

**FOURTH MEETING OF THE ALLPIRG/ADVISORY GROUP****(Montreal, 6 – 8 February 2001)**

**Agenda Item 2.1: Interregional coordination and harmonization mechanism – Harmonization of air navigation systems**

**USE OF AERONAUTICAL MOBILE SATELLITE SERVICES (AMSS)  
FOR COMMUNICATION AND SURVEILLANCE**

(Presented by the International Mobile Satellite Organization)

**SUMMARY**

IMSO has concluded an Agreement of Cooperation with the International Civil Aviation Organization (ICAO), under which the Organizations have established and maintain close, but non-exclusive, consultation and cooperation in matters of common concern relating to aeronautical mobile satellite communications. Under this Agreement, IMSO will ensure that the company takes into account the applicable ICAO Standards and Recommended Practices in line with the Public Services Agreement and will regularly inform ICAO accordingly.

This paper presents information on current implementations of communication and surveillance systems based on AMSS in some regions, identifies the possibilities for expanding these into other regions, and suggests that the coordination and expansion of these activities be included as an item in the work programme of each ICAO PIRG.

**1. INTRODUCTION**

1.1 At its Twelfth Session in April 1998, the Inmarsat Assembly adopted amendments to the Inmarsat Convention and Operating Agreement which were intended to transform the Organization's business into a privatised corporate structure, while retaining intergovernmental oversight of certain public service obligations. The Assembly and Council of Inmarsat subsequently decided to implement the amendments as from 15 April 1999, pending their formal entry into force in accordance with the requirements of the Convention. In doing so, it was recognised that early implementation of the new structure was needed to maintain the commercial viability of the system and thereby ensure continuity of the public service obligations, including: peaceful uses of the system, non-discrimination, service to all geographical regions and fair competition.

1.2 The restructuring of Inmarsat involved the incorporation of holding and operating companies, located in England and registered under British law on 15 April 1999, as planned. On the

same day, the Headquarters Agreement between the UK Government and the IMSO was signed. A Public Services Agreement between IMSO and the privatised Inmarsat was also signed with immediate effect. The Operating Agreement was terminated and the Signatories received ordinary shares in the privatised Inmarsat in exchange for their investment shares. Future capital requirements will be met from existing shareholders, strategic investors and public investment through a listing of the shares on a stock exchange (IPO) within about two years from the date of privatisation.

1.3 The Inmarsat satellites and all other assets of the former IGO have been transferred to the privatised operating company which continues to manage the global mobile satellite communications system for the future.

1.4 The intergovernmental organization (IMSO) continues with 87 parties, operating through the Assembly of Parties, its Advisory Committee and a small Secretariat, headed by the Director who is the legal representative of the Organization. Under the relevant provisions of the Convention, as amended, the Public Services Agreement and the Articles of Association of the company, IMSO is charged with overseeing, and under some circumstances may enforce fulfilment of some of the company's public service obligations.

1.5 IMSO has now concluded an Agreement of Cooperation with the International Civil Aviation Organization (ICAO), under which the Organizations have established and maintain close, but non-exclusive, consultation and cooperation in matters of common concern relating to aeronautical mobile satellite communications. Under this Agreement, IMSO will ensure that the company takes into account the applicable ICAO Standards and Recommended Practices in line with the Public Services Agreement and will regularly inform ICAO accordingly.

## 2. BACKGROUND

2.1 ICAO established the Future Air Navigation Systems (FANS) Committee in 1983 to determine *inter alia* how best to achieve required improvements in the communications and surveillance systems used for the management of air traffic over oceans and remote land masses. Since radar surveillance and VHF communications systems are limited to line-of-sight ranges, they are impractical for the former, while their need for extensive support, including electrical power and maintenance, makes them unsuitable for the latter. HF communications are similarly unacceptable, being unreliable, of generally poor quality, user-unfriendly and requiring significant skilled operational support.

2.2 The FANS committee identified the use of satellite technology as the way to achieve the desired goals. Satellite communications can provide instantly available, high quality voice and data communications between the ground and aircraft in flight, no matter where in the world the aircraft are located. The data communications facility, used in conjunction with on-board navigation systems, enables surveillance to be exercised in a manner previously impossible without radar. Satellite technology can also provide the improved navigation capability required to achieve future air traffic management goals. These concepts were endorsed at the 10th Air Navigation Conference in September 1991.

2.3 Inmarsat contributed to the work of both FANS Committees and to the ICAO Aeronautical Mobile Communications and Automatic Dependent Surveillance Panels established to develop satellite CNS systems Standards and Recommended Practices. The development of the Inmarsat aeronautical mobile-satellite communications system proceeded in parallel with these activities and resulted in the implementation of a system fully capable of meeting ICAO technical and operational requirements. The Inmarsat system became operational in November 1990 and has provided SARPs compliant air-ground-air voice and data communications to an increasing number of aircraft ever since.

