International Civil Aviation Organization

FIRST MEETING OF THE TASK FORCE ON THE INTEGRATED REGIONAL TELECOMMUNICATION INFRASTRUCTURE PROJECT
(Pretoria, South Africa, 24-28 June 2013)

Agenda Item 4: Development of a Regional Project on an Integrated Aeronautical Telecommunication Infrastructure

4.1 Technical issues

IMPLEMENTATION OF A FULL AMHS SYSTEM

(Presented by Ethiopia)

SUMMARY

Ethiopia has implemented an AMHS system which has become operational since early 2011. The project was administered by ICAO/TCB, meeting all the criteria and requirements in ICAO Doc. 9705 and Doc. 9880.

The purpose of this W/P is to urge the Task Force to reconsider Ethiopia's newly implemented full AMHS system in developing the future ATN architecture for the AFI region.

1. INTRODUCTION

1.1 One of the key aspects to maintaining the vitality of Civil Aviation is to ensure that a safe, secure, efficient and environmentally sustainable air navigation systems is available at national level. This requires implementation of an air traffic management system that allows optimum use to be made of enhanced capabilities provided by technical advances.

1.2 The Ethiopian Civil Aviation Authority has embarked on such safety critical projects which are technologically advanced since 2009.

1.3 These CNS/ATM implementation projects were carried out in strict compliance with the ICAO standards in Annex-10, various Documents, the Regional Planning requirements and other planning material available at other sources.

1.4 Accordingly procurement, installation and commissioning of the AMHS, PSR/SRR/ADS-B and flight calibration system for NAV aids have been completed since 2011 providing:

- Greater air space capacity

- Reduced separation standards
- Access to preferred trajectories
- Lower approach minima

1.5 The future implementation of CNS/ATM and ASBU concepts seems to revolve around global interoperability, harmonization and seamlessness of systems which will depend on effective data communication networks, proven information exchange and collaborative decision making process.

1.6 The purpose of this paper is to present to the meeting the capabilities and robustness of the AMHS System implemented by Ethiopia and urge any future development of the ATN architecture to take this and other already operational systems in the region into account.

2. THE AMHS PROJECT SCOPE

2.1 Provision of an ATS Message Handling System (AMHS) and associated equipment and services for the Ethiopian Civil Aviation Authority was carried out by Radio Com Inc. Under the project administration of ICAO/TCB. The system integrates MTS/MS/DS services meeting all the functional areas of the ICAO SARPS including:

- A fully SARP conformant ATN Directory
- AMHS routing, with M-Vault X-500 and M-switch X-400 as well as M-store X-400 performing the routing.
- Extended ATS message service conformant MTS.
- Extended ATS message service conformant message store.
- ATN Directory support for AFTN address mapping, ATC resources and ATN data management tools.
- System management providing all the management functionalisties implied by ICAO SARPS.

3. SYSTEMS PERFORMANCE

3.1 The AMHS system installed at Addis Ababa has been developed in full compliance with ICAO Docs 9705/9880 and the European AMHS Target Profile, as a complete messaging solution with capacity for generating, receiving and conveying ATS message (most of them based on pre-defined templates as required in Doc. 4444, Annex 15 and WMO formats).

3.2 These messages are conveyed to the MTA/MS, in Addis, where the messages could be routed to their destinations, be it another AMHS address, using X400 P3 or P7 protocols to communicate with the UA, or $X400p_1$ protocols to address a different MTA or to an AFTN recipient through the gate way.

4. COMPONENTS OF THE NEW AMHS SYSTEM

- Dual MTA
- Dual Gate Way
- AIS Database
- Dual Routers
- Billing Server

- NMS Server
- Time Server

5. CAPACITY OF THE AMHS SYSTEM

- Creates an environment for Seamless transition to ATN with fully automated systems for ATS/AIS message generation.
- Route including directory service.
- Queues management.
- Automatic diversion or re-routing
- Archiving (messages, logs, statistics and alarms)
- Message retrieval.
- Statistics.
- Communication with local users (over ITU-TX400, P7 or P3 Protocols)
- Communication with remote AMHS system (over ITU-TX400 P_1 Protocol)
- Format and address conversion (AFTN to/from AMHS)
- Dynamic configuration (users, adj. MTS, routes AMHs/AFTN,. Address mapping etc)
- MTA/Ms/ gate way monitoring
- SNMP network management agent.
- True end to end delivery acknowledgement.
- Message size not limited in length.
- Message content not limited to text.

