an overall aerodrome rate and then set the appropriate mix of arrivals and departures within this rate. This decision will be made with the required CDM taking place with relevant members of the aviation community. The ATFM system will then assign slots according to the blended rate. This approach will simplify the rate-setting process within the ATFM system and will give the user a better model of overall aerodrome demand prior to submitting the delay program. This will assist in preventing an ATFS from submitting a GDP that may incur significant surface saturation.

5.4. Line of Flight Continuity

In implementing slot management for arrivals and departures, efficiency is gained by knowing the connection between a flight arriving at an aerodrome and the potential later departure slot that the same aircraft has at the aerodrome. If a GDP delays the flight from arriving on schedule, then knowing the connection between arrival and departure slot allows the ATFM system to be more efficient in assigning an achievable departure slot for the same aircraft. To this end, it is required that AO submit their aircraft registrations (tail numbers) into the flight plan in field 18 or via the CAMU Web page. The ATFM system uses the registration number of aircraft, to make the association between arrival and departure slots.

5.5. Slot Precedence

A tremendous amount of complexity is created in the system as multiple slots are assigned to a single aircraft. For example a flight departing FACT for FAJS that files to fly through a Flight Constrained Area (FCA) that has an active Airspace Flow Program and then returns to FACT through the same FCA. In this scenario, the flight would have a departure slot at FACT, an arrival slot at the FCA, an arrival slot at FAJS, a departure slot at FAJS, another arrival slot at the AFP, and finally an arrival slot at FACT (6 slots!). Without a rule for slot precedence, this slot allocation problem cannot be solved. The following slot allocation precedence is used for ATFM regulations:

(in chronological order)

- Aerodrome arrival slot
- Aerodrome departure slot
- AFP arrival slot

If this order of precedence is applied to the previous example, then all slots would be based upon the slot allocation for arriving at FAJS.

5.6. The Exemptions

The obvious exemptions to slot management are international flights that the ATFM would not be able to communicate controlled departure times. International flights, particularly long-haul international flights, would typically be included in the airport slot data and therefore would hold a slot. However, these flights would not be available for slot modifications through a revision or compression in the ATFM system. In addition, when a CAMU operator runs a revision or compression to a current flow management program, airborne flights are also exempt for obvious reasons.

5.7. Slot swapping

The ATFM system will allow AO's to retain their slots for substitutions and swapping. However, after a certain time interval, if the AO has not placed another flight into a cancelled slot, then the slot automatically reverts back to the unassigned slot pool that is

available to all AO's and the ATFS to assign flights. Substitutions, cancellations, and slot swapping is possible through three separate interfaces in the ATFM solution: the CAMU Web site, the CDM Interface (ESM), and the ATFM system directly via the ATFS. An AO has open access to the CAMU Web site and is able to actively participate in the collaborative process through that site without purchasing ESM.

5.8. Allocation Stage

At a fixed time before the Estimated Off-Block Time (EOBT) of each flight, a slot is allocated to the flight and a Slot Allocation Message (SAM) is sent to the AO's and ATC. An allocated slot cannot be taken by another flight. However, an AO should update an EOBT, if it is thought that the flight will not be able to comply. Moreover, the slot allocated to a flight may be improved by the true revision process.

5.9. Slot Compression Process

At certain times during a GDP or AFP, it may be favourable to run a Compression. The Compression function exchanges delayed flights with open slots to lessen the delay on flights. This is the semi-automatic mechanism that routinely attempts to improve the slot of allocated flights; for a given flight, the true revision process takes place after the SAM has been issued until a time parameter before the CTOT. This parameter is linked to the Aerodrome of Departure (ADEP).

5.10 Slot Swapping Procedure

AO's may submit their request for a slot swap to CAMU either directly to the ATFS, or preferably via the CAMU web. The prerequisites are that both flights have their slots issued and that they are both subject to the same most penalising regulation. A maximum of one swap per flight may be carried out, if the swap is feasible and has no negative airspace/aerodrome effect.

Note: Normally, only two flights of the same AO may be swapped. Exceptionally, in critical events at airports slots of two different AOs may be swapped on request via the CAMU.

