

【Ex-post Monitoring of Completed ODA Loan Project】

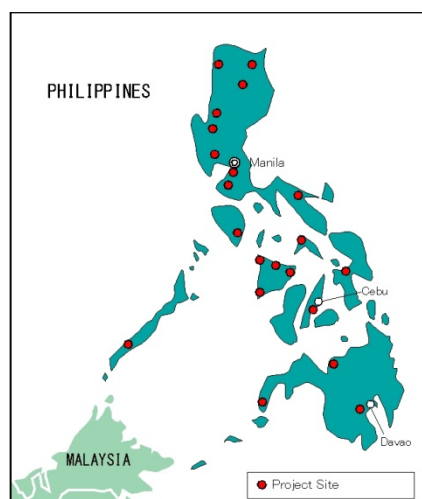
The Philippines

“Nationwide Air Navigation Facilities Modernization Project Phase III”

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Field Survey: April 2012

1. Project Description



Map of the Project Area



Laoag Control Tower

1.1 Project Objective

The project's objective was to enhance the safety of air traffic services by developing air navigation facilities nationwide, and thereby contribute to an increase in air traffic and growth of the air industry in the Philippines.

1.2 Outline of Loan Agreement

Loan Amount/ Disbursed Amount	6,386 million yen / 6,203 million yen
Loan Agreement Signing Date/ Final Disbursement Date	August 1995 / June 2004
Ex-Post Evaluation	FY 2006
Executing Agency	Air Transportation Office of Department of Transportation and Communication (DOTC-ATO) ((Current) Civil Aviation Authority of the Philippines (CAAP))
Main Contractor	TOMEN Corporation ((Current) Toyota Tsusho Corporation) (Japan)
Main Consultant	Japan Airport Consultants (Japan)

1.3 Background of Ex-post Monitoring

Before 1992 the traffic volume of the Philippines' aviation sector had remained stagnant due to political turmoil and economic recession. However, traffic volume has been increasing since 1992 as a result of population growth and economic development, as well as the introduction of larger aircraft with improved performance and the building of new airports. Under these circumstances, the government of the Philippines has been striving to promote the development of air navigation facilities based on a master plan on air navigation aid.

In 1978, the Air Transportation Office of Department of Transport and Communication (DOTC-ATO) implemented the Nationwide Air Navigation Facilities Expansion Project (Phase I) with an ODA yen loan. As part of the Phase I project, DOTC-ATO developed a long-term modernization program. In 1986, after reviewing its modernization program, DOTC-ATO implemented the Nationwide Air Navigation Facilities Modernization Project – Phase II. As part of the Phase II project, DOTC-ATO developed the Financial and Technical Management Study, a plan for years 1990 to 2000. Based on the criteria established in the study, the project reviewed the implementation of development projects for air navigation facilities that were being carried out with assistance from other donor countries and prepared the demand forecast for the Civil Aviation Master Plan (CAMP). DOTC-ATO then prepared the implementation plan (I/P) for this Phase III project and concluded an ODA yen loan contract for the project in 1995 to develop air navigation equipment.

Ex-post evaluation of this project recognized the high effectiveness because of expansion of the coverage of air-ground radio communication (areas where pilots and air traffic controllers can talk using radios) and better guidance control through improved sensitivity with introduction of state-of-the-art high-precision equipment. However, the project period greatly exceeded the planned period (220% of planned period); therefore the evaluation for efficiency was low. Despite some problems including lack of spare parts and an insufficient operation and maintenance budget, sustainability of this project was judged as moderate. Consequently, the total evaluation rating was satisfactory. In addition, ex-post evaluation recommended to the executing agency to secure sufficient budgets, develop a system for the provision of spare parts and enhance the equipment repair system.

Consequently, the project became subject to Ex-post Monitoring in order to review and verify the current conditions from the ex-post evaluation onward. The project was reviewed with distinct evaluation criteria, especially focused on sustainability, based on the results of the field survey and others and a conclusion was derived.