2.4 Section 3 of this paper reports on current implementations of communication and surveillance systems based on AMSS in some regions, and Section 4 identifies the possibilities for expanding these into other regions, and suggests that the coordination and expansion of these activities be included as an item in the work programme of each ICAO PIRG.

### 3. CURRENT OCEANIC AND REMOTE AIRSPACE SYSTEM IMPLEMENTATION STATUS

#### 3.1 Background

3.1.1 Implementation of CNS datalink systems using the Aeronautical Telecommunication Network (ATN) has been slow to materialize. However, systems based on “pre-ATN” networks continue to be implemented in most regions and aircraft operators are gaining benefits from these. The AMSS system will support both ATN and pre-ATN communications, and many of the pre-ATN implementations are based on the existing global airline networks. Boeing introduced the FANS-1 package in 1995 and today over 700 Boeing wide-bodied aircraft are equipped. Airbus introduced the equivalent FANS-A package during 2000 and advises that more than 200 Airbus aircraft could activate the package today. The great majority of CNS datalink systems implemented today in oceanic and remote airspace are based on the FANS-1 and FANS-A packages.

3.1.2 Direct Controller/Pilot voice communication is possible in oceanic and remote airspace via the public switched telephone network (PSTN) and to date over 160 Air Traffic Control centres have provided PSTN numbers which can be called by an aircraft equipped with an AMSS system, using abbreviated dialling codes (shortcodes) allocated by Inmarsat. Calls are generally restricted to non-routine flight safety calls. In addition several ATS service providers have developed systems to allow ground-to-air calls to be made to AMSS equipped aircraft.

#### 3.2 AMSS based datalink implementation by region

*Information in the following paragraphs is based on material published by the FANS Stakeholders’ Group in mid-2000.*

##### 3.2.1 *Africa-Indian Ocean Region*

A number of CPDLC/ADS ground systems are in place in ATS facilities throughout the region including Johannesburg and the Canary Islands, and several operational trials are either planned or in progress.

##### 3.2.2 *Asia/Pacific Regions*

South Pacific use of FANS-1/FANS-A in Auckland, Brisbane, Melbourne, Nadi, Tahiti and Oakland FIRs for CPDLC, and in some cases ADS, commenced in 1995.

CPDLC service is available in Tokyo and Oakland FIRs.

CPDLC and ADS available in Singapore FIR and in the Bay of Bengal.

CPDLC and ADS service available in Western China supporting ATS route L888.

A number of CPDLC/ADS ground systems are in place in ATS facilities throughout the region and several operational trials are underway.

### 3.2.3 *European Region*

Helicopters operating to and from the offshore oil platforms in Norwegian airspace in the North Sea are equipped with a modified ADS capability and AMSS. The Norwegian ATS provider developed and implemented this ATN based system.

A number of CPDLC/ADS ground systems are in place in ATS facilities throughout the region.

### 3.2.4 *Middle East region*

A number of CPDLC/ADS ground systems are in place in ATS facilities throughout the region including those in Cairo and Tehran, and several operational trials are underway.

### 3.2.5 *North Atlantic Region*

FANS-1/FANS-A ADS way-point position reporting trials in the Gander and Shanwick FIRs transitioned to operational trial status in late January 2001. Iceland is also participating in the trials.

## 4. **ROLE OF ICAO PIRGS**

4.1 Many of the implementations described above did not result from the ICAO regional planning process, but from the efforts of informal groups of users and providers. This approach has produced significant benefits for all parties, but it must be noted that there are wide variations in the scale of implementation between regions. An aircraft operating in several regions will receive a very different level of service in different regions.

4.2 The task of harmonizing the level of implementation in adjacent regions appears to belong to the ICAO PIRGs, and finally to Allpirg. It may now be timely for the PIRGs to examine implementations in oceanic and remote airspace in adjacent regions with a view to increasing their efforts to bring the level of implementation in all regions up to the level of the better equipped regions. This will allow aircraft to receive a consistently high level of service and will allow all parties to share in the benefits. It must be noted that the cost of implementing ground systems to support CNS/ATM in oceanic and remote airspace using AMSS is small compared to most other CNS/ATM systems.

## 5. **ACTION BY ALLPIRG**

5.1 ALLPIRG is invited to:

- a) note the current implementation status of CNS systems based on Annex 10 SARPs compliant AMSS services;
- b) note the suggested need for PIRGs to become more actively involved in ensuring that such implementations provide a consistent service to aircraft across regional boundaries; and
- c) consider including the coordination of interregional AMSS implementation in the work programme of the PIRGs.