**AIR TRAFFIC AND NAVIGATION SERVICES CO. LTD**



**Request for QUOTATION FOR THE APPOINTMENT OF A SERVICE PROVIDER FOR LUANDA VSAT INSTALLATION SERVICES AT THE NEW LUANDA AIRPORT - DR. ANTONIO AGOSTINHO NETO INTERNACIONAL AIRPORT.**

**REQUEST FOR QUOTATION NO: ATNS-EP- LUANDA VSAT-190623**

**Luanda SADC VSAT Terminal Installation**

**Volume 2 - Part 1**

**TECHNICAL REQUIREMENT SPECIFICATIONS**

**19 JUNE 2023**

**The information contained within this document is confidential to ATNS in all respects and it is hereby acknowledged that the information as provided shall only be used for the preparation of a response to this document. The information furnished will not be used for any other purpose than stated and that the information will not directly or indirectly, by agent, employee or representative, be disclosed either in whole or in part, to any other third party without the express written consent by the Company or its representative.**

**TABLE OF CONTENTS**

[1. SCOPE 3](#_Toc114233141)

[2. INTRODUCTION 3](#_Toc114233142)

[3. RFQ RESPONSE 3](#_Toc114233143)

[4. requirements for ats/ds CIRCUIT connectivity 4](#_Toc114233144)

[4.1 ATS/DS Circuit Connectivity 4](#_Toc114233145)

[4.2 ATS/DS Circuit Requirements for the Southern African States 4](#_Toc114233146)

[5. requirements for AFTN connectivity 8](#_Toc114233147)

[5.1 AFTN Circuit Connectivity 8](#_Toc114233148)

[5.2 AFTN Circuit Requirements for the Southern African States 8](#_Toc114233149)

[6. requirements for ATN connectivity 11](#_Toc114233150)

[6.1 ATN Circuit Connectivity 11](#_Toc114233151)

[6.2 ATN Circuit Requirements for the Southern African States 11](#_Toc114233152)

[7. requirements for engineering voice and data connectivity 13](#_Toc114233153)

[7.1 Engineering Circuits Connectivity Requirements for the NAFISAT and SADC/2 Networks 13](#_Toc114233154)

[8. requirements for LUANDA LINKS TO REMOTE EXTENDED RANGE STATIONS 15](#_Toc114233155)

[9. ATNS vsat network CIRCUIT CONFIGURATIONS 17](#_Toc114233156)

[9.1 General Requirement 17](#_Toc114233157)

[9.2 Voice Circuit Requirement for ATS/DS Implementation on the SADC/2 VSAT Networks 17](#_Toc114233158)

[9.3 Data Circuit Requirements for AFTN Implementation on the SADC/2 VSAT Networks 17](#_Toc114233159)

[9.4 Data Circuit Requirements for ATN Implementation on the SADC/2 VSAT Networks 17](#_Toc114233160)

[9.5 Voice and Data Circuit Requirements for Engineering Circuit Implementation on the SADC/2 VSAT Networks 19](#_Toc114233161)

[9.6 Circuit Requirements for VHF Forward Relay and Implementation on the ATNS local Network 19](#_Toc114233162)

# SCOPE

1. Air Traffic and Navigation Services Company Limited (ATNS) will installing two VSAT terminal in Luanda, one terminal (SADC/2 terminal) is for the current private SADC2 VSAT network that is used for fixed aeronautical ATS/DS, AFTN and ATN communications between main Air Traffic Control Centres in the SADC Regions, the second terminal is the main hub for the local VSAT network for remote VHF extended range stations. The local VSAT installation requires further VHF equipment to be supplied, installed, tested, and commissioned. (I).
2. The SADC2 network is be operated and maintained by ATNS from the ATNS operational centre, situated at the OR Tambo International Airport Operational Complex. The local network is operated by the local ANSP (I).
3. The two terminals are based on the ND Satcom technology platform (I).

# INTRODUCTION

1. This document describes the technical parameters and requirements for the installation services of two VSAT terminals. Installation services includes satellite outdoor and indoor equipment installation, setting to use, training and commissioning.

