



Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
New Manila Area Control Center (MACC) Development Project
CAAP Airways Facility Complex, Pasay City



Date : **18 February 2012**
Project/Description : **REPLACEMENT OF NEW MANILA AREA CONTROL CENTER (ACC) SYSTEM AND BUILDING**
Contract Amount : **PhP [REDACTED] (CY 2009 ANF Infra Program**
Contractor : **Revere Construction & Supply, CS Soft, Inc. and Enhanced Electronics and Communication Service, Inc. (JV)**

CERTIFICATE OF PROJECT COMPLETION

It is hereby certified that the installation and pre-commissioning of the **Replacement of Manila Area Control Center (ACC) System and Building Project (New MACC-Phase I)**, funded under the CY 2009 ANF Infrastructure Program of the DOTC has been satisfactorily completed as of 17 February 2012.

It is understood that this phase completion of this does not relieve the contractor, Revere Construction and Supply, CS Soft, Inc. and Enhanced Electronics Communication Service, Inc. (JV) of its obligation and responsibility to continue supporting the commissioning stage test of the system and to extend warranty and maintenance under Section 24 of the Contract. Further, the contractor shall undertake the repair work of any failure and/or defect at his own expense that may occur or maybe found in any section/part of the system component of the project as stipulated in the conditions of the contract.


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NEW MANILA AREA CONTROL CENTER

Project Brief

NEW MACC

Phase I - Replacement of Manila Area Control Center (ACC) System and Building

The existing Manila Eurocat 200 ATM system which relies on ground-based navigational aids, radar and voice communications is experiencing frequent breakdowns. The old traffic forecast the system was designed for has now doubled and has therefore overstrained its capacity.

The DOTC has considered the urgency of procuring an immediate replacement of this old system. This new system will be located at the interim, in a new annex building extension of the Manila ACC but will be relocated in the future to Mactan, Cebu to serve as Manila South Sector and backup of the Manila ATM center, which is expected to be commissioned in 2013 as part of the new CNS/ATM project. It is critical that the new automated ATC System will be capable of meeting both current and future demands.

The new ATM core functions are; airspace management, flow management, traffic management, separation management and aircraft systems and complemented by state-of-the-art technology satellite-based CNS and weather systems. These ATM functions, however, would be fully automated to increase capacity and improve safety and efficiency. All core functions and support systems would be networked and configured as a system-wide information management.

1.0 ALS 2.1 AIR TRAFFIC MANAGEMENT SYSTEM

The following air traffic automation management systems are provided:

- Radar Data Processing (Tracker)
- Flight Data Processing (FDP)
- ADS/CPDLC Gateway
- Air Situation Display (CWS)
- Integrated Terminal (IT)
- Air Situation Display (ADS-C position only)
- CPDLC terminal
- Recording and replay
- Safety nets

- Coupler
- System diagnostic and monitoring
- Time synchronization
- Mapper

System working suite includes:

- 6 sectors - ATCO
- 1 supervisor workstation
- 1 technology evaluation station with ADS-C air situation display and CPDLC terminal
- 2 flight data positions (FDA)
- 1 technical supervisor workstation
- ATCO working suite includes:
 - radar operator working positions - CWS
 - planner working position - IT

2.0 RADAR PLOTS AND VOICE RECORDING SYSTEM AND RE-PLAY

System continuously record input radar data, system tracks from tracker output, data SFPL and appropriate FPL, alerts from safety nets output, restricted areas activation and so on.

All data received from and sent to workstations are recorded.

Operator's activities on all CWS are recorded by storing screen shots of their screens.

Recorded data are stored for configurable time of 60 days.

3.0 Safety Nets

The following safety nets are provided:

- Short Term Conflict Alert (STCA)
- Minimum Safe Altitude Warning (MSAW)
- Area Proximity Warning (APW)

4.0 ADS/CPDLC

The system shall be connected to ACARS/ATN network available in the region using SITA AIRCOM air-ground datalink communication service. System shall provide interface to this network using external interface of SITA ADS/CPDLC Gateway (ACG).

System shall include a special working position for evaluation of datalink functionalities.

Based on flight plan data received from FDPS server, ACG shall provide CM (Context Management) service for FANS-1/A equipped aircraft logging to Manila ACC.

These communication channels shall provide the basis for the management of Automatic Dependent Surveillance - Contract (ADS-C) and Controller-Pilot Data Link Communication (CPDLC) message exchanges.

The ADS-C information processing system shall provide the following services:

- Automatic ADS contract establishment with equipped aircraft and transfer to adjacent centers when required.
- Monitoring of altitude deviation.
- Monitoring of lateral deviation.
- Monitoring of longitudinal deviation.
- Automatic adjustment of contract periods based on deviation events.
- Automatic determination of which ADS report groups must be used to most accurately determine aircraft's position.
- Automatic adjustment of contract periods based on a volumetric definition of the controlled airspace.

Full integration with the Flight Data Processing (FDP) function.

In addition to the above automatic features, the ADS-C system shall provide controllers with the facility to modify ADS contracts and perform instant report requests.

Upon receipt of ADS emergency event the ADS-C system shall display an emergency indication on the controller's situation display.

5.0 HMI REQUIREMENTS

Human-Machine-Interface to manage tracks and label display as follows:

- Graphical presentation.
- Safety net monitoring interfaces
- Electronic flight progress strips
- System diagnostics
- External interface facility
- Interface to AFTN
- Interface to surveillance sources

- Interface to SITA AIRCOM network
- Interface to external statistics and billing system

6.0 VOICE COMMUNICATION CONTROL SYSTEM (VCCS)

The Voice system must meet and exceed operational requirements for highly reliable radio and telephone communications, and should have extended and highly reliable radio/telephony to meet any mission-critical application.

