

**Fifth ASEAN Air Transport Technical Cooperation Sub-
Working Group Meeting**
Manila, Republic of the Philippines, 13-15 March 2002

Agenda Item 3: CNS/ATM WITHIN ASEAN

CNS/ATM Implementation Activities in the Philippines

Presented by the Philippines

SUMMARY

This paper provides an overview of the Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems Implementation Program in the Philippines. This program includes the development of a CNS/ATM master plan, which was completed in March 2000, and the identification of high priority CNS/ATM elements requiring immediate implementation. From the master plan, the New CNS/ATM Systems Development Project was formulated, the detailed design stage of which will commence in May 2002. Project completion is expected in the first quarter of 2007.

1. INTRODUCTION

1.1 The Philippines is a South East Asian archipelago located between the Philippine Sea and the South China Sea, east of Vietnam and south of Japan. It has a total land area of 298,170 sq. km. and a total coastline length of 36,289 km. It experiences a tropical climate, northeast monsoon (November to April) and southwest monsoon (May to October). The estimated population as of the year 2000 is about 81 million people.

1.2 There are 304 airports/heliports comprising of four (4) international airports, eighty-five (85) domestic airports, eighty-eight (88) private airports, and one hundred twenty-seven (127) heliports. The Ninoy Aquino International Airport in Manila and Mactan-Cebu International Airport in Cebu are the major airports but the former United States military airports at Clark and Subic Bay are being developed for significant commercial usage.

1.3 Philippines Airlines (PAL) is the dominant international and domestic carrier, and because of the deregulation policy of the Philippine government, five (5) other carriers are competing with PAL in the domestic market.

1.4 The Air Transportation Office (ATO), the civil aviation authority in the Philippines, under the Department of Transportation and Communications, is mandated by law to provide safe, orderly, and

expeditious flow of air traffic to an airspace of about 809,967 square nautical miles called Manila Flight Information Region (FIR). Air traffic management within the FIR is provided at the Manila Area Control Center. Aerodrome Control Services are provided at twenty-three (23) locations and Approach Control Services at fourteen (14) of these locations. There are Flight Service Stations (FSS) at thirty-five (35) locations where traffic is insufficient to justify Aerodrome Control Services.

1.5 In conformity with the requirement of the Global Air Navigation Plan for the CNS/ATM Systems and the Asia/Pacific Regional Plan for the New CNS/ATM Systems, the ATO, with the assistance from the Japanese government, conducted a study aimed at formulating the Master Plan for the New CNS/ATM systems from March 1998 to February 2000. High priority CNS/ATM elements were identified, and project implementation is expected to commence in May 2002.

2. CNS/ATM MASTER PLAN

2.1 Given the need to implement new technologies using satellite systems, and to overcome the shortcomings of the existing facilities, the Government of the Republic of the Philippines (GOP) requested for technical assistance from the Japan International Cooperation Agency (JICA) to facilitate the transition to satellite-based CNS/ATM systems. JICA/ATO conducted the study on the new CNS/ATM systems from March 1998 until January 2000, and formulated a long-term master plan for the new CNS/ATM system development. The total project cost is estimated at US \$338.689M, with Phase I at US \$215.338M and Phase II at US \$123.351M. In the study, the high priority components requiring urgent implementation were identified, and the technical and economic feasibility of the new CNS/ATM systems was confirmed.

2.2 The Master Plan for the New CNS/ATM Systems is summarized below:

Facility	Year 2005	Year 2010
Air Traffic Management Automation		
Manila ATM Center Building	Construction of new ATM center building (approx. 5,000 m ² , 2 stories, RC structures) including power, emergency generators, uninterrupted power supply equipment, telephones, air conditioning, water supply	To continue in use
	Development of new ATM automation system including: Air Traffic Management functions, - Flow Management function, - Airspace Management function, - Flight Data Processing function - Radar Data Processing function, Automatic Dependence Surveillance - Data Processing function, - ATS facility notification function, - Controller Pilot Data Link Communications (CPDLC) processing function, - Pre-Departure Clearance (PDC),	The following functions will be added and ATM Automation software will be upgraded: Air Traffic Management functions, - ADS-B function - Spacing and metering data function - Route assignment data function