5.11. Aerodrome Parameters

Taxi-time

The taxi-time at aerodromes is an important parameter taken into account in the slot allocation process. Default taxi-time is specified for each runway at an aerodrome in the ATFM system database but can be changed on the day of operation. Changing taxi-time can resolve certain aerodrome operating problems without the need to reduce capacity or to request an increase of the slot window beyond the existing - 5+10 minutes around the CTOT.

The taxi-time can be modified for a given time period. A modification of the taxi-time will modify all flights having their EOBT inside the period, some issued slots may be recalculated and a few short notice SRMs issued.

6 SLOT ALLOCATION PROCEDURES

The slot allocation procedures detailed below are those applicable to the CAMU ATFM system. They are applied to all flights subject to ATFM slot allocation departing from within the ATFM area or from within the ATFM Adjacent area and entering the ATFM area.

6.1. Airport slots

The airport slot allocation procedures remain enforce as described in SA AIP ENR 1.9.1 part 1 and Aircraft Operators are to comply with their EOBT unless subjected to an Air Traffic Control Slot. These slots will be available on the CAMU WEB on the day of operation.

6.2. Departure Slots

When other ATFM processes are exhausted, traffic management initiatives (TMIs) will be applied by CAMU to balance demand against capacity and departure times will be issued in the form of a Calculated Take Off Time (CTOT). AO's must plan their flight to be ready for takeoff at the calculated take off time (CTOT) (At the holding point). The calculated take off time (CTOT) is a nominal time with a tolerance of –5 to +10 minutes; this enables the ATC to manage traffic tactically

The calculated take off time (CTOT) is generally issued not later than 2 hours before EOBT, however Aircraft Operators and ATS Units are to monitor the CAMU web for the latest information on calculated take off time (CTOT) as this could change as tactical conditions dictate.

The calculated take off time (CTOT) is included in a slot allocation message (SAM), which is sent by the CAMU to:

- The address notified in advance to the CAMU by the aircraft operator, or;
- When the address is not known with the CAMU:
  - The ATC Tower of the aerodrome of departure, and;
  - If different, the flight plan originator;
- The CAMU web's slot substitution and flight elements subpages.

Furthermore, ATC is informed about the calculated take off time (CTOT) issued. If no slot allocation message (SAM) is received before EOBT, it can be assumed that the flight concerned may depart in accordance with the filed EOBT.

Aircraft Operators shall arrange the departure of their flights to comply with the calculated take off time (CTOT) issued. A slot window is available to ATC to optimise the departure sequence. This is not for use by AO's who should plan an EOBT consistent with the CTOT.

All flights subjected to a calculated take off time (CTOT) will be displayed on the CAMU Web's Initiatives page.

6.3. Late Reception of Slot Messages

There are many mechanisms within the AFTM system to prevent, in normal circumstances, the late transmission of a slot, or update to a slot. Nevertheless, there are four conditions that can cause the late reception of a slot time:

Late Flight Plan Submission/Update. The flight plan is filed or modified (reception of a FPL/DLA/CHG message by the ATFM system) shortly before the EOBT. If needed, a SAM/SRM is sent immediately. Of course, in this case the SAM/SRM is also late.

A TMI is Created or Modified. For flights having already received a slot, a SRM may be sent.

Manual Intervention

The ATFS can manually allocate another slot to a given flight causing a SRM to be sent.

Transmission Delay

The message is sent early enough, but due to transmission problems it arrives late. The occurrence is limited but it may happen.

6.4. Slot Adherence

AO's and ATC are jointly responsible for CTOT compliance at departure aerodromes.

6.4.1. Aircraft Operators

In order to comply with a CTOT, AO's need to plan the departure of a flight so that the aircraft will be ready for start up in sufficient time to comply with a CTOT taking into account the taxi-time.

AOs shall inform themselves of and adhere to:

- General ATFM procedures including flight plan filing, strategic ATFM Measures and message exchange requirements.

and

- Current ATFM Measures (e.g. specific measures applicable on the day in question, such as ATFM slot or flight suspension).

