AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG)



**INFRASTRUCTURE & INFORMATION (IIM) SUB-GROUP**

**AIR / GROUND COMMUNICATION PROJECT 3**

QUESTIONNARE

**Version 2.0**

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| **STATE CONTACT NAME** |  |
| **CONTACT DETAILS (Name and email)** |  |

1. **PURPOSE**

The purpose of the questionnaire document is to collect data to determine the implementation status of Aeronautical Mobile Service (AMS) through VHF voice, HF voice, VHF Datalink (VDL), HFDL, CPDLC and SATCOM in various AFI states. The collected data shall assist the project team to formulate the relevant recommendations regarding the implementation status of Aeronautical Mobile Service.

The survey will focus on the following as minimum metrics indicated below:

* 1. The number of routes covered by VHF voice, HF voice, VHF Datalink (VDL), HF Data Link (HFDL), CPDLC and SATCOM (Implementation status),
  2. The VHF voice, HF voice, VHF Datalink (VDL), HF Data Link (HFDL), CPDLC and SATCOM equipment type, i.e life span, frequency, location, etc and
  3. The VHF voice, HF voice, VHF Datalink (VDL), HF Data Link (HFDL), CPDLC and SATCOM site locations, etc.

1. **PROJECT OBJECTIVE**

In the framework of the technologies Roadmap for Communication defined in the GANP and the AFI strategy assist States in the implementation of Aeronautical Mobile Service through:

1. High Frequency/Very High Frequency (HF/VHF) voice Communication
2. High Frequency/Very High Frequency Data Link communication (HF/VHF DL)
3. Controller/Pilot Data Link Communication (CPDLC).

In accordance with the operational requirements of ICAO Annex 10 Volumes II & III Aeronautical Telecommunication, Annex 11 Air Traffic Service and the relevant supporting guidance documents (Doc 4444 Procedures for Air Navigation Service (PANS--ATM) Doc 9694 Manual on Air Traffic Services Data link Applications, Doc 10037 Global Operational Data Link Document (GOLD), Doc 9869 Manual on Performance Based Communication and Surveillance (PBCS).

1. **PROJECT SCOPE**

The provision of air/ground communication between Pilots and ATCOs will cover all Airspaces and Air Traffic Control Centers involved in the provision of air avigation service for international civil aviation.

The implementation scheme will be in accordance with the requirements of the provision of Aeronautical mobile Service (AMS) as defined by the AFI Air Navigation Plan (AFI/RAN Abuja 1997).

1. **PROJECT STRATEGY**

All tasks will be carried out by Communication experts nominated by AFI States participating in the project, led by the Project-Team Coordinator and under the supervision of the Project Facilitators (ROs/CNS, Dakar and Nairobi) through the IIM SG working methodology. Upon completion of the tasks, the results will be sent to the Project Facilitators as a final document for submission to, and if necessary approval by the APIRG Projects Coordination Committee (APCC). For the purpose of collaborative decision-making, meetings will be held with the areas involved.

1. **RATIONALE / JUSTIFICATION**
2. **HF/VHF Voice:** The requirements for HF/VHF are contained in the AFI Air Navigation Plan (ANP), FASID TABLE CNS 2A (Aeronautical Mobile Service and Aeronautical Mobile Satellite service-AMS &AMSS and Stations circuits have been implemented in accordance with this AFI Air Navigation Plan. Significant improvements are noted, notably with the implementation of aeronautical satellite telecommunications. However, the non- availability of Remote VHF encountered from time to time results from the obsolescence of some VSAT Stations.
3. **HF/VHF and Data Link:** The regional requirements for HF/VHF Data Link remain to be updated by the project Team.
4. **CPDLC:** The introduction of datalink communication in the region associated with surveillance data processing systems with possible automation of the transfer and coordination of Air Traffic between air traffic Centres (AIDC) require an available digital air/ground communication system. The implementation of CPDLC will bring more accuracy in the exchanged messages and increase the availability of message exchanges between ATCOs and pilots.
5. **DATA COLLECTION**

The survey will be sub-divided into six sub-sections, i.e VHF voice, HF voice, VHF Datalink (VDL), HF Datalink (HF DL), CPDLC and SATCOM categories to determine the following per State:

1. The number of implemented stations per state,
2. Equipment location and coordinates, to determine the theoretical AMS coverage,
3. Transmitter and Receiver frequency used,
4. Routes per flight level,
5. System availability statistics,
6. Equipment life span
7. Training requirements,
8. Supporting tools requirement
9. Skills capability
10. Requirement list, i.e the operational need
11. Infrastructure owned or leased
12. System readiness, etc.

The gathered information will inform the decision or recommendation the team will commend per state as to which technology to introduce, the solution design, specifications and the transition plan per state.