	- ATS Inter-facility Data Communications (AIDC)	
ATM Automation System	Safety Measure functions <ul style="list-style-type: none"> - Conflict Alert (CA) function, - Minimum Safe Altitude Warning (MSAW) function, - Emergency Data Retrieval function, - ADS route conformance monitoring function, - Missing position reports alert function, - Missing ADS reports alert function - Flight plan conflict probe 	Safety Measure functions <ul style="list-style-type: none"> - Danger area infringement warning - Route adherence monitoring - Cleared level adherence monitoring - ADS-B collision avoidance function
Aeronautical Information Service (AIS)	AIS data base at Manila ATM Center: 1 set AIS terminal at major airports: 23 sets	AIS terminal at remaining airports: 30 sets
Facility	Year 2005	Year 2010
Communications		
VHF Data link, VHF digital link, AMSS	Outsource to service providers	Outsource to service providers
ATN system	ATM System at Manila ATM Center	
Voice Switching and Control System (VSCS)	VSCS at Manila ATM Center: 1 set	
VHF Radio	En-route air-ground sites: 24 sets Terminal / aerodrome: 90 sets	En-route air-ground sites: 8 sets Terminal / aerodrome: 23 sets
HF Radio	En-route air-ground sites: 8 sets Terminal / aerodrome: 30 sets	En-route air-ground sites: 2 sets
Data Link Automated Terminal Information Service (D-ATIS)	D-ATIS Data Base at Manila ATM Center: 1 set D-ATIS terminal and VHF radio at international airports: 4 sets, alternate international airports: 4 sets	D-ATIS terminal and VHF radio at trunk line airports: 11 sets
ATS Message Handling System (AMHS)	AMHS at Manila ATM Center: 1 set	
Microwave Link	Manila ATM Center and airports: 9 sets	
Very Small Aperture Terminal (VSAT)	VSAT hub station at Manila ATM Center: 1 set VSAT remote station at remote sites and airports: 26	
Facility	Year 2005	Year 2010

Navigation		
GNSS (GPS)	Aircraft operations procedures (non-precision approaches) based on GPS and WGS-84 will be established at an early stage before application of SBAS. NDBs will be gradually phased out and decommissioned after 2005.	GNSS will be applied by means of SBAS (Category-I precision approaches) and GBAS (Category-II/III precision approaches).
SBAS	SBAS will be used for all areas in the FIR. Five ground monitor stations for SBAS will be installed at Laoag, ATM Center, Mactan, Puerto Princesa and General Santos. The integrity and augmentation data obtained from the ground monitor stations will be transmitted to master station through public telecommunication lines.	SBAS services will be maintained
GBAS	GBAS will be applied for NAIA for precision approach Category-I.	GBAS will be applied for NAIA and Mactan for precision approach Category-II/III
ILS/DME	Replacement of equipment: Mactan, Subic Bay, Cagayan de Oro, Davao, Zamboanga	
VOR/DME	Replacement of equipment: Cagayan de Oro, Cotabato, Tuguegarao, Legaspi, Lubang, Puerto Princesa, San Jose	
Facility	Year 2005	Year 2010
Surveillance		
En-route SSR	The existing RDPS will be maintained for the transition at Manila ACC Replacement of Tagaytay en-route SSR Installation of 3 en-route SSRs at Palawan, Zamboanga and South General Santos	Replacement of en-route SSR at Laoag Replacement of en-route SSR at Mt. Majic, Cebu
Terminal Radar	Replacement of NAIA terminal radars (PSR/SSR)	Replacement of terminal radars (ASR/SSR) at Mactan. No RDPS function is required in Mactan. Replacement of terminal radars (ASR/SSR) at Subic Bay. No RDPS function is required in Subic.