2. Outline of Survey

2.1 Survey Schedule

Monitoring Period: January 2012 - October 2012

Field Survey Period: April 7 - April 19, 2012

2.2 Constraints of Monitoring

None

3. Monitoring Results

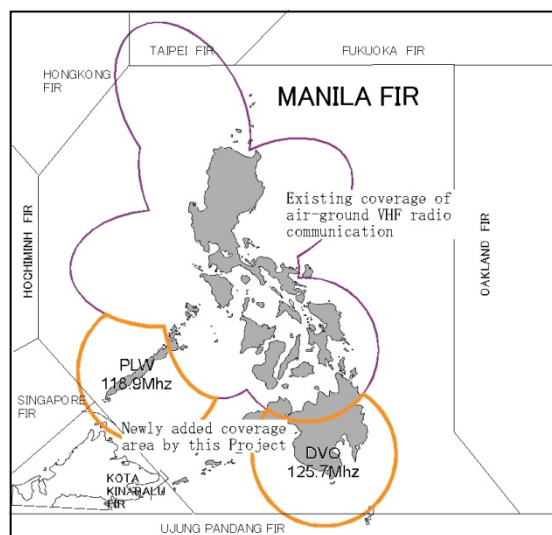
3.1 Effectiveness

3.1.1 Quantitative Effects

3.1.1.1 Indicators of Operation and Effects

(1) Expansion of Coverage by Air-ground Radio Communication

Figure 1 shows the Manila Flight Information Region (Manila FIR) and coverage by air-ground radio communication by Very High Frequency (VHF) radios. Manila FIR covers an area of approximately 3 million km² and VHF radio covered an area around 1.2 million km²



before the project. The introduction of high precision state-of-the-art equipment¹ with VHF radios improved communication sensitivity and reduced errors. In addition, communication facilities in Palawan (PLW in Figure 1) and Davao (DVO in Figure 1) developed by this project expanded the coverage by 430 thousand km².

Total air-ground radio communication coverage area did not change from the time of ex-post evaluation in 2006. Thus, the effectiveness of this project was continuously sustained.

Source: Prepared based on CAAP data

Figure 1 Manila FIR and Air-ground Radio Communication Coverage

(2) Improvement of Safety and Reliability (Aircraft Accident Count)

There has not been an accident involving large aircraft with more than 100 fatalities since 2000 and air transport safety has been improved.

Specifically, most recent accidents in these ten years are caused by general aviation² and there has not been an accident due to miss-operation of air traffic control.

¹ These facilities are mainly (1) En-Route Air Traffic Control Facilities and (4) Terrestrial Communication Facilities on the attached Table in the last page.

² General Aviation is flight operations by small sized aircraft for non-business air transportation.

Table 1 Transition of Aircraft Accident Count

Year	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Accident	1	0	2	1	2	0	1	3	0	3	4	0	0	1	0	1
Fatalities	2	0	4	0	4	0	4	67	0	8	40	0	0	0	0	0

Year	1996	97	98	99	2000	01	02	03	04	05	06	07	08	09	10
Accident	3	1	2	4	1	0	2	1	2	2	2	2	1	5	1
Fatalities	0	2	107	18	131	0	19	3	2	0	0	0	0	11	3

Source: Aviation Safety Network; (<http://aviation-safety.net>)

Note: Excluding criminal act such as hijacking and military operations.

3.1.1.2 Internal Rate of Return (IRR)

Ex-post evaluation did not calculate the internal rate of return and this monitoring survey does not as well.

3.1.2 Qualitative Effects

Because the ex-post evaluation did not measure qualitative effects, this Ex-Post Monitoring Survey does not compare them.

Based on these facts, the effectiveness of this project appears in the coverage of VHF radio and improvement of safety and reliability at the same level as the ex-post evaluation.

