



WORKING PAPER

SPECIAL AFRICA-INDIAN OCEAN (AFI) REGIONAL AIR NAVIGATION (RAN) MEETING

Durban, South Africa, 24 to 29 November 2008

Agenda Item 6: Development of a set of comprehensive work programmes in the air navigation field, aimed at improving efficiency of the air navigation system (Efficiency Committee)

STRATEGY OF IMPLEMENTATION OF CNS COMPONENTS IN THE AFI REGION

Presented by Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Equatorial Guinea, France, Gabon, Guinea-Bissau, Madagascar, Mali, Mauritania, Niger, Senegal, Togo, ASECNA Member States

SUMMARY

This paper presents the strategy in the implementation of CNS in ASECNA area with regard to the technological evolution, the results of the specialized technical working groups on the issue of CNS and based on its own experience and other experiences from some ICAO regions. It calls the AFI Region to a common effort in improving CNS required equipment for a beneficial implementation of the CSN.

Action by the meeting is in paragraph 3.

1. INTRODUCTION

1.1 The communications, navigation, and surveillance (CNS) systems concept, which has received the endorsement of ICAO Member States, is now in its implementation phase. This major task includes the development of standards, recommended practices and guidance material through various specialized working groups. Today experimentations are being conducted regarding the implementation of CNS systems in the different ICAO regions.

1.2 Early, ASECNA has been involved in the experimentation and the implementation of new CNS systems in cooperation with several partners in order to take advantage of these systems to improve the safety of air navigation service provided to the users.

1.3 The AFI Region adopted an initial transition plan to communications, navigation, and surveillance/air traffic management (CNS/ATM) and the guidance materials which require regular updating to take into account the new developments and experiences in the CNS field.

2. DISCUSSION

2.1 The airspaces managed by ASECNA include a major oceanic and desert part and the air/ground communications to support air navigation service and to meet the ICAO **Required Communications Performance have to match with this kind of constraints.**

2.2 On the basis of regional and interregional role assigned to some FIRs and centres of ASECNA, the ground-to-ground communications issue is followed in coordination with others involved air navigation Service Providers.

2.3 Communications

2.3.1 The ATN implementation strategy

2.3.1.1 The aeronautical telecommunication network (ATN) has been defined as an inter-network architecture that allows for the operation of the ground, air-ground and avionics data sub-network through the adoption of common interface and protocol services based on the International Standardization Organization (ISO) open system interconnection (OSI) reference model.

2.3.1.2 The implementation of ATN requires reliable sub-networks, properly interconnected and interoperable. So efforts must be purchased in the upgrading and the interoperability of the AFI sub-networks as emphasized by several AFI meetings.

2.3.1.3 The strategy of implementing ATN based on the OSI model had been at first considered for long, now the strategy of implementing TCP/IP in the ground-to-ground network is widely shared, this leads to the necessity of implementing dual-stack ATN end-systems (TP4/CLNP and TCP/IP), which need to be implemented at interregional boundary gateways to other ICAO regions and at intraregional gateways to air-ground ATN routers for possible relay of messages from the ground-ground network to the air-sub networks or routers.

2.3.1.4 In order to go ahead in the implementation of the ATN in the AFI Region, a specialized working group could be created to study the strategy to implement ATN/OSI and/or ATN/IP.

2.3.2 Communications applications implementation strategy

Ground/ground communications

2.3.2.1 The major ATN applications defined by ICAO as ground-to-ground (G/G) applications are:

- a) Aeronautical Message Handling Service (AMHS); and
- b) ATS Inter-facility Data Communications (AIDC).

2.3.2.2 Based on the **existing architecture** and in the meantime to achieve the global performance required for the ATN implementation, **changes** for the improvement of communications services could be **implemented gradually**.

2.3.2.3 Dakar, Niamey and Brazzaville are AFI AFTN main centres newly equipped with AFS systems complying with ATS Messages Handling Service (AMHS) capability.

2.3.2.4 So full AMHS links could be implemented in trials phase in parallel with the main AFTN circuit in ASECNA area and with the others equipped main Centres (Algiers, Casablanca).

2.3.2.5 N'Djamena, Dakar, Niamey, Abidjan, Antananarivo sites are already equipped with FDPS (EUROCAT-X) and with the AIDC capability, Brazzaville very sooner and ASECNA plans to implement the AIDC links between this centres and also with some of his neighbour in a cooperative approach.

Air/ground communications

2.3.2.6 In the various studies and experimentations it appears that in the future, the use of data link transmissions will increase to the detriment of voice communications. However, the migration to a full compliant ATN /VDL could take some time due to the cost of the fleet retrofit and the full replacement of VHF analogue radio available today and not compatible with the upcoming new technology. The VHF Data Link (VDL) operation requires VHF Digital Radio (VDR).

2.3.2.7 At the moment and in the meantime the fleet is enough equipped with the VDL ASECNA decided to use the data link over ACARS to support the FANS1/A applications (CPDLC, ADS). ASECNA and SITA signed an agreement for the use of AIRCOM system.

2.3.2.8 The cost of the ACARS lines for the AFI Region is relatively expensive and it is necessary to have a global approach by the ANSP.

2.3.2.9 According to the VDL capability of some fleet ASECNA will introduce gradually a VDL network by upgrading or change the existing VHF equipments to support the VDL capability.

2.3.2.10 However, ASECNA will continue to improve the extended VHF coverage by implementing new VHF stations in order reinforce the existing VHF coverage to get a double coverage.

2.4 Navigation

2.4.1 The implementation of a new system requires acquiring experience and confidence before authorizing its operation. It is also necessary to know its characteristics to be able to define the procedures of ratification, operation and maintenance.

2.4.2 ASECNA in cooperation with international partners (ESA, DGAC) has experiments including operational tests which gave very satisfactory results and allowed competence in GNSS domain (SBAS).

2.4.3 Technically, benefice could be got from the GNSS implementation for the AFI region but the institutional, economic and financial aspects and the fleet equipment are not yet well defined. **ASECNA GNSS strategy is pending the regional position to be decided in a global AFI GNSS strategy by the states for ANSP.**

2.5 Surveillance

2.5.1 Surveillance is the eye of the ATC which provides the controller with the necessary information to enhance air navigation safety.

2.5.2 ASECNA adopted a surveillance plan based on:

- a) the implementation of secondary monopulse surveillance Radar augmented with S mode in N'Djamena, Dakar, Niamey, Abidjan, Brazzaville;
- b) ADS-C coverage in all airspace specially in the oceanic and desert areas to complete the radar coverage; and
- c) ADS-B or multilateration systems in the others parts of the FIRs based.

2.5.3 An ADS-B experimentation in Dakar conducted in cooperation with (DTI-France) showed that ATC could take advantage of this system with regard to the architecture of VSAT communications network used to support the extended VHF coverage in ASECNA area.

2.5.4 For the efficiency, the airlines must be enough equipped and a regional strategy must be considered in this way.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:.

- a) take note of ASECNA efforts in implementing CNS systems to improve air navigation safety;
- b) comment on the regional strategy to implement the new CNS systems and adopt in collaboration with ICAO, a regional strategic position for the implementation of GNSS complying with the users requirements;
- c) recommend the continuation of the efforts to meet the requirement of communications performance in terms of capability, availability, traffic delays;
- d) encourage regional and interregional cooperation in experimentation of the new CNS systems; and
- e) recommend to airlines to equip their aircraft to take advantage of the new systems to be implemented.

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