ADS	ADS will be applied for high-density over-flying air routes in Manila FIR where radar coverage is not possible. ADS data from aircraft will be transmitted to Manila ATM Center through AMSS and/or VHF data links of communications network provider(s). ADS data will be processed by an ATM automation system, which is to be installed in Manila ATM Center, and displayed at control positions.	Full implementation of ADS in Manila FIR.
ADS-B	No application	Broadcast over VHF digital links or by SSR Mode-S, with ADS-B data processing and display systems in Manila ATM Center.
SMGCS Plan	Airport surface detection radar at NAIA Collection of terminal radar data: Linkage to terminal radar data processing system Surface movement guidance and control: Radar data digitizer, data processing, display sub-systems	Surface movement guidance and control: System upgrading to accommodate control of aeronautical ground lights and aerodrome vehicle control Control of aeronautical ground lights: Selective switching of stop bars and taxiway center line lights Aerodrome vehicle control: Aerodrome vehicle control based on GNSS positioning
Facility	Year 2005	Year 2010
Meteorology		
WAFS data receiving system	To receive WFS data through INTELSAT, VAST equipment and work station will be installed at ATM Center building	
MTSAT Receiver	MTSAT receiver will be installed in ATM Center building to provide dynamic weather forecasts	
Upper weather data	Upper weather collection system will be integrated into ATM Automation System so that WAFS data will be upgraded, and include turbulence information Weather data storage and display system will be handling all weather data in the Philippines FIR, and be located in Aviation weather forecast center in the ATM Center building	
Weather radar	Terminal Doppler weather radar (TDWR) will provide	Terminal Doppler weather

	wind shear and microburst warning for Manila approach	radar (TDWR) to provide wind shear and microburst warning for Mactan approach
AWOS	Automatic weather observation system equipment will be installed at NAIA	
Wind Shear Alert	Low level wind shear alert system will provide integrating TDWR data and more accurate wind shear alerts on final approach or departure at NAIA	Low level wind shear alert system integrating TDWR data, more accurate wind shear alerts will be provided on final approach or departure at Mactan airport
Lightning Alert	Lightning alert system will provide lightning alerting and be installed at NAIA	Lightning alert system to provide lightning alerting, equipment will be installed at Mactan airport

3. NEW CNS/ATM SYSTEMS DEVELOPMENT PROJECT

3.1 From the above master plan, the Implementation Program for the New CNS/ATM Systems Development Project was formulated and submitted to the National Economic and Development Authority (NEDA) on June 8, 2000 with a total estimated cost of US\$204.90M (Forex-US\$180.70M and Local-US\$24.20M). This project will be funded under the 25th Yen Loan Package of the Japan Bank for International Cooperation (JBIC), and will be implemented in five (5) years, covering the following areas:

3.1.1 ATM Automation

- 3.1.1.1 Construction of Manila ATM Center Building (approx. 5,000 m², 2-storey, RC structures) and Power Plant Building (approx. 700m², 1-storey, RC structures)
- 3.1.1.2 Installation of an ATM Automation System consisting of Air Traffic Management, Safety Measure, Weather information analysis and display, ATM data recording and Controller's training.
- 3.1.1.3 Provision of an AIS Database at Manila ATM Center and installation of twenty-three (23) sets of AIS terminals at major airports

3.1.2 Communication

- 3.1.2.1 Installation of one (1) Aeronautical Telecommunication Network (ATN) System in Manila ATM Center to connect to data links inside/outside the country
- 3.1.2.2 Installation of one (1) set of Voice Switching and Control System (VSCS) for air-ground voice communications and ATS direct speech circuits
- 3.1.2.3 Installation of one (1) set of Data link Automated Terminal Information Service (D-ATIS) database at Manila ATM Center, and installation of eight (8) sets of D-ATIS terminals, VHF transmitters and receivers at international airports (includes alternate international airports)
- 3.1.2.4 Installation of an ATS Message Handling System (AMHS) at Manila ATM Center to exchange ATS messages

- 3.1.2.5 Replacement and addition of twenty (20) and fourteen (14) sets of en-route and terminal VHF Remote Control Air-Ground communication facility (RCAG) respectively
- 3.1.2.6 Replacement of eight (8) microwave links for voice and data transmission
- 3.1.2.7 Installation of one (1) Very Small Aperture Terminal (VSAT) hub station at Manila ATM Center and twenty-six (26) VSAT remote stations at remote site and airport

3.1.3 Navigation.

- 3.1.3.1 Installation of Satellite Based Augmentation System (SBAS) including two (2) Ground Monitor Stations (GMS) at Manila ATM Center and General Santos airport (or Puerto Princesa airport)
- 3.1.3.2 Installation of a Ground Based Augmentation System (GBAS) at NAIA for Category-I precision approaches