3.2 Impact

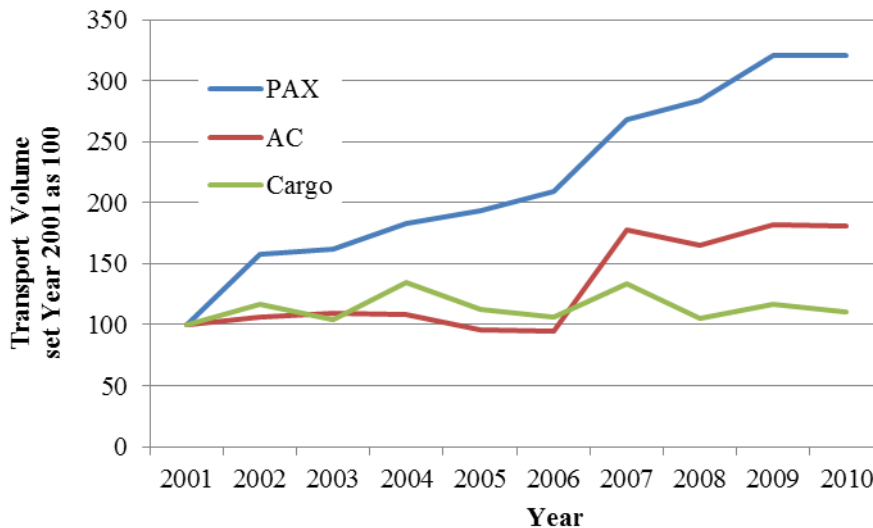
3.2.1 Intended Impact

3.2.1.1 Increase in Air Transport Volume

By introduction of new air navigation facilities³ of this project, existing airways can be operated more efficiently and new airways were prepared. Therefore, airway capacity expanded and air transport volume increased.

Figure 2 shows the air transport volumes of passengers (PAX), aircraft movement (AC) and cargo (Cargo) from 2001 through 2010 by setting the value of year 2001 as 100. Comparing the values in 2010 to those in 2001 (value of 2010 / value of 2001), number of passengers, aircraft departures and arrivals and cargo transport values are 321%, 181% and 111% respectively.

³ These facilities are mainly (1) En-Route Air Traffic Control Facilities (3) Air Navigation Facilities and (4) Terrestrial Communication Facilities on the attached Table in the last page.



Source: CAAP

Figure 2 Transition of Air Transport Volume

Thus, the total number of passengers using airports in 2011 increased to 40.86 million, which is more than three times the number in 2001. The number of aircraft departures and arrivals increased gradually and passengers per aircraft seemed to increase. Looking at the numbers by airport, especially Kalibo Airport was used by 5.2 times as many passengers in 2011 as in 2001. This is due to the increase in visitors attracted by tourism development in the surrounding area.

3.2.1.2 Conformance to International Standards (Consistency with ICAO standards, etc.)

The Civil Aviation Authority of the Philippines (CAAP) is working to conform to the International Civil Aviation Organization (ICAO) standards. However, ICAO does not certify the conformance and does not rank airports and air traffic control. According to CAAP, CAAP prioritizes the budget allocation and participates in international conferences to meet ICAO standards, but they have yet to achieve the needed results.

In 2008, Federal Aviation Authority (FAA) of the United States of America downgraded the overall aviation sector of the Philippines from Category I to Category II. It means that the FAA recognized some deviation from ICAO standards.

On the other hand, the European Union (EU) has banned all Philippine airlines from flying to the European region for safety reason. It is effective as of April 2012.

According to CAAP, all FIRs adjacent to Manila FIR introduced ADS/CPDLC⁴ and only Manila FIR has been left behind⁵.

By these reasons, the Philippine airline companies have limitations to expand their business in the international market and air traffic control in Manila FIR lagged behind even in

⁴ Automatic Dependent Surveillance and Controller- Pilot Data- Link Communications

⁵ Introduction of ADS/CPDLC is beyond the scope of this project.

comparison with adjacent FIRs.

3.2.2 Other Impacts

3.2.2.1 Impact on Natural Environment

CAAP recognized no special impact on natural environment.