5.2 The AMHS system installed for ECAA includes a NOTAM Data Bank and a Billing System also incorporating additional subsystems such as OPMET, flight plan and logistics information data banks, all AMHS native, with no compromise or overload for the gate way.

6. PRESENT SYSTEM CONNECTIVITY

6.1 Presently the AMHS at Addis is connected through a WAN designed with the capability of dynamic routing of traffic managed form the X400 switch via IP address assigned by Ethio-Telecom to the following airports:

- Addis Ababa ⟶ Mekele
- Addis Ababa ⟶ Dire Dawa
- Addis Ababa ⟶ Bahir Dar

6.2 As one of the ten main AFTN centers, Addis Ababa is connected via NAFISAT to Jeddah, Nairobi, Niamey, Sana, Djibouti and Khartoum:

6.3 Currently the New AMHS system is connected to these AFTN points through a gate way perfectly interfaced and providing proven transition solutions corresponding to their existing AFTN services.

6.4 The MTA at Addis is based on M-Switch X400 which makes it high performances, highly flexible and robust X400 message transfer agent (MTA). The system is suitable for use either as a departmental or back bone MTA supporting the use of distribution lists.

7. IMPORTANT AFI MEETINGS CONSIDERING ATN ARCHITECTURE ISSUES

7.1 Ethiopia's plea as a main AFTN center to be included in the ATN architecture as one of the Back Bone Intermediate Systems (BBIS) and the objection regarding the AMHS implementation aspects is a long standing one. It goes as far back as the initial drafting of the AFI ATN routing architecture. As a result, decisions or conclusions reached at the various sub-group and APIRG meetings are provided as follows:

a. APIRG-15 - Reviewed the initial draft ATN architecture and requested all AFI states to review the draft AFI ATN routing architecture. (Ethiopia expressed its objection to the Draft)

b. APIRG-16 - Noted Ethiopia's complaint on the issue, and upgrading of the Addis Ababa AFTN main center to be fully compliant with and ATN environment. It was decided that the CNS/SG would review the draft architecture when it met to look into ATN matters.

c. APIRG-17 - Established an AMHS implementation task force in which Ethiopia was included as member.

d. AMHS/1/TF/1- Draft AFI AMHS implementation strategy developed. Ethiopia was listed as pioneer to implement AMHS.

e. APIRG-18 - Endorsed the finalized AFI ATN Architecture Plan, which confirms Addis Ababa among the Back Bone Boundary Intermediate Systems (BBIS).

8. CONCLUSION

8.1 The newly installed AMHS System at Addis Ababa AFTN Center was implemented, as indicated above, with full recognition and approval of the relevant ICAO Regional bodies. The volume of information being circulated through Addis particularly during the annual AU meetings is enormous justifying the limited AFTN System to AMHS. The new system perfectly matches with all the ICAO Doc. 9705 and 9880 as well as any relevant requirements to serve as a Back Bone Center.

9. ACTION BY THE MEETING

9.1 The meeting is invited to :

a) note the status of implementation of the AMHS System in the region including the one installed at the Addis Ababa Com Center and review the ATN architecture in accordance with APIRG/18 Conclusion;

b) note the system implemented by Ethiopia at Addis Ababa meets all the AFI back bone requirements i.e. availability, reliability, capacity, alternate

routing and can contribute to further enhancements to AFI ATN Architecture; and

c) agree to amend the AFI ATN Architecture by including Johannesburg, Addis Ababa and Cairo as trunk back bone route and/or other back bone connections as they come on board.

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