6.4.2. ATC

ATC is responsible for CTOT compliance monitoring at departure aerodromes. Whereas the exact procedures to be followed will depend on the way that ATS is organised at each aerodrome, the following requirements shall apply in all cases:

- ATS Units shall ensure that CTOT, if applicable, be included as part of the ATC clearance. ATC shall take account of an applicable slot or flight suspension when a clearance is issued.
- ATS Units responsible for CTOT compliance monitoring shall be provided with the necessary information concerning the ATFM Measures in force and CTOTs allocated.
- ATC shall provide all possible assistance to AO's to meet CTOT.
- A slot tolerance (-5' to +10') is available to ATC to organise the departure sequence.
- ATC may deny start up clearance to a flight unable to meet its CTOT until coordination with the CAMU / CAMU Web has been effected and a revised CTOT issued.

6.5. Slot Revisions

Revisions to CTOTs should, where possible, be coordinated between the AO and the CAMU using the CAMU Web Slot Swap exchange procedures. However, it may be the case that last minute revisions to CTOTs and slot extensions when the pilot is in direct communication with ATC, are more easily or efficiently coordinated with the ATFS via ATC.

6.6. ATFM Contingency

In the event of the ATFM system failure, a number of appropriate procedures have been put in place to minimise the impact on the aviation community.

For each contingency procedure instructions will be issued by the ATFS. In order to permit an effective and orderly resumption of slot allocation by the ATFM system following recovery, flight plan and flight plan update messages will continue to be sent to the ATFM system throughout the whole period of operation of the contingency plan.

6.7. Flight Plans

All aircraft operators are requested to file non-repetitive (ICAO) flight plans at least 3 hours before EOBT to provide CAMU with accurate forecast of potential air traffic demand. Early filing of flight plans will ensure that the calculated take off time (CTOT) issued is as close to the requested EOBT + published Taxi time as possible. Aircraft Operators (AO's) should be aware that filing a flight plan late may lead to a disproportionate delay. It is in the best interest of Aircraft Operators (AO's) to initiate prompt revisions or cancellations, thus permitting the system to maximise use of available capacity and minimise delay. The later the revision is made the greater the probability of a delay.

6.8. Duplicate Flight Plans

Duplicate Flight Plans is the term used to refer to the flight plans of flights which do not take place i.e. flight plans that were not cancelled by the originators and another flight plan has been filed. Only one Flight Plan shall exist at any given time for the same flight.

It is absolutely essential that flight plan originators:

- Cancel a flight plan as soon as they know that the flight is not going to take place.
- Cancel an existing flight plan before filing a replacement flight plan for the same flight.

The existence of multiple flight plans is to be avoided at all costs as they will:

- Present ATC with false information.
- Impair the efficiency of the ATFM system.
- Be responsible for the issuance of unnecessary new slots.
- Cause additional unnecessary delays to regulated flights.
- Lead to an under utilisation of ATC capacity.

6.9. EOBT Requirements

It is a requirement for both ATC and ATFM, that the EOBT of a flight shall be an accurate EOBT. This applies to all flights, whether subject to a flow management regulation or not. Any change to the EOBT of more than 15 minutes for any IFR flight intending to operate within South African Airspace shall be communicated to the appropriate ATS Units.

When an AO submits an amendment message (e.g. DLA or CHG) to an ATSU, they must always give the EOBT the earliest EOBT they may comply with. This time is not directly related to the (new) CTOT provided in the SAM/SRM. The EOBT in the flight plan should always reflect the time at which the AO actually wants to be off-blocks. The EOBT should always be changed if the original EOBT established by the AO cannot be met by the AO for reasons other than ATFM delay.

The following procedures are to enable an AO to meet the above requirements whenever they know that the EOBT of a flight will require modification.

6.10. Procedure for Modifying the EOBT of a Flight having received an ATFM Slot.

During a TMI, operators must obtain a new slot via the CAMU WEB and then compile with the following:

It is a requirement for both ATC and ATFM that the EOBT of a flight shall be an accurate EOBT. This applies to all flights, whether subject to ATFM or not. Any change to the EOBT of more than 15 minutes (+ or -) for any IFR flight must be addressed to CAMU via an amendment message (e.g. DLA or CHG). The Aircraft Operator (AO) will receive a new Slot Allocation Message (SAM) or Slot Revision Message (SRM), once the changes are made through the CAMU Web.