3.2.2.2 Resettlement and Land Acquisition

The project acquired new land for construction of control towers and communication facilities. This land had been used for agricultural use and no resettlement took place. Although it took some time to acquire land in Baguio, Laoag and Kalibo, this has been resolved not by compulsory acquisition but by negotiation and there is no problem currently.

Therefore, this project has had certain impact on expansion of the air transport industry in the Philippines by improvement of air transportation safety and expansion of airway capacity.

3.3. Sustainability

3.3.1 Structural Aspect of Operation and Maintenance

In March 2008, the Air Transportation Office of Department of Transportation and Communication (DOTC-ATO or ATO) was transformed into the Civil Aviation Authority of the Philippines. This meant the organization changed from a government department to an independent authority. The difference from the ATO was assumed that CAAP had “fiscal independency,” which enabled CAAP to allocate their revenue for their operations by their decisions. After the reorganization, there was no change in the department names and division of duties and Airways Navigation Service (ANS) has been operating and maintaining the air traffic control system. Air traffic controllers belong to Air Traffic Service (ATS).

In 2012, ANS requires 760 regular staff but employs only 528. Staff shortage is covered by continuous shift duty and overtime. At the time of transformation, the new CAAP management promoted voluntary early retirement with a retirement package which caused staff shortages. On the other hand, CAAP is recruiting new graduates, but it is difficult to fulfil the regular staff requirements quickly because of strict qualification standards and longer initial training. Staff shortage, however, does not influence the operation.

Based on ICAO standards, ANS operates and manages the air navigation aid system, radar, meteorological and communications equipment. ANS maintains airport air traffic control facilities based on operational hours of each airport, and air navigation aid systems such as VHF Omni-directional Range (VOR) and Distance Measuring Equipment (DME) by three round-the-clock shifts on the ground.

Although ICAO standard requires calibration of VOR and DME from the air, the calibration has not been conducted since October 2010 because of aircraft failure for aerial inspection.

CAAP will try to outsource the inspection within the year 2012 to a private air charter.



Photo 1 VOR/DME
(Photo 1 and 2 in Laoag Airport)



Photo 2 VOR/DME Maintenance

ANS staff at each airport conducts regular operation and maintenance of equipment based on daily, weekly, and monthly routines. If a problem is found, Operations Department of ANS headquarters deals with it and the defective parts sent to Manila Maintenance Center (MMC) for repair work. Field survey found there is no serious problem with regular maintenance as routine logs are kept properly. In addition to communication equipment, ANS is also responsible for facility management.

3.3.2 Technical Aspects of Operation and Maintenance

ANS has two major fields of engineers: Communications Navigation Systems (CNS) Officers and Airfield Lighting and Power Technician. The former is classified into five ranks and the latter into four ranks by each technical level and corresponding training is conducted. Air Traffic Service has two fields of specialists: Air Traffic Controller, ATS-319, and Airways Communicator, ATS-205. Air traffic controllers and airways communicators are checked based on three themes of training and examination for airport and approach as well as medical testing.

“Educational Support for the New CNS/ATM Systems Implementation Project in the Philippines (JICA Technical Cooperation Project, 2004-2008),” “Capacity Development Project for Improvement of Safety and Efficiency for Air Navigation System (JICA Technical Cooperation Project, 2009-2014 (Scheduled), On-going),” and “New CNS/ATM Systems Development Project (JICA Loan Project, L/A in 2002, On-going)” are to introduce a more advanced air navigation system which requires the use of satellite. However, as of April 2012, it is not clear when this navigation system will be introduced completely. Even after the completion and introduction of New CNS/ATM, the necessity and effectiveness of equipment introduced by this project will not change. If operation and maintenance of equipment by the project are not performed properly, the equipment may not function correctly for air traffic safety.

3.3.3 Financial Aspect of Operation and Maintenance

After the transition to CAAP, its financial statements are to be released but they have not been publicized as of April 2012 and the status of account settlement is not clear. At the time of ATO, ATO budgeted recurrent cost and DOTC bore investment cost. After the establishment of CAAP, CAAP is supposed to prepare investment and recurrent budget. These two factors do not change from the ATO age and financial reform by ATO to CAAP transition has been incomplete.

