

El Director General de Aviación Civil

Madrid, 27 de Marzo de 1.989

Ilmo. Sr. D. Alfonso Muñoz-Seca
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DIRECCIÓN GENERAL AVIACIÓN CIVIL	
- SECRETARÍA -	
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Querido Alfonso:

Como continuación a mi carta de fecha 16 de Marzo pasado y referida a la Reunión de Expertos de Seguridad Aérea en la Antártida, te confirmo que nuestra delegación, además del ya citado Sr. Plaza Bódalo, estará compuesta por D. David Díez Fernández, Analista de Sistemas y especializado en modernos sistemas de control, navegación y vigilancia (CNS).

Igualmente, te adjunto un documento que nos parecería oportuno se discutiera en la citada Reunión, o al menos para que sirva de acicate para un posterior desarrollo dentro de las discusiones de la misma.

Recibe un fuerte abrazo



Fdo. Carlos Martín Plasencia

ESTABLISHMENT AND PROVISION OF A MULTINATIONAL ICAO ANTARTIC SATELLITE BASED CNS FACILITY/SERVICE

(prepared by F. P. Bodalo and D.Diez. Spain)

1. Introduction

The difficulty to implement present CNS systems and operate them in a consistent manner in the Antarctica, caused by a variety of reasons like difficult terrain, bad weather, and so on, makes satellite technology to be the only, now viable solution that would enable international civil aviation to fulfil the needs and requirements for such a remote area at a moderate cost.

2. Satellite based CNS systems

2.1 Navigation

Satellite navigation, where the user performs on-board position determination from information received from broadcast transmission by a number of satellites will potentially provide highly reliable, highly accurate and high integrity global coverage independently and will meet the requirements for sole means of navigation for civil aviation in the Antarctica.

The accuracy and integrity of the satellite navigation system will be such that they can serve all navigation functions with timely failure warnings for en-route and terminal operations, as well as provide adequate information to support non-precision type approaches.

In accordance to the FANS committee recommendations, the coverage of the system should be capable of providing acceptable service consistent with stated operational requirements over all the used airspace of the world, regardless of time, weather, altitude, terrain or propagation characteristics.

Two global coverage satellite navigation systems, the Global Positioning System (GPS) and GLONASS, are on the point of being introduced, having both accuracies of approximately 100 m in the horizontal position and 150 m in the vertical position.

2.2. Communications

It is envisaged that aeronautical mobile communications will make extensive use of digital data interchange between ground and aircraft.

Satellite based data links can be used for safety communications like ATS and AOC, and not-safety communications like AAC and APC.

The FANS committee developed a system architecture for satellite voice/data communication services, that provides for all four kinds of communication summed above. This system architecture has been approved by the ICAO Council and is the basis for the setting up of SARPs on satellite air-ground communications systems by the AMSS Panel.

It is to be expected that the implementation of an aeronautical mobile-satellite communications service covering the Antarctic polar area will abolish the need for HF and other ground-based communications in the Antarctica.

2.3. Surveillance

The introduction of air-ground satellite data links, together with sufficiently accurate and reliable aircraft navigation systems, present the opportunity to provide surveillance services in areas which lack such services in the present infrastructure, in particular oceanic areas and other areas like the Antarctica where the current systems prove difficult, uneconomic, or even impossible, to implement.

Automatic dependent surveillance (ADS) is a function for use by air traffic services in which aircraft automatically transmit, via a data link, data derived from on-board navigation systems. As a minimum the data includes aircraft identification and three-dimensional position. The ADS data would be used by the automated ATC system to present a pseudo-radar or alternate traffic display to the controller.

3. Antarctic satellite-based CNS system

3.1. System proposed

The implementation of a CNS service based on the use of satellite communications, global navigation satellite system (GNSS) and satellite automatic dependent surveillance is proposed.

3.2. Benefits foreseen

The implementation of the above service will improve:

- i) safety due to moving from rudimentary ATC procedural to an ADS-based system able to provide continuity of service.
- ii) air carrier operational economy due to improved reliability of navigation and communication systems and addition of non-precision approach capability.

3.3. Implementation costs

The states, user and operating costs have not been evaluated, but are expected to be moderate.

4. Institutional/management issues

The establishment and provision of a multinational ICAO Antarctic satellite-based CNS facility/service will be required. An agreement covering the development, implementation, operation and maintenance of such a multinational facility/service could either take the form of a formal international treaty or an administrative agreement.

The provision of satellite communication and surveillance services involves many elements, comprising the ATS facilities, terrestrial networks, earth stations, spacecraft and airborne facilities. INMARSAT could be a possible candidate to provide the communications and surveillance space segment, and Eurocontrol to provide ATS services.

Navigation can be provided by the GPS and GLONASS systems.