# RFQ RESPONSE

1. Bidders shall provide a written response to each paragraph in this Volume 2: Technical Requirement Specifications. Bidders are required to state compliance (C) in this regard (M).
2. Requirements marked (I) are for information purposes and the bidders are required (M).
3. Failure to respond as instructed in 3.1 and 3.2 will result in the bid being regarded as non-responsive and subsequently disqualified.
4. Bidders are referred to the relevant paragraphs in Volume 1, stipulating the structure of the response to this tender and are advised to strictly follow these stipulations (M).
5. Any additional or supportive information that the Bidder feels is necessary for clarification shall be included and referred to in the response. (M)

# requirements for ats/ds CIRCUIT connectivity

## ATS/DS Circuit Connectivity

4.1.1 The following diagram shows a graphical representation of the ATNS Network ATS/DS voice requirements within the North East African (NAFISAT) and SADC Regions (I).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



## ATS/DS Circuit Requirements for the Southern African States

1. The following diagram shows a graphical representation of the ATS/DS voice communication circuit requirements within the Southern African (SADC/2) Region. The focus in on Luanda (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



4.3.2 **Table 2** below identifies the ATS/DS voice circuits required from and between Luanda Air Traffic Control Centre and adjacent states. The circuit interconnectivity requirements shall be linked as depicted above and as be the table below(M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

4.3.3 The ATS/DS circuits as shown shall be implemented (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

**Table 2:** Luanda ATD/DS communication circuits (SADC/2 Network) (M).

| **ATS Circuits for Speech Communications** | | **Status** | | **VSAT**  **Network** | | **Remarks** |
| --- | --- | --- | --- | --- | --- | --- |
| **Terminal I** | **Terminal II** |
| **ANGOLA** | | | | | | |
| Luanda | Accra | I | | AFISNET & SADC/2 | | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Accra. Ghana CAA is responsible for the terminal equipment at Accra. |
| Abidjan | | I | | AFISNET & SADC/2 | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Abidjan. ASECNA is responsible for the terminal equipment at Abidjan. | |
| Brazzaville | | I | | AFISNET & SADC/2 | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Brazzaville. ASECNA is responsible for the terminal equipment at Brazzaville. | |
| Dakar | | I | | AFISNET & SADC/2 | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Dakar. ASECNA is responsible for the terminal equipment at Dakar. | |
| Gaborone | | I | | SADC/2 |  | |
| Johannesburg | | I | | SADC/2 |  | |
| Kinshasa | | I | | SADC/2 |  | |
| Lusaka | | I | | SADC/2 |  | |
| Point Noire | | NI | | AFISNET & SADC/2 |  | |
| Windhoek | | I | | SADC/2 |  | |

# requirements for AFTN connectivity

## AFTN Circuit Connectivity

### The following diagram shows a graphical representation of the ATNS Network AFTN requirements within the North East African (NAFISAT) and SADC Regions (I).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



## AFTN Circuit Requirements for the Southern African States

5.3.1 The following diagram shows a graphical representation of AFTN data communication circuit requirements within the Southern African (SADC/2) Region. The focus is on Luanda (I).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



5.3.2 **Table 4** below identifies the AFTN data circuits required from and between Luanda main Air Traffic Control Centre and adjacent states. The circuit interconnectivity requirements shall be linked with the circuits depicted in the graphical representation and the Table 4 below. (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

5.3.3 The AFTN circuits as shown shall implemented for Luanda (SADC/2 network) (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

**Table 4**: Luanda AFTN communication circuits (SADC/2 Network) (M).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data Circuits for AFTN Communications** | | **Status** | **VSAT**  **Network** | **Remarks** |
| **Terminal A** | **Terminal B** |
| **ANGOLA** | | | | |
| Luanda | Accra | **I** | **AFISNET** | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Accra. Ghana CAA is responsible for the terminal equipment at Accra. |
| Brazzaville | **I** | **AFISNET** | Circuit implemented via MCPC satellite ground terminal equipment installed at Luanda. No SADC/2 terminal at Brazzaville. ASECNA is responsible for the terminal equipment at Brazzaville. |
| Johannesburg | **I** | **SADC/2** |  |