Currently, CAAP prepares Annual Procurement Plan (APP), budgets it and receives approval by DOTC. Among APP (2011), budget for Air Navigation Facilities (ANF) was given as 109.07 million Pesos by accumulation of each item.

Implementation process of the budget for operation and maintenance has the following concerns. For instance, as an issue with the entire procurement process of CAAP, ANS cannot procure parts in a timely manner and as necessary. The reason is that CAAP adopts government procurement rules for its procurement of parts and equipment. Parts producers are restricted and CAAP cannot conclude a discretionary contract, but must adopt competitive bidding through its procurement committee. This does not fit to the necessity and reality of the situation.

3.3.4 Current Status of Operation and Maintenance

As of April 2012, all equipment is working properly, but the following points are concerns.

3.3.4.1 Repair and Replacement Situation

(1) Generic Parts

Sufficient original spare parts were stocked for a 2-5 year supply, and all of the consumable parts (generic parts such as bulbs and fuses) have been utilized. These generic parts are locally available and replaced or repaired.

(2) Important Substrates

Since 2010, main circuit boards, such as substrates of frequency modulator of the equipment can cause breakdowns and MMC can sometimes repair them and sometimes cannot.



Photo 3 Manila Maintenance Center



Photo 4 Repairing Transceivers

In some cases, equipment, which is supposed to have main and standby system, is running only

on one system because the other system is defective. Furthermore, in case a main system breaks down, a parts from other airport equipment with two systems is to be brought in. MMC can repair the defective substrates but not in all cases. Thus, CAAP tries to procure some substrates and circuits from original manufacturer such as those in Japan, but this has some problems as well. For instance, the original VOR manufacturer is no longer producing VORs, but can supply necessary substrates as required under the fifteen-year warranty for supply of spare parts. The project contractor, Toyota Tsusho Corporation⁶ is working as a conduit for the procurement. Since March 2011, CAAP and Toyota Tsusho have negotiated and Toyota Tsusho issued a quotation. However, CAAP has not officially ordered the parts by discretionary contract base up to April 2012. Thus, CAAP cannot procure the necessary parts.

(3) Breakdown of Equipment

As Voice Logging Machines breakdown, some airports are operating only on one main machine and some are operating without any machines. ICAO requires voice recording machines. In addition, the original manufacturer of Voice Logging Machines no longer exists and it is difficult to repair or replace the machines. Uninterrupted Power Supply (UPS) often breaks down and some equipment is operated without UPS. Without UPS, some equipment cannot transmit signals due to power interruption or failure and this causes heavy load on equipment.

3.3.4.2 Removal of Facilities and Change of Facility Usage

Due to expiration of land lease contract, the landowner, Tagaytay City, requested CAAP to return the land used for extended range facilities of receivers and transmitters. Tagaytay City is a tourism spot facing Taal Lake and hotels and resort condominiums have been developed recently. Tagaytay City considered the site suitable for tourism development rather than leasing to CAAP and did not extend the land lease contract and requested the land be returned. CAAP negotiated to continue to use the land but was forced to return it. As the next best choice, CAAP is making efforts to operate the equipment. Then, CAAP moved all equipment to another location to prepare for re-installation, and demolished the buildings, but some fittings were reused. CAAP is taking care to minimize the impact on the existing facility's functions (by CAAP). Since 2010, some rooms of MMC have been used as offices of ANS and there has been no problem with the function of MMC.

3.3.4.3 Management and Repair of Facilities

Facility management of airport control towers had some problems such as an out-of-service

⁶ TOMEN Corporation, original contractor of this project, was merged with Toyota Tsusho Corporation.

elevator (Kalibo Airport, budget allocated) and roof leakage (Laoag Airport). If ANS staff reports such problems to headquarters, ANS will take appropriate actions. There seems to be some problems with miscommunication and insufficient budget processing.