Once a flight plan has been filed for a flight subject to ATFM measures, any change in EOBT of more than 15 minutes shall be submitted, using a DLA message or by cancelling the original FPL and filing a new flight plan.

Aircraft Operators will be able to interact with CAMU via the CAMU website, www.camu.co.za to amend calculated take off times (CTOT), suspend, de-suspend and to perform a slot swap within own aircraft schedule or move the flight to the acceptable open slot in the future.

In Summary:

- AO is to obtain a new slot via the CAMU Web, and,
- When amending the EOBT to a later time, a DLA or CHG message shall be sent.
- When amending the EOBT to an earlier time, a CNL message shall be sent to an ATSU and shall be followed by a new flight plan with the new EOBT indicated.

Or

Calculating your EOBT once a CTOT is sent:

- Take the current CTOT, minus the taxi time, and send the new EOBT, which must not be after this time e.g. EOBT 1000, CTOT 1100, but the flight cannot go off blocks until 1042. The taxi time is 18 minutes. 1100 minus 18, = 1042. The new EOBT must be earlier than 1042.

Possible Scenarios:

ATFM systems are continuously seeking to give zero delay, the CTOT of the flight will never be earlier than the new EOBT plus the taxi-time.

Recommendations:

- All CTOT revisions or cancellations are to be made preferably using the CAMU Web Page interface
- In all cases, it is in the best interest of AOs to initiate prompt revisions/cancellations thus permitting the system to maximise use of available capacity and minimise delay.

General information on ATFM messages used by the CAMU including the format, messages fields and addressing procedures are included in paragraph 6.14. A summary of all messages is set out in Annex 1.

6.11. CAMU Helpdesk

The CAMU is available to provide assistance to those AO's who have critical operational problems which cannot necessarily be solved by use of the CAMU Web interface or whose aircraft has a delay in excess of the average delay for the most penalising regulation. The CAMU is also there to provide advice and assistance to those AO's who do not have access to the CAMU Web page or who do not understand the ATFM system.

The CAMU can assist, for example, with flights, which are delayed to the point where they may no longer be able to operate because of night curfews, weather or crew flight and duty times.

The CAMU telephone number is +27 (0) 11 9286433

When connected to the CAMU, callers are requested to provide the flight's ACID before stating the problem. This enables the ATFS to display the relevant data concerning the flight before any problem solving takes place. Callers, who have less than the average delay and no specific operational flight critical problem to resolve, should not call the CAMU. All calls to the CAMU are recorded for quality purposes.

AOs who require advice, assistance of a routine nature can also contact the CAMU. For operational flight planning problems, AOs should call the relevant ATSU or briefing office, not the CAMU.

The CAMU resources have to be focussed on assisting the more critical problems.

6.11.1. Contact Details

While this document should cover all operational matters, the CAMU may be contacted using the following methods:

Postal Address:	*CAMU (ATNS)* *Private Bag X1* *Bonaero Park* *1622* *SOUTH AFRICA*	Site Address:	*CAMU (Johannesburg ATCC)* *Gate 14* *OR Tambo Intl Airport OPS Complex* *Bonaero Drive* *Bonaero Park* *KEMPTON PARK*
Tel:	*+27 (0) 11 928 6433*		
Fax:	*+27 (0) 11 928 6420*		
Email:	*camuhelpdesk@atns.co.za*		

6.12. ATFM Messages

6.12.1. Slot Allocation Message (SAM)

The SAM is used to inform AOs & ATS of the Calculated Take-Off Time (CTOT) computed by the ATFM system for an individual flight, to which AOs/ATC must adhere. This message is sent to AOs/ATS 2 hours before the last received EOBT.

—TITLE SAM —ARCID SAA123 —ADEP FAJS —ADES FADN —EOBD 100303 —EOBT 1020 —CTOT 1035 —REGUL FAJS — TAXITIME 0015 —REGCAUSE WA 84

Figure 6-1 Composition of Slot Allocation Message (SAM)

The SAM is used to inform AO's and ATS of the Calculated Take-Off Time (CTOT) for an individual flight.

