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Fourteenth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/14)
Bangkok, Thailand, 4 to 8 August 2003

Agenda Item 3: CNS/ATM Implementation and Related Activities

Status of Multifunctional Transport Satellite (MTSAT)

(Presented by Civil Aviation Bureau, Japan)

SUMMARY

This paper provides status of JCAB's Multifunctional Transport Satellite (MTSAT) system and its Aeronautical Mobile Satellite Services (AMSS) function. JCAB is implementing the CNS/ATM systems for Japan centering on MTSAT, which will provide, among others, AMSS functions available not only for ATS providers but also for airline users in the Asia/Pacific Region.

1. Introduction

1.1 In 1994, the Council for Civil Aviation, a consultancy body for the Minister of Transport, forecasted that air traffic in the North and Central Pacific (NOPAC and CENPAC) in 1992 would double by 2000 and triple by 2010. The Council considered that the existing air navigation systems could not cope with the increasing NOPAC and CENPAC traffic, and that new air navigation systems, based on satellite technology as endorsed by the 10th Air Navigation Conference in 1991, should be implemented to cater to the future traffic in Japan and the adjacent airspace. The Council also considered that in order to make the air navigation systems safer and more reliable, sufficient system redundancy was required. The Council recommended, therefore that a new aeronautical satellite should be launched and air navigation systems should be implemented centering on such a new satellite in order to ensure the systems safer and more reliable.

1.2 According to the recommendations made by the Council, JCAB has decided to launch a new aeronautical satellite, integrating aeronautical mission into the meteorological observation mission of the Geo-stationary Meteorological Satellite (GMS), which is being utilized for providing meteorological information to the Asia/Pacific States since the 1970s. JCAB considered that a new satellite should be designed to be widely utilized for not only for ATS providers but also by aircraft operators in the Asia/Pacific Region in addition to the existing satellites. This new satellite is known as Multi-functional Transport Satellite, MTSAT.

2. MTSAT System

2.1 As stated above, MTSAT has two missions, i.e. meteorological mission and aeronautical mission. The aeronautical mission of MTSAT will contribute to each element of the ICAO CNS/ATM Systems, i.e. communication, navigation and surveillance. The MTSAT system will provide direct controller-pilot communication in voice (SATVoice) and data (controller-pilot datalink communication: CPDLC), GPS augmentation information, and automatic dependant surveillance (ADS) capabilities. The MTSAT system will not only be capable of handling oceanic ATS communications within the Japanese FIRs, but will also be offered to the civil aviation community in the Asia/Pacific Region as common aviation infrastructure, which could facilitate implementation of their ICAO CNS/ATM Systems.

3. AMSS functions of MTSAT and status of MTSAT

3.1 MTSAT-1 was launched in November 1999 from the Tanegashima Space Center in Japan. The launch of MTSAT-1 was, unfortunately, not successful due to an engine failure in the launch vehicle. The MTSAT-1 was regrettably not able to reach the orbit. Since JCAB considered MTSAT as the key element of the ICAO CNS/ATM Systems for Japan, and the requirements for MTSAT remained unchanged, the Ministry of Transport decided to continue pursuing the JCAB MTSAT program and arrangements for launching an alternate satellite commenced. The alternate satellite (MTSAT-1R) is being manufactured and will be launched in early 2004. Following the system evaluation and staff training, the AMSS function of MTSAT-1R will become operational in late 2004.

3.2 MTSAT-2 is also being manufactured and will be launched in early 2005. The aeronautical mission of each MTSAT is designed to have a service life of ten years, and future MTSATs will be launched with certain interval to replace existing MTSATs. Consequently, the MTSAT system will be maintained in a dual operation, including ground systems, for the foreseeable future.

3.3 The MTSAT system will be composed of two satellites and four ground earth stations (GESs) at two aeronautical satellite centers in Japan, i.e. Kobe (approximately 500 km west of Tokyo) and Hitachi-Ohta (approximately 100 km northeast of Tokyo). Switchover of communications via MTSAT between the two satellites and between the aeronautical satellite centers will be made instantly. Therefore, the AMSS via MTSAT is highly redundant.