# requirements for ATN connectivity

## ATN Circuit Connectivity

### 6.1.1 The following diagram shows a graphical representation of the ATNS Network ATN requirements within the North East African (NAFISAT) and SADC Regions (I).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



## ATN Circuit Requirements for the Southern African States

6.3.1 The following diagram shows a graphical representation of ATN data communication circuit requirements within the Southern African (SADC/2) Region. The focus is on Luanda (M)

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



6.3.2 Table 7 below identifies the different ATN backbone data circuits required from and between Luanda main Air Traffic Control Centre in the SADC and states. The circuit interconnectivity requirements with NAFISAT shall be correlated with the circuits depicted and tabled (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

6.3.3 The ATN backbone circuits as shown shall be implemented for Luanda(M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

**Table 7**: Luanda ATN backbone circuits (SADC/2 Network) (M).

| **Data Circuits for ATN Communications** | | **VSAT**  **Network** | **Remarks** |
| --- | --- | --- | --- |
| **Terminal A** | **Terminal B** |
| **ANGOLA** | | | |
| Luanda | Brazzaville | AFISNET & SADC/2 |  |
| Johannesburg | SADC/2 |  |
| Accra | AFISNET & SADC/2 |  |

6.3.4 **Table 8** below identifies the ATN terminal or tributary data circuits required from and between the Luanda Air Traffic Control Centre in the SADC and adjacent Regions. The circuit connectivity requirements shall be correlated (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

6.3.5 The ATN terminal or tributary circuits as shown shall be implemented Luanda(M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

**Table 8**: Luanda ATN terminal circuits (SADC/2 Network) (M).

| **Data Circuits for ATN Communications** | | **VSAT**  **Network** | **Remarks** |
| --- | --- | --- | --- |
| **Terminal A** | **Terminal B** |
| **SOUTH AFRICA** | | | |
|  | Luanda | **SADC/2** | To be implemented. |

# requirements for engineering voice and data connectivity

## Engineering Circuits Connectivity Requirements for the NAFISAT and SADC/2 Networks

1. The following diagram shows a graphical representation of data communication circuit requirements between the ATNS NAFISAT maintenance support centre at Entebbe, Uganda and the ATNS SADC/2 maintenance support centre at Johannesburg engineering voice/speech between the remote sites and Johannesburg (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |



1. **Table 9** below identifies the engineering voice and data circuits required from and between the Network Maintenance Centres. The circuit connectivity requirements shall be correlated with the circuits depicted in the graphical representation under paragraph 7.1.1 above (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

1. The engineering circuits as shown shall be implemented through the NAFISAT and SADC/2 networks (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

**Table 9**: NAFISAT and SADC engineering circuits (NAFISAT & SADC/2 Network) (M)

| **Circuits for Data Communications** | | **VSAT Network** | **Remarks** |
| --- | --- | --- | --- |
| **Terminal A** | **Terminal B** |
| **Angola** |  |  |  |
| Luanda | Johannesburg | SADC/2 | Engineering circuit |

# requirements for LUANDA LINKS TO REMOTE EXTENDED RANGE STATIONS

**8.1 Table 10** below identifies the different VHF circuits required from and between the Air Traffic Control Centres and the specific remote sites in Angola (M).

| **Circuits for Data Communications** | | | **VSAT Network** | | **Services** |
| --- | --- | --- | --- | --- | --- |
| **Terminal A** | | **Terminal B** |
| **Angola** | |  |  | |  |
| Luanda | | Cabinda | Local | | Voice E1/PABX/ATS/DS |
|  | | Cuito | Local | | Voice Telephone IP |
|  | | Huambo | Local | | Voice Serial Data |
|  | | Namibe | Local | | Voice IP Data |
|  | | Saurimo | Local | | Voice |
|  | | Soyo | Local | | Voice |
| **COMPLIANCE (C/PC/NC/Noted)** | | |  | | |

