



DIRECTORS GENERAL OF CIVIL AVIATION CONFERENCE ON A GLOBAL STRATEGY FOR AVIATION SAFETY

Montréal, 20 to 22 March 2006

Theme 2: Improving aviation safety

Topic 2.2: Management of aviation safety

CNS/ATM IMPLEMENTATION IN FLIGHT INFORMATION REGION IN INDONESIA

(Presented by Indonesia)

SUMMARY

This information paper contains brief accounts about CNS/ATM implementation in the flight information region in Indonesia.

1. INTRODUCTION

1.1 According to the flight information region (FIR), air space under Indonesian management is about 2 219 629 NM², and crossed by four sub-system international flights and two sub-system domestic flights as follows:

- a) flight routes from Australia to Asia and Africa;
- b) flight routes from Asia to Australia/New Zealand;
- c) flight routes from Asia – Europe through “South Himalaya”;
- d) flight routes South East Asia – North East Asia;
- e) flight routes within the Jakarta upper flight information region (UIR); and
- f) flight routes within Ujung Pandang UIR.

1.2 To enhance air traffic management (ATM) operation, technical and operational requirements are required whether on the ground or in air space. Gradually, at this moment sub-system international flights are grouped into four destinations. The ATM function is to promote and implement:

- a) area navigation (RNAV) routes;
- b) communications, navigation, and surveillance/air traffic management (CNS/ATM) routes;
- c) vertical separation;
- d) longitudinal separation; and
- e) lateral separation.

1.3 The final level of first-rate service will be performed gradually. While functions of devices in aircraft are to support the need of ATM system enhancement are:

- a) having capability and function of flight management system (FMS) and RNAV capability;
- b) CNS/ATM approved aircraft, FMS, controller-pilot data link communications (CPDLC), aeronautical operational control (AOC) data link, direct flight plan uploads;
- c) ICAO Standards and Recommended Practices (SARPs), reduced vertical separation minimum (RVSM) approval;
- d) RNAV capability, FMS, DCPC voice or data, required navigation performance (RNP) 10 approval, automatic dependent surveillance (ADS), accurate time Global Positioning System (GPS), RNP4 approval; and
- e) RNAV approval, FMS, DCPC, RNP approval, ADS.

1.4 Functions of ground equipment in supporting the needs for air traffic management are:

- a) track generation distribution;
- b) DCPC (voice or data), CPDLC, air/ground data link, AOC/ACC data communication, flight plan generation, air traffic control (ATC) traffic situation display, ATM system that can be operated interoperability with automatic devices in aircraft;
- c) ICAO SARPs;
- d) DCPC (voice or data), ADS, ATC situation display, accurate time GPS; and
- e) DCPC (voice or data), ADS, ATC situation display, accurate time GPS.

2. PLANNING

2.1 In planning the need for interests on the ground, several steps will be prepared as follows:

Air Traffic Management

a) **Air space management**

- 1) optimization of air space sector:
for sector crossed by AR1 and AR2, it has been performed since 2000, while AR4, AR9 and domestic routes will be performed in 2006;
- 2) contingency RNAV route has been performed since 2000;
- 3) random RNAV routes (including flex T):
AR1 → has been performed since 2000;
AR2, AR4, AR9 and domestic → will be performed in 2006;
- 4) RNP implementation:
AR2 and AR9 have been performed since 2000;
AR1 and AR4 have been performed since 2001;
- 5) required communication performance (RCP) implementation will be determined later; and
- 6) required surveillance performance (RSP) implementation will be developed further (it will begin in 2006).

b) **Air traffic services**

- 1) trajectory conformance monitoring has been performed since 2000;
- 2) minimum safe altitude warning implementation will begin in 2006;
- 3) conflict prediction implementation will begin in 2006;
- 4) conflict alert implementation will begin in 2006;
- 5) conflict resolution advice implementation will begin in 2006;
- 6) reduced vertical separation:
 - Route for FL350 – FL410 has been performed since 2000 – 2006;
 - For all air space at FL310 – FL410 have been performed since 2003;
- 7) reduced longitudinal separation:
 - AR1, AR2, AR4 and AR9 have been performed since 2000;
 - Domestic will begin in 2006;
- 8) reduced lateral separation implementation will begin in 2006;