Normal response of AO's/ATS to a Sam message

- AO's must comply with the CTOT. A slot is issued as a Calculated Take-Off Time (CTOT). The CTOT is defined as a time at which the aircraft shall take-off.

- The calculation of take-off times takes into account the off-block times and an average taxiing time for the runway in use at the airfield concerned.

6.12.2. Slot Revision Message (SRM)

After the ATFM system has issued an initial SAM, subsequent updates may be notified via the Slot Revision Message – (SRM). This message may be used to indicate a delay increase or decrease. The SRM notifies a change of slot. It is issued after the SAM, if applicable. AOs/ATC must comply with the NEWCTOT.

CAMU system sending of a SRM

- A SRM is sent to notify all concerned of either a significant change (>5') to the original CTOT or a modification of the most penalising regulation or both. Such changes are due to circumstances unrelated to the flight e.g. the introduction of a new restriction or a change to the parameters of an existing restriction the ATFS are able to let all flights be considered for improvement.
- In response to a DLA or CHG when the current CTOT is no longer compliant with the new information.
- When AO modifies slot on the CAMU web and the new slot is within a TMI then a SRM will be sent, AO must then send a CHG/DLA message.
- To notify all concerned of a routine improvement/deterioration of the CTOT.

—TITLE SRM —ARCID ABC101 —ADEP FAJS —ADES FADN—EOBD 100303 —EOBT 0925 —NEWCTOT 0950 —REGUL FAJS — COMMENT CLDT 100303 1050— TAXITIME 0010 —REGCAUSE WA 84

Figure 6-2 Composition of a Slot Revision Message (SRM)

Response of AOs/ATS to SRM

The NEWCTOT must be complied with

6.12.3. Flight Suspense Message (FLS)

Indicates that a specific flight has been suspended in the system and is considered as not taking off. The flight data is kept in the database, but suspended (closure of an aerodrome for a long period, for example). The procedure for de-suspending a flight is through a DLA, a CNL or a CHG, depending on the circumstances, that will be explained in another part of the document.

AOs may suspend their flights on CAMU Web and later de-suspend their flights into open slots. This is used when an AO is experimenting technical difficulties and need to temporarily suspend their flight. AOs are still required to send a CHG or DLA to modify the FPL.

The ATFM system will cancel the original CTOT, issue the suspension with a Flight Suspension (**FLS**) message and await the response of the AO.

—TITLE FLS —ARCID ABC101—ADEP FAJS —ADES FADN —EOBD 100303 —EOBT 0945 —TAXITIME 0015

Figure 6-3 Composition of Flight Suspense Message (FLS)

6.12.4. Slot Requirement Cancellation Message (SLC)

Sent to AOs/ATS to advise that a flight is no longer subject to ATFM measures and may depart without delay or as per EOBT.

An SLC is sent to AOs/ATS to advise that a flight which has received a CTOT is no longer subject to an ATFM restriction. It may be due to the change in parameters of an existing restriction or its cancellation, or to the reception of a message from AOs such as DLA, and CHG.

—TITLE SLC —ARCID ABC101 —ADEP FAJS —ADES FADN —EOBD 100303 —EOBT 0945 —TAXITIME 0015

Figure 6-4 Composition of Slot Requirement Cancellation Message (SLC)

Response of AOs/ATS to a SLC

A flight may normally depart without an ATFM restriction.

When the SLC is issued after EOBT + 15 minutes the AO must update its EOBT by sending a DLA.

6.12.5. De-Suspension Message (DES)

This CAMU message indicates that a flight, which was previously suspended, is now de-suspended and active in the system. No further action is expected after the reception of a DES by the AO

The ATFM system sends a DES when a flight not subject to ATFM restrictions is de-suspended. The original suspension could have been due to e.g. receipt of an SAM, the effect of exceptional conditions, closure of aerodrome, termination of the activation monitoring.