8.2 **Table 11** below describes the list of VHF to be supplied, installed, tested and commissioned by the contractor as part of the local VSAT terminal installation (M).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item No** | **Description** | **Vendor** | **Type** | **Remarks** |
| **1** | TD-35 modem | Jotron |  |  |
| **2** | Power cables |  | Mains and FPS supply |  |
| **3** | UPS |  |  |  |
| **4** | IP Telephone | Inova | Inova phone 202 |  |
| **5** | Comm 2600 voice switch | Jotron |  |  |
| **6** | Serial port expander | Jotron |  | For Com 2600, serial port expander, TD-35 modem and power supply |
| **7** | Rack 19'' / 20HU / fan / patch-panels / cabling |  |  |  |
| **8** | Lightning and Surge Protection |  |  |  |

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

# ATNS vsat network CIRCUIT CONFIGURATIONS

## General Requirement

9.1.1 It is required that the two VSAT terminal (one SADC/2 and one local) be installed in Luanda. The paragraphs below provide details of services provided. It is required that the installation will provide the services as described (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

## Voice Circuit Requirement for ATS/DS Implementation on the SADC/2 VSAT Networks

9.2.1 The tables under paragraph 4.0 above provide detailed information on the ATS/DS direct speech circuits implemented throughout the ATNS VSAT network. All voice circuits used for ATS/DS speech are at least ITU-T CS-ACELP G.729 or G.729A compliant. The end-user equipment are 2-Wire FXS/FXO compliant. Voice circuits are sized at 16 kbps duplex (each ½ circuit 8 kbps). The terminal shall continue to provide the existing ATS/DS services. (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

## Data Circuit Requirements for AFTN Implementation on the SADC/2 VSAT Networks

9.3.1 The tables under paragraphs 5.0 above provide detailed information on the AFTN data circuits implemented throughout the ATNS VSAT network. The end-user AFTN equipment are RS-232 V.24/V.28 asynchronous serial data compliant. AFTN data circuits are sized at a maximum transmission burst rate of 9.6 kbps. The terminal shall continue to provide the existing AFTN services. (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

## Data Circuit Requirements for ATN Implementation on the SADC/2 VSAT Networks

The tables under paragraph 6.0 above provide detailed information on the ATN data circuits required to be implemented (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

9.4.1 All ATN backbone data circuits shall be deployed for IP based applications. Main ATN backbone circuits shall be sized at a transmission rate of 64 kbps or 19.2 kbps. A cross reference matrix shall be provided detailing the number of higher speed data ports (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

9.4.2 All ATN terminal or tributary data circuits shall be deployed for IP based applications. Secondary ATN terminal or tributary circuits shall be sized at a transmission rate of 9.6 kbps. A cross reference matrix shall be provided detailing the number of lower speed data ports (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

## Voice and Data Circuit Requirements for Engineering Circuit Implementation on the SADC/2 VSAT Networks

9.5.1 Table 9 under paragraph 7.0 above provide detailed information on the existing engineering data circuit implemented between the Entebbe Standby Master site and the Johannesburg Master site. All engineering data circuits are V.35 and/or X.21, X.27 (V.11) HDLC type synchronous serial data compliant. Engineering data circuits are sized at a maximum transmission burst rate of 64 kbps. The terminal shall provide data circuit as required (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

9.5.2 Table 9 under paragraph 7.0 also provides detailed information on the engineering voice circuits implemented between the Entebbe site and the Johannesburg site. All engineering voice circuits are at least ITU-T CS-ACELP G.729 or G.729A compliant. Only 2-Wire FXS/FXO are be provided. Voice circuits are sized at 16 kbps duplex (each ½ circuit 8 kbps). The terminal shall continue to provide the existing engineering voice circuit (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |

## Circuit Requirements for VHF Forward Relay and Implementation on the ATNS local Network

9.8.1 The table under paragraph 8.3 above provide detailed information on the internal VHF extended range voice/speech and data circuits required to be implemented for the local VSAT hub. All VHF extended range voice/speech circuits for the shall be 4-wire E+M with PTT and Squelch conversion compliant. All VHF extended range voice/speech circuits shall be sized at 16 kbps duplex (each ½ circuit 8 kbps). A cross reference matrix shall be provided detailing the number of VHF forward relay ports (M).

|  |  |
| --- | --- |
| **COMPLIANCE (C/PC/NC/Noted)** |  |