Therefore, ANS of CAAP basically secures the operation and maintenance and it is not in a situation to jeopardize the operation of aircraft. CAAP purchases sufficient generic parts and MMC performs necessary repair work. However, the larger procurable equipment such as UPS and non-generic parts (such as parts and substrates which can be provided only by the original maker) are not procured properly, and the recommendations for provision of spare parts supply and enhancement of equipment repair systems by the ex-post evaluation has not been sufficiently implemented.

4. Conclusion, Recommendation and Lessons Learned

4.1 Conclusion

Effectiveness to air safety and positive impact on air transport sector by this project has been continuously sustained. However, deviation from ICAO standards and international air transportation market trend, the Philippine air sector is lagging behind the international level.

Even after the introduction of a new air traffic control system such as New CNS/ATM, the air traffic control system by this project will be required for an additional ten years or longer. If spare parts are not procured properly, it is a concern that the equipment will not be able to maintain its current functionality.

4.2 Recommendation

DOTC: The reform by the transition from ATO to CAAP has been incomplete and DOTC is expected to authorize broader discretion of CAAP for budgeting and implementation in order to clarify the financial responsibility of CAAP for operation.

CAAP: This Project procured a wide variety of equipment and appropriate maintenance and necessary parts supply are essential. First, CAAP should secure the budgeting and its implementation for generic parts (mostly consumables). Second, if non-consumable parts are not generic and unable to be repaired, it is difficult to procure them by the general competitive bidding defined by the national government. Therefore, it is necessary to facilitate the procurement of these parts by discretionary contract base or long-term maintenance contract with each original contractor and maker.

4.3 Lessons Learned

A yen loan project featuring a variety of equipment often requires involvement of original equipment makers at the stage of operation and maintenance. Although the borrower country bears the recurrent cost, it is desirable to agree with the executing agency how to supply spare

parts properly at the stage of implementation.

Comparison of Planned and Actual Scope

Item	Planned	Actual
1. Output	(29 airports/facilities)	(25 airports /facilities)
(1) En-Route Air Traffic Control Facilities	<ul style="list-style-type: none"> Improvement of air traffic control facilities (expansion of VHF wave coverage on the west side and on the south side, improvement of Remote Center Air Ground Communication [RCAG] at 2 sites) Improvement of terminal control facilities (8 airports) 	As planned Nearly as planned
(2) Aerodrome/ Approach Air Traffic Control Facilities	<ul style="list-style-type: none"> Development of FSS facilities: Cauayan, Puerto Princesa 	Nearly as planned
(3) Air Navigation Communication Facilities	<ul style="list-style-type: none"> Development of an Automatic Telex Message Switching System for securing point-to-point aerial communication network: 14 airports Renovation and installation of air navigation radio facilities for use on air routes and at airports (VOR/DME) 	Not implemented Nearly as planned
(4) Terrestrial Communication Facilities	<ul style="list-style-type: none"> Expansion of terrestrial based communication facilities (between Davao Airport and Tagaytay-Manila Center) 	Nearly as planned
(5) Satellite Based Communication Facilities	<ul style="list-style-type: none"> Improvement of satellite communication facilities (14 airports, Mt. Majic transmitting/ receiving station, Manila AFC) 	Not implemented
(6) Maintenance Center	<ul style="list-style-type: none"> Development of a maintenance center inside Manila Airport, placement in the center of spare equipment parts of all airports, and provision of a supply system 	As planned
Consulting services	International: 184M/M Local: 182M/M	As planned
2. Project Period	August 1995-August 1999 (4 years, 1 month)	August 1995- June 2004 (8 years, 11 months) Completion of construction work: March 2004
3. Project Cost		
Foreign Currency	6,386 million yen	6,203 million yen
Local Currency	738 million yen (179 million pesos)	1,419 million yen (354 million pesos)
Total	7,124 million yen	7,622 million yen
ODA Loan Portion	6,386 million yen	6,203 million yen
Exchange Rate	1 peso = 4.13 yen (January 1995)	1 peso = 4.01yen (Average rate 1995 - 2004)