



## **FANS Interoperability Team Meeting (FIT/18)**

**Honolulu, Hawaii, USA, 22-23 March 2011**

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### **Agenda Item 4 – Working Papers**

#### **Performance Based Approach for Communications and Surveillance**

**Presented by Airways New Zealand**

#### **SUMMARY**

This paper proposes the development of a performance based framework for communications and surveillance within the ICAO Asia/Pacific region that will complement the existing performance based navigation framework. The performance based communications and surveillance framework will apply performance specifications to FANS1/A controller-pilot data link communications (CPDLC), automatic dependent surveillance contract (ADS-C), and satellite communications (SATCOM) voice for air traffic control.

This paper draws on work by the FAA from papers presented to the North Atlantic Implementation Management Group (NAT IMG) and the North Atlantic Communications, Surveillance and Navigation Group (NAT CNSG) during 2010.

## **1. INTRODUCTION**

- 1.1. While the Asia/Pacific Region has an implementation plan for performance based navigation no regional plan exists for the implementation of performance based communication and surveillance.
- 1.2. ISPACCG states have reduced separations that are predicated on certain communication, surveillance, and navigation requirements. With an increasing proliferation of different aircraft FANS1/A systems and given current ground system implementations it is possible that separations may be misapplied because the qualification criteria for communication and surveillance are not formally applied within the Asia/Pacific Region.

## **2. DISCUSSION**

### *Current Situation*

- 2.1. Reductions in separations and other operational initiatives are predicated on communication, surveillance and navigation performance. Given the current ground system implementations, the ATC facility can potentially misapply air traffic services to an operator or aircraft type. This is most likely occurring today where

reduced separations are applied, because the qualification criteria for communication and surveillance are not formally applied. These criteria are not prescribed and there is no formal approval mechanism in place to ensure that the end-to-end system complies with the criteria

*Compliance to CPDLC RCP240 and ADS-C RSP180*

- 2.2. CPDLC RCP240 and ADS-C RSP180 are used for reduced lateral and longitudinal separation within the region. These performance specifications are included in Appendix B and Appendix C of GOLD.
- 2.3. Airways New Zealand, Tahiti, and the FAA have implemented post implementation monitoring in accordance with the GOLD. Figure 2-1 provides a graphical overview of the post-implementation monitoring process. Monitoring performance and providing feedback to operators and CSPs has a positive effect on end-to-end performance.

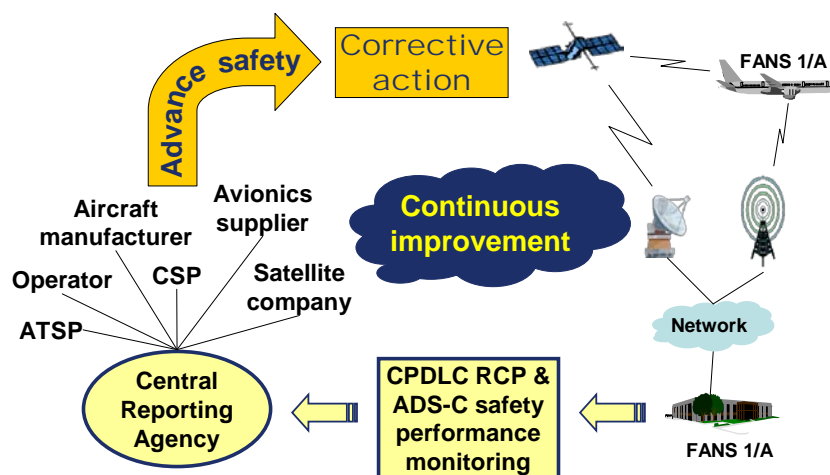


Figure 2-1 Post Implementation Monitoring

- 2.4. The monitoring indicates that some operators can meet the RCP240 and RSP180 criteria. However, a number of issues have been identified that cause degraded performance with some operator's fleets. Issues that have been identified relate to aircraft equipage, subnetwork selection and use, and operator procedures.
- 2.5. The introduction of FANS1/A over Iridium satellite (FOI) and Inmarsat SwiftBroadBand (SBB) and Classic Aero Services on the I4 satellites has seen the introduction of new space and ground infrastructure. ANSP have not specified any special requirements or restrictions to service provisions and/or Regional SUPPs, AIP, or equivalent.
- 2.6. In addition to post-implementation monitoring and analysis, the following will provide more confidence in ensuring an acceptable level of performance for communications and surveillance:

- Prescription of requirements for communication and surveillance performance for the operator, aircraft, and infrastructure, e.g., Regional SUPPs, AIPs, and flight plan;
- Guidelines on means of compliance to qualify each entity; and
- Appropriate approvals by the State of the Operator and/or State of Registry.
- Means for ATC automation to determine and apply appropriate level of service to eligible aircraft.