# VHF voice COMMUNICATION NETWORK

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| **VHF VOICE COMMUNICATION REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **STATIONS/SITES** | Indicate the total number of implemented VHF station/sites (Transmitter, Tx and Receiver, Rx) including Transceivers. | 1. Transmitter sites = 2. Receiver sites = 3. Transceiver = |
| **LOCATION** | List all VHF sites Coordinates (longitude, latitude and altitude of the station) | Attach Spreadsheet |
| List all VHF sites Frequency, i.e Tx, Rx and Transceivers used |
| **AVAILABILITY** | Average annual availability of VHF voice: X% | VHF voice availability = % |
| **EQUIPMENT/SYSTEM** | Equipment Life Span per VHF site, if owned | Attach Spreadsheet |
| Equipment IP readiness per VHF site |
| Is backup system available or not per VHF site |
| Installed OEM name |
| Leased or owned by state/ANSP |
| **NETWORK** | Supporting network – IP or traditional voice per site | Attach Spreadsheet |
| **MAINTENANCE** | Is maintenance outsourced or in-house? | In-house |
| Do you have maintenance monitoring system or tool? | Yes |
| **TRAINING** | a . Any VHF voice communication system related training requirements.  b. What training is required before working on VHF voice communication system? | VHF Transmitters and receivers concept course, PAET6T T6R equipment course – Aviation Training Academy |
| **RESOURCES** | Indicate the VHF voice communication system skills capability | Engineering technician that has gone through ATA and on the job training. |
| **TOOLS** | List VHF voice communication system special tools required to maintain the VHF voice system. | Comm Test Set, Wattmeter, Frequency counter. Antenna tester, Spectrum Analyzer. |
| **CHALLENGES** | Any operational challenges with the installed VHF voice communication system per site, eg. Frequency Interference, etc. | Frequency interferences reported to ICASA. Freq 1289KHz was interfered with and had to be changed to 1344KHz. |
| **OTHER**  (Any other relevant/additional information to note icw VHF voice communication system) | If using terrestrial links or satellite links for VHF coms network | There are no links for some of the VHF forward relay sites, the service provider cannot repair analogue circuits, migration to IP based is required to solve this link issue. Some sites are IP-ready some are not |

# HF voice COMMUNICATION NETWORK

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| **HF VOICE COMMUNICATION REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **STATIONS/SITES** | Indicate the total number of implemented HF station/sites Transmitter, Tx and Receiver, Rx. | 1. Transmitter sites = 1 2. Receiver sites = 1 |
| **LOCATION** | List all HF sites Coordinates | Attach Spreadsheet |
| List all HF sites Frequency, i.e Tx, Rx and Transceivers used |
| **AVAILABILITY** | Average annual availability of HF voice: X% | HF voice availability:…..% |
| **EQUIPMENT/SYSTEM** | Equipment Life Span per HF site, if owned | Attach Spreadsheet |
| Equipment IP readiness per HF site |
| Is backup system available or not per HF site |
| SELCAL migration readiness per HF site |
| OEM name per installed HF site |
| HF site equipment leased or owned by state/ANSP |
| **NETWORK** | HF site supporting network – IP or traditional voice per site |
| **MAINTENANCE** | Is HF voice site maintenance outsourced or in-house? | In-house |
| Do you have HF voice site monitoring system or tool? | Yes |
| **TRAINING** | 1. Any HF voice communication system training requirements. 2. What training is required before working on HF voice communication system? |  |
| **RESOURCES** | Indicate the HF voice communication system team skills capability.  What skill set is possessed by the team working on HF communication system? | Highly skilled Engineering Technicians. |
| **TOOLS** | List the HF voice communication system special tools required to maintain the HF voice system | No special tools as such. Knowledge on how to use the software and 4KW dummy load. |
| **CHALLENGES** | Any operational challenges with the installed HF voice communication system per site, eg. Frequency Interference, etc.? | 1. TX site prone to occasional theft and antenna cable damage.  2. RX site lots of power failures.  3. Spares shortage. No support contract with Rockwell Collins. Software outdated, no more support. spares that get sent away for repair take forever to return. |

# VHF Datalink (VDL) COMMUNICATION NETWORK

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| **VDL COMMUNICATION REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **STATIONS/SITES** | Indicate the total number of VDL stations/sites implemented | Attach Spreadsheet |
| VDL modes (VDL1/2/3 or 4) |
| **LOCATION** | List all sites Coordinates |
| **AVAILABILITY** | Average annual VDL sites availability: X% | VDL sites Availability: ……% |
| **EQUIPMENT/SYSTEM** | Is the VDL equipment leased or owned by state/ANSP | Attach Spreadsheet |
| Indicate VLD equipment Life Span per site, if owned |
| Is backup system available or not per VDL site |
| Indicate OEM name per installed VDL site. |
| **MAINTENANCE** | Is VDL maintenance outsourced or in-house? | In-House assist with corrective maintenance |
| Do you have VDL maintenance monitoring system or tool? | None. System is monitored overseas by ARINC |
| **TRAINING** | Any VDL training requirements. | None |
| **RESOURCES** | Indicate the VDL the state skills capability | The ARINC call centre advises on what needs to be done. |
| **TOOLS** | List the VDL special tools required to maintain the VDL system | None |
| **CHALLENGES** | Any operational challenges with the installed VDL system per site, eg. Frequency Interference, etc.? Elaborate. | None |
| **OTHER**  (Any other relevant/additional information to note) | If not implemented are there any plans to implement |  |

