International Civil Aviation Organization

THIRTEENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/13)
Bangkok, Thailand, 9 to 13 September 2002

Agenda Item 2.2: ASIA/PAC Air Navigation System and Related Activities –
Sub-item 2.2: CNS/MET Matters

ADS-B STUDY AND IMPLEMENTATION TASK FORCE

(Presented by Fiji)

SUMMARY

This working paper discusses the studies and plans for ADS-B in Fiji. It invites the meeting to review the Draft Conclusion 6/9 made at the sixth meeting of CNS/MET so that Fiji is included in the **ADS-B Study and Implementation Task Force.**

1. Introduction

With the implementation and commissioning, earlier this year (2002), of state of the art technology providing modern CNS/ATM systems and services in its Oceanic Airspace, Fiji is now faced with the next challenge; that is to introduce similar technology and system in the Domestic Airspace covering 120Nm and 300 islands spread over the seas. The two main islands are mountainous within its center and this provides a challenge for siting of ground-based equipment, which will provide the required coverage.

It has been identified much earlier that the use of radar is not an option due to the number that would be required together with the prohibitive costs (capital and operational). Hence, the use of Satellite technology with some ground based and airborne equipment was considered the best alternative solution.

1.1 Background

Prior to the formation of Airports Fiji Ltd in 1999, the Civil Aviation Authority of Fiji (CAAF) in coordination with a supplier company Harris Incorporated, of United States (in 1995) implemented a pilot program to test out the operation of pseudo-like radar (ADS) in the Domestic Airspace. This utilized satellite technology (GPS) with Airborne Data-Link Processors (ADLPs), Ground based Data-Link Processors (GDLP) with radio transmissions on the VHF band. Appropriate networks and processors on the ground provide the information to the Air Traffic Controller's Air Situation Display (ASD).

This was an historical event and a major milestone for Fiji as the worlds first in introducing the use of GPS as a supplemental means of navigation and surveillance. It worked quite well for both the Airline Operators involved as well as the Air Traffic Services providers. There were some minor problems, which were identified and these were rectified by the supplier.

During this program three (3) sites were used in Fiji, which provided coverage to most of the required area.

This program came to a halt for two reasons:

- with the Y2K contingencies plan in place, there was requirement for an updated program and enhancements in the software and support services. Since, this was a pilot program with proprietary software it was time to start thinking about further developments and long term plans;

- Airports Fiji Ltd had to carry out its own studies to decide on whether to continue with this pilot program or take advantage of technological developments and implement a system, which harmonises with other systems implemented in the ICAO ASIA/PAC Region..

Fiji decided to discontinue the program and use the experiences gained as well as technological developments in the region to pursue a more long-term solution. The lessons learnt and experiences gained enables Fiji to move forward in search for a long term solution for ADS in its Domestic Airspace as well as share those experiences with member states in the ICAO ASIA/PAC region.

2. Limitations in the current operational environment

2.1 *Restrictive Separation Standards:*

On the Nadi-Nausori corridor, traffic is subjected to extreme restrictions often incurring delays. The direct track is the preferred route between the two main airports by most operators. However the current standards and navigational aids available allows for 10 min separation for subsequent traffic at the same level on this 40-minute flight sector.

In the event of one NDB being inoperative then the situation is further degraded.

2.2 ***Delayed Flight Information Service:***

There is a sector in the Domestic Airspace called the Vanua Sector where flight information service is provided due to limited navigation aid available in view of the terrain. On busy days, it can be very demanding on both the pilot and the FISO in ensuring that up-to-the-minute flight info is made available to flights, however this is not always possible.

Arrivals to and departures out of Savusavu and Labasa are usually the worst affected due to their close proximity, their location, the limitations of equipment used and the increasing volume of traffic.

2.3 ***Restrictive Instrument Approaches :***

Straight-in instrument approaches at Nadi is limited to one runway only mainly due to terrain and equipment availability. In Instrument Meteorological Condition (IMC) only one aircraft at a time can carry out instrument approach until it either breaks visual or has effected a landing. This process usually takes 4mins to complete hence subsequent approaches will have to hold in the holding pattern until so cleared by Tower.

When a large/heavy body jet is established on the localizer, VFR movements are restricted to remain outside the intermediate approach area until the aircraft has landed. This effectively holds a major portion of traffic at Nadi at bay most times.

Nausori airport currently has no ILS equipment installed but the prevalent weather conditions necessitate frequent instrument approaches.

2.4 Geographical Limitations:

Due to the mountainous terrain and remote isolation of most airports, there is an urgent requirement to provide navigational aids to enhance safety. However the high cost of installing and maintaining these ground-based equipments makes it economically not viable to do so.

2.5 Position Reports:

Position Reports by pilots cannot be verified by any other means. This can be very dangerous in cases where the pilot or controller makes a mistake for whatever reason.

2.6 Search and Rescue:

Currently the system depends on the last position report provided by the pilot when initiating search of overdue aircraft and these reports can be 10 minutes old at times. This delay factor contributes significantly to the wide area of search coverage and also limits effective rescue operations where required.

3. Possible solution

The possible solutions include:

- the use of radar but the costs are prohibitive so this option will not be pursued.
- to equip aircrafts with GPS for supplemental means of navigation with the intention to eventually regulate GPS as a sole (primary) means of navigation for the pilots in the domestic airspace.
- the Air Traffic Management requires an ADS system to provide for better surveillance of the designated airspace. ADS-B is a definite option, which Fiji would like to investigate further.

4. Plans

The approach taken by Fiji is discussed below.

4.1 Cost Benefit Analysis (CBA) studies

In line with requirements by ICAO CNS/ATM Planning, Fiji is currently undertaking a Cost Benefit Analysis (CBA) study in partnership with suppliers of the EUROCAT system (Thales ATM) on the use of ADS-B in Fiji. It is envisaged that this will be successful and bring about benefits with efficient, cost effective and safer operations for Airline operators.

The study is expected to be completed by October 2002.

4.2 Trials

Following successful CBA, further discussions with Stakeholders (CAAFI, Airline operators, Government) who are also part of the National CNS/ATM Planning team would continue so that trials may be conducted in 2003.

5. Conclusion

At this point in time, it can be concluded that the approach above is a logical one but in order to proceed from CBA studies to trials and successful implementation a lot more coordination work and discussions must be held. Fiji plans to work closely with the regulators, suppliers, stakeholders,

ICAO regional office and member states in trying to ensure that it implements the most cost-effective, efficient and safe system which harmonises with the ASIA/PAC Regional Plan.

6. Action by APANPIRG/13:

In order that the above conclusion is realised, it is recommended that Fiji be included in the ICAO Regional team for the ADS-B Study and Implementation Task Force.

The meeting is requested to consider this recommendation.
