International Civil Aviation Organization

THE THIRD MEETING OF ADS-B STUDY AND IMPLEMENTATION TASK FORCE (ADS-B TF/3)

Bangkok, Thailand, 23 – 25 March 2005.

Agenda Item 6: Progress development of regional implementation plan

b) States to present WP of any significant progress in ADS-B planning or deployment.

ADS-B IMPLEMENTATION FOR LA REUNION ISLAND

(Presented by France)

SUMMARY

This information paper presents the ADS-B implementation plan for La Réunion Island. An implementation is under finalisation to give the framework of this implementation. Preliminary results are presented in this paper. Although ADS-B is considered as a major enabler for this purpose, preliminary studies have shown that considerable efforts are still required on regulatory aspects such as aircraft equipage mandate and definition of separation minima.

1. The « La Réunion » Island context

1.1. "La Reunion" Island is situated in the Indian Ocean at about 100 Nm in the west of Mauritius. It is in charge of air traffic control in an airspace situated in the Antananarivo FIR with a class E airspace from 1000ft up to FL195 and a class A airspace from FL195 up FL460. It is adjacent with airspace controlled by Antananarivo and Plaisance ATC (Mauritius). It includes 2 airports : St Denis Gillot and St Pierre Pierrefonds.

1.2. Traffic in Saint-Denis-Gillot TMA is composed with: long range aircraft (over-flights, flights to Europe), regional aircraft (flights between islands especially between Mauritius and La Réunion), single engine and light twin engine VFR or IFR aircraft; helicopters; ultra-lights. Most of these flights are climbing or descending in this airspace and the complexity of the situation has increased with the development of the second airport. This makes Air traffic control more and more difficult.

1.3. Only non-radar control methods from Doc 4444 are used : longitudinal separation of 10 min and VOR-DME separation. These separations can be very restrictive, especially for Reunion – Mauritius route.

1.4. For all these reasons the Air Navigation Directorate of the French DGAC recently decided to implement an ADS-B system in Reunion Island and has launched the definition study to prepare this implementation.

2. ADS-B implementation study

2.1. The Implementation study is addressing operational need, aircraft equipage policy, ADS-B gound station installation, ADS-B data processing and display system, cost and work breakdown. The study is based on the choice 1090 MHz ES ADS-B technology.

2.2. The first operational need is to display all IFR traffic in the airspace controlled by La Réunion. VFR traffic display is also needed in the vicinity of both airport. Then it is envisaged to apply radar like separation between ADS-B equipped aircraft. Search And Rescue improvement are also needed to get a better localisation of aircraft in emergency or an information of the latest known aircraft position. Expected coverage is from surface in a radius of 6.5 Nm from the St Denis Airport, above 6500 ft in the TMA and above FL195 at 200 Nm from St Denis. It is expected that traffic from Mauritius could be detected at 3000 ft after take off. This would ease coordination between both ATC centres.

2.3. A fleet survey has been made to assess the feasibility of having equipped traffic in this airspace. Meeting with airlines has shown that about 40% of the traffic could be equipped based on enhanced surveillance requirement, aircraft renewal and voluntary retrofit. For other airlines only a regional implementation could justify their equipment investment. A regional mandate may be necessary to converge to a full equipped traffic situation.

2.4. Ground station site survey and coverage simulation have been performed. The sites are existing VHF station sites that can host easily an ADS-B ground station. 3 ground stations would satisfy the need for coverage of IFR traffic as identified in the operational need assessment.

2.5. The definition study also identifies the requirement for an ADS-B data processing and display system. ADS-B data processing includes fusion of multiple ADS-B sources with overlap coverage. Display system is expected to be very similar to existing radar display system. Flight identification on the controller display requires specific attention for safety reasons. It is planned to display the flight identification transmitted via ADS-B and to compare it with the flight plan in conjunction with specific operational procedures..

2.6. The definition study is expected to be released to DSNA by may 2005. Afterwards it is planned to issue a call for tender for the delivery of ADS-B ground stations in order to achieve a first installation at 4th Q of 2006. Operational validation will start early 2007 and will progressively include additional ground stations. It is planned that validation will last about 2 years. Safety analysis including ADS-B separation standard study will be conducted in order to achieve ADS-B separation procedures with most of the traffic by 2009.

3. Main ADS-B issues to be addressed

3.1. The study has also assessed in detail the impact of mandating 1090 MHz Extended Squitter capability onboard all involved aircraft. For the most advanced “digital” aircraft, Service Bulletin already exists, thus the cost of equipment should be affordable. For other aircraft especially light aircraft and helicopters, 1090 MHz ES transponders and also appropriate GNSS receivers are available, but Supplemental Type of Certificate have to be developed leading to a higher cost for these types of aircraft. Integrated low cost GNSS ADS-B transponders is also envisaged when available. Work is still needed to validate that the broadcast data are usable for ADS-B specific separation standard that are under definition by ICAO.

3.2. The aircraft equipment policy is one of the essential items that needs to be investigated considering the cost, the schedule and the availability of the certification material in a regional coordinated process. Active coordination in the Indian Ocean region between France, Madagascar, Mauritius, South Africa and other involved states will have to take place to maximize benefits for equipping and coordinate the strategy for a mandate and its definition.

3.3. In addition to ICAO panels activities on ADS-B such as OPLINK and SAS panels, requirements for radar like application are under development by the Requirement Focus Group and are essential for certification of aircraft and for a full operational use of ADS-B

with radar-like procedures. These requirements are also addressing navigation requirements and especially satellite navigation precision and integrity. French DSNA experts are actively contributing to this RFG.

3.4. Definition of separation minima is the other issue that is essential for an operational use of ADS-B as a surveillance means. Criteria have to be defined by ICAO taking into account ADS-B performances and failure modes as assessed by safety studies.

4. Conclusion

4.1 The Meeting is invited to take note of the information provided in this paper.