# HF Datalink (hfDL) COMMUNICATION NETWORK

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| **HFDL COMMUNICATION REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **STATIONS/SITES** | Indicate the total number of HFDL stations/sites implemented | Attach Spreadsheet |
| **LOCATION** | List all HFDL sites Coordinates |
| **AVAILABILITY** | Average annual availability of HFDL: …….X% |
| **EQUIPMENT/SYSTEM** | Is the HFDL equipment Leased or owned by state/ANSP |
| Indicate the HFDL equipment Life Span per site, |
| Is the HFDL backup system available or not per site |
| Indicate the HFDL system OEM name installed per site |
| **MAINTENANCE** | Is the HFDL maintenance outsourced or in-house? |  |
| Do you have the HFDL maintenance monitoring system or tool? |  |
| **TRAINING** | Any HFDL system training requirements. |  |
| **RESOURCES** | Indicate the HFDL State Skills capability |  |
| **TOOLS** | Any special tools required to maintain the HFDL system |  |
| **CHALLENGES** | Any operational challenges with the installed HFDL system per site, eg. Frequency Interference, etc.? |  |
| **OTHER**  (Any other relevant/additional information to note regarding the HFDL communication) | If not implemented are there any plans to implement |  |

# CPDLC COMMUNICATION NETWORK

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| **CPDLC COMMUNICATION REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **SYSTEM** | Indicate the CPDLC system readiness. Elaborate | The FAJO (Oceanic) has used CPDLC since the inception of Eurocat-X in October 2003. |
| Is the CPDLC system required or not? State the operational requirement and if stakeholder engagements required or not? | There’s no compulsory requirement for CPDLC. |
| **LOCATION** | List all CPDLC sites Codes –Logon Codes |  |
| **AVAILABILITY** | Average annual availability of CPDLC links: ………X% |
| **EQUIPMENT/SYSTEM** | Is the CPDLC equipment leased or owned by state/ANSP. Indicate provided SLA. |
| List equipment Life Span per site |
| Is the CPDLC backup system available or not per site |
| List CPDLC installed system OEM name, eg. SITA, etc? |
| **MAINTENANCE** | Is the CPDLC maintenance outsourced or in-house? | In-house maintenance with OEM support for challenging issues. |
| Do you have CPDLC maintenance monitoring system or tool? | YES. |
| **TRAINING** | Any CPDLC system training requirements. | ATM system training, either via OEM or FOAR SSS training which incorporates the CPDLC function. |
| **RESOURCES** | Indicate the CPDLC system skills capability. | Validated ATC with associated license rating for the airspace affected (FAJO) and OEM facilitated training for Engineering Technician. |
| **TOOLS** | Any special tools required to maintain the CPDLC system |  |
| **CHALLENGES** | Any operational challenges with the installed CPDLC system per site, eg. Frequency Interference, etc.? | NONE. |
| **OTHER**  (Any other relevant/additional information to note regarding the CPDLC system)   1. AMHS/AFTN implemented: X% 2. AIDC implemented: X% | If not implemented are there any plans to implement |  |

# SATCOM COMMUNICATION NETWORK

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| **SATCOM REQUIREMENT** | **DESCRIPTION** | **RESPONSE** |
| **STATION** | Indicate the total number of stations implemented and IP readiness | Attach Spreadsheet |
| **LOCATION** | List all sites and INMARSAT codes of each site |
| **AVAILABILITY** | Average annual availability of SATCOM network.......X% |
| **EQUIPMENT/SYSTEM** | Is the system leased or owned by state/ANSP |
| Indicate the equipment life span per site, if owned |
| Is backup system available or not per installed site |
| List the OEM name per installed site. |
| **MAINTENANCE** | Is maintenance outsourced or in-house? | In-house. |
| Do you have maintenance monitoring system or tool? | YES. |
| **TRAINING** | List state training requirements | Satellite Communications for ATSEP. |
| **RESOURCES** | Indicate the skills capability. | National Diploma: Electrical Engineering (Light current). |
| **TOOLS** | Any special tools required to maintain the SATCOM system | Spectrum Analyzer. |
| **CHALLENGES** | Any operational challenges with the installed SATCOM system per site, eg. Frequency Interference, etc.? | Lightning strikes affected most of the terminals, Rf switch and RCU needed replacement. |
| **Other**  (Any other relevant/additional information to note regarding satellite communication) | If not implemented are there any plans to implement |  |

1. **OTHER**

Add any other relevant/additional information to note regarding the AMS, i.e VHF voice, HF voice, VHF Datalink (VDL), HF Datalink (HF DL), CPDLC and SATCOM.

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