*Planning and implementation*

2.7. Currently, performance-based navigation (PBN) has been implemented by reference in appropriate airspace specifications. However, none of these documents invoke the RCP Manual (ICAO Doc 9869), the GOLD, or any guidance material for use of SATCOM voice for ATC communications (SVG M).

2.8. Figure 2-2 provides an overview of the requirements framework and guidance material. The standards, such as the Regional SUPPs, AIPs and NOTAMs should invoke the guidance material, such as the *PBN Manual* and the *GOLD*. The technology and implementation should enable the ATC facility to provide the appropriate level of service to eligible operators. Operators would be eligible as indicated in operational specifications and based on their filed flight plan.

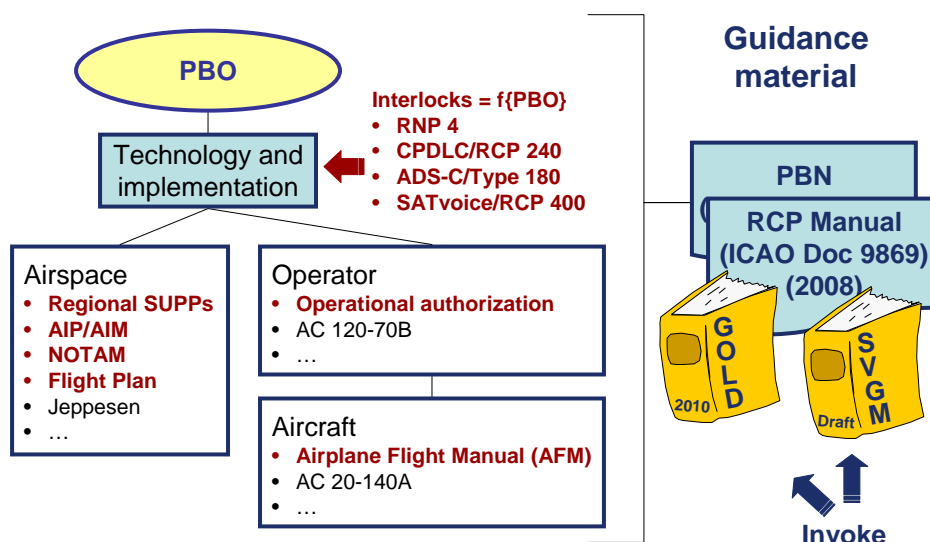


Figure 2-2 Implementation of a performance based communications and surveillance framework

*GOLD*

2.9. GOLD is a guidance document, designed to be invoked by the State to associate compliance material for the requirements as prescribed for the applicable airspace by Regional SUPPs and State AIPs. For example, the Regional SUPPs should prescribe FANS 1/A CPDLC RCP 240 and ADS-C RSP180 specifications as the

communication and surveillance requirements, in combination with RNP 4 specification, for application of 30/30 separation. The guidance for meeting these specifications – or means of compliance – is provided by the GOLD and PBN Manual.

2.10. The GOLD, para 2.1, provides globally-standardized indicators to identify interoperability and performance specifications for communication and surveillance capability. Interoperability indicators identify the specifications for the applications and the subnetworks. Performance indicators identify the specifications for the communication and surveillance performance needed for a specified operational need, such as a reduced separation minimum. These indicators are intended to be used consistently to prescribe the requirements for airspace, and to identify aircraft equipment and capability determined by approvals for aircraft installations and the operator's intended use.

### **3. CONCLUSION**

3.1. States have an obligation to ensure that aircraft and operators are meeting requirements for intended uses.

3.2. A flexible framework is needed to support different communication and surveillance capability and performance when new voice and data technologies are used that:

- Provisions for the unknown, i.e., to assign new indicators for specifications, as needed;
- Leverages “less capable” aircraft capability – communication capability was not simplistically ON or OFF, or based solely on the presence of a CPDLC connection or ADS contract; and
- Prescribes and/or restricts operation to appropriate level of service based on demonstrated performance level of the aircraft/operator.

3.3. To implement a performance based communications and surveillance framework, changes are needed for:

- Type design approval of aircraft;
- Related operational approvals;
- Regional SUPPs (ICAO Doc 7030 Amendments) and AIPs (or equivalent);
- Flight plan filing requirements; and



- ATC automation to act appropriately based on communication and surveillance equipment and capability indicators provided in the flight plan.

3.4. A regional plan is needed for the implementation of performance based communication and surveillance.

#### **4. ACTION BY THE MEETING**

4.1. The meeting is invited to:

- a) Note the information in this paper
- b) Agree with the approach summarized in Section 3 of this paper.
- c) Provide further comment as necessary.