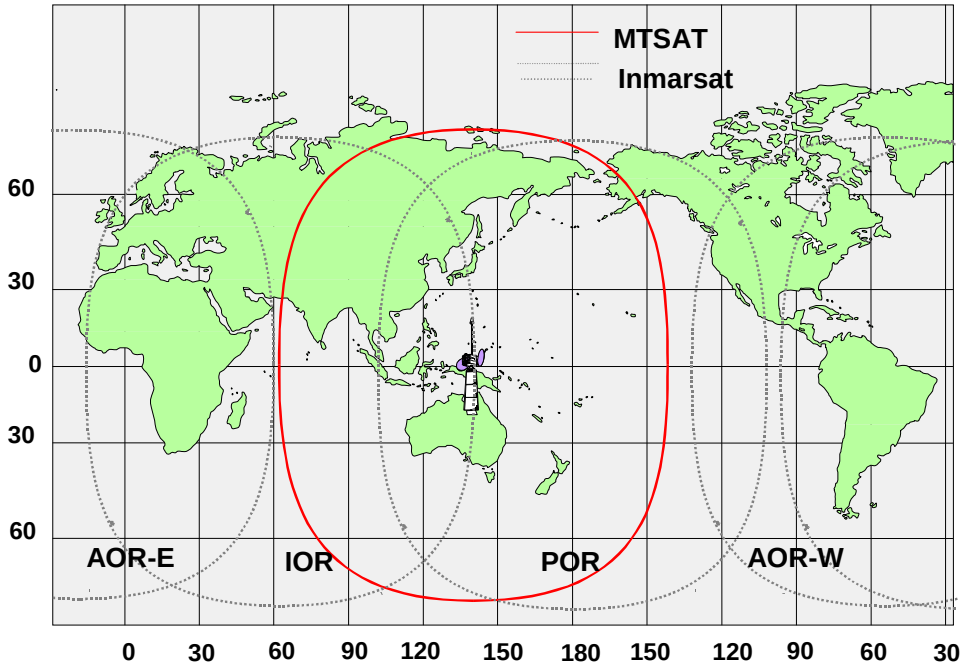
3.3 The AMSS function of MTSAT is fully compliant with the SARPs of the ICAO Annex-10 and fully supports all the aeronautical communications defined by ICAO. MTSAT is, therefore interoperable with the existing Inmarsat satellite system. There are four types of communications in ICAO, air traffic services (ATS), aeronautical operational control (AOC), aeronautical administrative communications (AAC), and air passenger communications (APC). The ATS messages will be handled by JCAB in the same manner as VHF and HF voice communications in the current ATS environment, while the AOC, AAC and APC messages will be handled separately by service provider. JCAB has recently selected Societe Internationale de Telecommunications Aeronautiques (SITA) to handle those messages as the service provider for MTSAT. It is expected that all four types of messages will be delivered through the MTSAT system not only to ATS providers but also airlines, home and offices smoothly with full of integration and reliability by JCAB in cooperation with SITA. In order to assure the full interoperability between two systems, JCAB has made an operational agreement with Inmarsat who currently provides the AMSS services worldwide. Therefore, airlines currently using the Inmarsat system will smoothly transition to the MTSAT system without any modification to their aircraft systems.

4. Conclusion

4.1 JCAB strongly believes that the MTSAT system will increase the availability and reliability of the global satellite communication services in the Asia/Pacific Region. JCAB offers MTSAT system to the Asia/Pacific States as common aviation infrastructure in order to achieve global, seamless, safer and more reliable air navigation systems in the Region, on not-for-profit basis, and does not intend to seek economic profit from MTSAT services.

5. Action of the meeting

5.1 The 14th APANPIRG Meeting is invited to note the information contained in this paper.



Coverage of MTSAT and Inmarsat Satellites

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