—TITLE DES —ARCID ABC101 —ADEP FAJS —ADES FADN —EOBD100303 —EOBT 0945—COMMENT CLDT 100303 1055 —TAXITIME 0015

Figure 6-5 Composition of a De-Suspension Message (DES)

The required action by the AO/ATC is to amend the EOBT by more than 15 minutes later than the EOBT given in the flight plan by sending a DLA message.

6.13. ATFM Messages Fields

Each ATFM message comprises a number of fields some of which are mandatory and some optional. Their number varies according to the message type. The fields used in ATFM messages are summarized as follows.

FIELDS	DEFINITION
ADEP	ICAO indicator of aerodrome of departure
ADES	ICAO indicator of aerodrome of destination
CTOT	Calculated Take-Off Time
EOBD	Estimated Off-Block Day.
EOBT	Estimated Off-Block Time
FILTIM	Date and time stamp of original message
NEWCTOT	Revised CTOT
NEWEOBT	Revised EOBT
NEWRTE	New Route
REGUL	Identifier for the restriction imposed (may include more than one) Which aerodrome? Or FCA
RESPBY	Latest time by which a response is required
RVR	Runway Visual Range (this field is optional in certain messages)
COMMENT	Commentary
TAXITIME	Taxi Time
REGCAUSE	Regulation Cause – Refer Annex 2 *
TITLE	Title of the message

***REGCAUSE Field**

In order to provide more specific nomenclature for delay causes and, at the same time, to assist the post-flight analysis, the ADEXP field —REGCAUSE comprises:

a) Reason for Regulation code (one letter code corresponding to the reason assigned by the ATFM system to the most penalising regulation).

b) Regulation Location code - one letter code: D, E or A), describing the phase of the flight (Departure, Enroute and Arrival) affected by the most penalising regulation.

c) A space.

d) The IATA Delay Code in numeric (81, 82, 83, 84, or 89) or 00 when no IATA Code available.

The —REGCAUSE appears in the SAM and SRM messages, and is associated only with the most penalising regulation. The code appearing in the message is the code valid at the time the delay was given to the flight.

7. REROUTING PROCEDURES

During the Tactical Phase, the ATFS monitors the delay situation and where possible, identifies flights subject to delays that would benefit from a reroute.

This is achieved by selecting a flight and then either:

Choosing an alternative route. or

Asking the ATFM system to process all possible options.

In both cases the ATFM system will consider the routes as well as the possible flight level limitations and give the consequent result in terms of delay.

The ATFS will consult with the AO concerned about the choices. Once the final decision is taken the selected route which will result in the booking of a slot for that flight and at the same time trigger the sending of a Rerouting Proposal (RRP) message to the originator. AO's who wish to benefit from the offer shall consequently modify their flight plan (either with a CHG or a CNL and refile).

To secure the new CTOT, the CHG / new FPL should be received before the Respond By (RESPBY) time in the RRP. At the reception of the new route in the flight plan, the CAMU system will merge it with the proposal. Then SLC, SAM or SRM messages will be transmitted as appropriate.

7.1. Rerouting Proposal (RRP) Message

The CAMU sends an RRP following the assessment of 'WHAT-IF' reroute scenarios which are initiated by the ATFS. The RRP may be issued after the transmission of a slot (i.e. SAM) or prior to the slot transmission i.e. when a Provisional Take-Off Time (PTOT) has been allocated to a flight internally in the system.

The flight has already received a CTOT corresponding to its original route.

A new CTOT is offered provided the flight is refiled along the proposed New Route (NEWRTE).

ACTION A RRP with a NEWRTE is issued.

—TITLE RRP —ARCID ABC101 —ADEP FAJS —ADES FADN —EOBD 100801 —EOBT 1030 —ORGRTE APDAK UQ48 VAVAN —NEWRTE STV 2620S02850E VAVAN—RESPBY 0900 —TAXITIME 0010

Figure 7-1 Composition of Rerouting Proposal (RRP) Message (1)

The flight has already received a CTOT corresponding to its original route.

8. EXEMPTIONS FROM ATFM SLOT ALLOCATION

8.1. Flights that Qualify for Exemption from ATFM Slot Allocation

The following flights are exempted from ATFM slot allocation:

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