The Voice Communication Control System (VCCS) shall provide a complete solution for all air traffic control applications. Using a modular, client-server architecture, with open-platform software and commercial-off-the-shelf hardware, the VCCS must offer a reliable, scalable solution suited to the variety of air traffic control operations, including control towers, area control centers, flight service stations and mobile towers.

7.0 RCAG VHF RADIO

The Ground Station shall be designed for operation in air traffic control centers and equipped with a receiver guard channel scan mode.

The frequency range extends from 108 to 137 MHz VHF in 25 KHz and 8.33 kHz channel spacing. The channel spacing is given by the frequency.

The equipment must automatically switch to the right selectivity and audio frequency bandwidth. Up to 98 preset channels must be available which can be programmed by the operator. To each channel the output power (high or low), the squelch threshold level and offset frequency can be stored. The guard frequency is stored in the 99th channel at any desired value.

8.0 MANILA APPROACH PSR/SSR NEC RADAR INTEGRATION AND LINK TO MANILA ACC

The system shall integrate the Manila NEC approach radar to the new Manila ACC. Serial input radar data protocols, SSR raw data and mix video will be converted to LAN protocol.

9.0 SYSTEMS DESIGN FOR THE TRANSITION OF THE NEW MANILA ACC TO THE NEW CNS/ATM

An overall final design and installation deployment plan will be created for the Manila ACC ATM system and the integrated support hardware, consoles, servers, VHF, VCCS, VLS, AFTN, CPDLC, AMHS, en-route radars and the Manila approach NEC radar. Complete systems documentation and manuals will be part of the overall project design.

10.0 CONSTRUCTION OF NEW MANILA ACC BUILDING EXTENSION

A new annex building approximately 400 square meters in floor area will be constructed adjacent to the old ACC. This structure will house the hardware, software and support components of the new Manila ACC, including the power and operations room.

11.0 DETAILED DESIGN FOR AUTOMATION & INTEGRATION OF MACTAN ACC TO THE NEW CNS/ATM

In preparation for the future integration of Mactan ACC to the new CNS/ATM, a detailed design for operational protocols, software porting, code interpreters and other necessary I/O requirements will be prepared.

NEW MACC

Phase II - Manila FIR ATS VHF Extended-Range Voice Ground-Air Communication System

The current mode of communications is primarily voice but the current air-ground radios being utilized by the Manila ACC do not meet the current and near-term ATC communication demands. These aging and expensive to maintain equipment need to be replaced by long-range VHF radios to accommodate the growing number of sectors and service using the available radio frequency spectrum.

SSRs are being complemented by air to ground VHF extended range communication system to cover approximately 65% of the Philippine airspace. Communications beyond the VHF line-of-sight is being conducted using cumbersome and unreliable HF air to ground communication system.

The performance of the Manila ACC system for the last eight years has been reported to be below the standards required for international civil aviation albeit the increasing volume of air traffic movement within the Manila FIR. Outages and unreliability of the ACC system have resulted to unnecessary flight delays and/or cancellations and disruptions and exposed flight operation to hazard.

Operational and safety studies have been undertaken during the past years to address these issues. As a result of these studies, the urgent measure is to improve the ATC capacity and the management of optimum flight level allocation, enhancing the safety requirements of the Manila FIR by providing for: (a) the replacement of existing ACC system with ATM automation system, (b) ADS/CPDLC services beyond the VHF and radar line-of-sight coverage, (c) automatic coordination and exchange of flight data and critical information with adjacent ATC centers through ATS Inter-facility Data

Communications (AIDC), and (d) replacement of voice communication switch and ten (10) VHF radios to improve radio coverage.

An issue of strategic importance is the capacity of the Manila FIR to service the increasing traffic volume in the Western Pacific and South China Sea areas; wherein the Manila FIR is the last remaining airspace component in the Region without a reliable voice and data communication.

1.0 EXTENDED-RANGE GROUND-AIR VOICE COMMUNICATION SYSTEM

Voice support for ground-based infrastructure and the operational requirements for ground-based surveillance will be extended to a range of about 300-500 nautical miles. This will address over-the-horizon (OTH) VHF communication where early contact with aircraft before they enter a core region can be initiated.

2.0 RADIO NETWORK (REMOTE CONTROL SYSTEM) AND REMOTE ACCESS

At the radio site, a design system interface to radio equipment and network adaptors shall support the radio audio and compresses it in accordance with a chosen codec algorithm. For the case where transmission occurs over a TDM network, the codec data stream is then sub-rate multiplexed with equivalently processed data streams from other radios. The composite data stream containing encoded audio from several radios is then further combined with the corresponding radio control signal (e.g. PTT, squelch, main/standby). In addition to that data, a number of maintenance I/O signals from the radio site are also merged into the composite data stream. The combined data stream is then error coded, inserted and then transmitted on the appropriate TDM network channel.

3.0 MANILA VCCS REMOTE UPGRADE

At the VCS site (also called the control site), the radio control signals are split out onto I/O signals to the VCS. However, the maintenance data from the radio site is separated out into a serial data stream and routed to the maintenance facility. For all reverse signals from the VCS destined to the radio site (i.e. audio, radio control), the exact reverse process occurs at the control site. A serial data stream from the maintenance facility is also added in identical fashion as at the radio site.

4.0 ATC DLCS DATA LINK SYSTEM

An integrated Manila ACC data link server will be installed at the new MACC. A VDL2 data link system will be developed, installed, tested and shadowed. In addition, a data link system will be developed for the SITA service with a 1-year subscription package included.