- 9) independent instrument flight rules (IFR) approaches to closely-spaced runways implementation will begin in 2007;
- 10) RNAV SIDs and STARS implementation will begin in 2006;
- 11) curved and segmented approach implementation will begin in 2006;
- 12) arrival metering, sequencing and spacing implementation will begin in 2006;
- 13) advanced surface movement guidance and control systems (A-SMGCS) implementation will begin in 2006;
- 14) ATS inter-facility data (AIDS) communication implementation will begin in 2006; and
- 15) application of data link has been performed since 2000.

c) **Air traffic flow management**

- 1) centralized air traffic flow management (ATFM) implementation will be determined later;
- 2) inter-regional co-operative ATFM implementation will be determined later;
- 3) establishment of ATFM Databases implementation will be determined later;
- 4) application of strategic ATFM planning implementation will be determined later;
- 5) application of pre-tactical ATFM planning implementation will be determined later; and
- 6) application of tactical ATFM planning implementation will be determined later.

Communication

a) **Trials and demonstration**

- 1) aeronautical mobile-satellite service (AMSS):
 - for Jakarta, it has been performed since 2000-2002;
 - for Ujung Pandang, it has been performed since 2004-2006;
- 2) high frequency (HF) data implementation will be determined later;
- 3) very high frequency (VHF) data:
 - for Jakarta, it has been performed since 2000-2002;
 - for Ujung Pandang, it has been performed since 2004-2006;
- 4) secondary surveillance radar (SSR) Mode S is planned to be performed in 2005-2006 in Jakarta and Ujung Pandang;

- 5) aeronautical telecommunication network (ATN) (ground-ground) has been performed in 2004-2005 in Jakarta and Ujung Pandang; and
- 6) ATN (air-ground) implementation will be determined later.

b) Implementation and operational use

- 1) AMSS:
 - For Jakarta, it has been performed since 2001;
 - For Ujung Pandang, it has been performed since 2005;
- 2) HF data implementation will be determined later;
- 3) VHF data:
 - for Jakarta, it has been performed since 2002;
 - for Ujung Pandang, it has been performed since 2005;
- 4) SSR Mode S has been performed in 2005 in Jakarta and Ujung Pandang;
- 5) ATN (ground-ground) has been performed in 2003 in Jakarta and in 2004 in Ujung Pandang; and
- 6) ATN (air-ground) implementation will be determined later.

Navigation (WGS-84)

a) Trials and demonstration

- 1) en-route has been performed in Jakarta and Ujung Pandang in 2000-2002;
- 2) non-precision approach has been performed in Jakarta and Ujung Pandang in 2000; and
- 3) precision approach has been performed in 1998 in Jakarta and will be performed in 2007 in Ujung Pandang.

b) Implementation and operational use

- 1) WGS-84 has been performed since 1990;
- 2) for en-route flight phase, WGS-84 has been performed since 2000;
- 3) for non-precision approach flight phase, it has been performed since 2001 in several locations; and
- 4) precision approach implementation will be determined later.

*Surveillance***a) Trials and demonstration**

- 1) ADS has been performed in 1998 in Jakarta;
- 2) ADS-B (VDL – Mode 4) has been performed in 1998 in Jakarta; and
- 3) trials on ADS-B based to Mode S will be performed in 2006.

b) Implementation and operational use

- 1) ADS has been performed in 2000-2003 in Jakarta and in 2005 in Ujung Pandang;
- 2) ADS-B will be performed after satisfying and acceptable trials; and
- 3) SSR Mode S has been performed in 2005.

2.2 The words “will be determined later” mean that until now the system is still being studied for implementation in the Asia/Pacific Region due to limitations, and this system is assumed not to be in a priority scale. The system has not even been examined by the international research institutions with their expertise which is recognized by ICAO and the Air Navigation Commission, nor is it available.

2.3 Due to the new CNS/ATM system, the existing equipment will be replaced by the new function and system. The existing navigation supporting devices such as non-directional radio beacon (NDB) and VHF omnidirectional radio range (VOR) will be replaced gradually with a satellite-based navigation system, and RADAR will be complemented with ADS.

2.4 Supplying and funding for NDB calibration can be gathered to organize ADS-B for aircraft with a capacity of twenty persons or less and is part of the subsidies from Government and the returning fund can be introduced through non-tax national income not in a very long time period.

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