3.1.4 Surveillance

- 3.1.4.1 Provision of a consolidated Automatic Dependent Surveillance (ADS) function in the ATM Automation System at Manila ATM Center
- 3.1.4.2 Replacement of Tagaytay en-route SSR, and installation of three (3) en-route SSRs at Palawan, Zamboanga and General Santos

3.1.5 Meteorological System

- 3.1.5.1 Installation of a WAFS Data Receiving System, including VSAT equipment at ATM Center
- 3.1.5.2 Installation of an MTSAT weather receiver and antenna at the ATM Center
- 3.1.5.3 Provision of an En-route Weather Data Receiving System, including installation of interface equipment with ADS and CPDLC and workstation-based network equipment for data storage and management at the ATM Center
- 3.1.5.4 Installation of a Weather Data Storage and Display System in the Manila ATM Center
- 3.1.5.5 Installation of a Terminal Doppler Weather Radar at NAIA

3.1.6 Project Location. The project covers the following 28 airports and sites as shown in Appendix 1.

- 3.1.6.1 En-route Facilities: Manila ATM Center in ATO Compound-Pasay City, Laoag RCAG Facility, Tagaytay RCAG Facility, Manila Transmitter Facility, Mount Majic, Cebu RCAG Facility, Palawan SSR Facility, Davao RCAG Facility, Basilan RCAG & SSR Facility, and Gen. Santos SSR Facility
- 3.1.6.2 International Airports: NAIA, Mactan, Clark, Subic, Laoag, Zamboanga, Gen.Santos, and Davao
- 3.1.6.3 Trunkline Airports: Bacolod, Baguio, Cagayan de Oro, Cotabato, Dumagute, Iloilo, Legaspi, Puerto Princesa, Roxas, San Jose, and Tacloban
- 3.1.6.4 Secondary Airports: Butuan, Kalibo, Plaridel, and San Fernando

3.1.7 Project Implementation Schedule. The project implementation schedule is in Appendix 2.

4. PROJECT MILESTONE

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|---|---|-----------------------------------|
| 4.1 Basic Design | - | 100% completed (under JICA Grant) |
| 4.2 Detailed Engineering (15 mos.) | - | 0% |
| 4.3 Assistance in Tendering (12 mo.) | - | 0% |
| 4.4 Manufacturing, Construction/
Installation Works (30 mo.) | - | 0% |
- 4.5 Request for technical assistance from JICA for the Detailed Engineering was submitted to DOTC on 27 March 2000
- 4.6 DOTC favorably endorsed the request to the National Economic Development Authority (NEDA) in a letter dated 06 April 2000
- 4.7 The Implementation Program entitled "New CNS/ATM Development Project" including NEDA's ICC-PE documents were submitted and received by DOTC on 18 April 2000
- 4.8 On 07 September 2000, ATO together with NEDA Infra Staff presented the project to the NEDA ICC Technical Board, which subsequently endorsed the project to the ICC Cabinet Committee for approval.
- 4.9 On 23 November 2000, ICC Cabinet Committee approved the project for implementation.
- 4.10 From 10-13 January 2001, the Japan Bank for International Cooperation (JBIC) dispatched a mission to discuss and confer with ATO counterpart team the proposed scope of works, budgetary requirements and implementation schedule of the project.
- 4.11 From 12-16 November 2001, the Japan Bank for International Cooperation (JBIC) dispatched a mission which carried out a field survey and detailed discussions with officials of ATO/DOTC confirming the scope of works, budgetary requirements and implementation schedule of the project. The Minutes of Discussions on the New CNS/ATM Systems Development Project between ATO/DOTC and JBIC was signed on 16 November 2001.
- 4.12 Note Verbales were exchanged between the Government of Japan and the Republic of the Philippines on 9 November 2001 and 28 November 2001, respectively, on the "Detailed Design Study for the New CNS/ATM Development Project".
- 4.13 On 18 January 2002, the Implementing Arrangement on the Detailed Design Study of the New CNS/ATM Development Project was agreed upon and signed between ATO/DOTC and JICA.

4. ACTION BY THE MEETING

The meeting is invited to note the information in this paper.