

Country Name	The Project for the Replacement of Air Navigation System at Kamuzu International Airport
The Republic of Malawi	

I. Project Outline

Background	Kamuzu International Airport (KIA) was constructed during 1977-82, and a terminal building, air traffic control tower and air navigation system were developed by Japanese ODA loan projects in 1980s. Most of the existing equipment related to air navigation were installed before inauguration of the airport, thus being outdated. Also the spare parts were not available due to the product obsolescence. Even so, the Department of Civil Aviation of Malawi (DCA) had contrived ways to maintain the existing equipment within its capacity. However it came to such extent that the International Civil Aviation Organization (ICAO) and International Air Transportation Association (IATA) recommended necessary measure to comply with the international standard by duly providing safe and reliable aviation infrastructure.				
Objectives of the Project	To ensure safe and efficient aircraft operations at Kamuzu International Airport meeting to the international standards of ICAO in terms of air navigation/safety equipment by modernization and rehabilitation of air navigation systems, thereby contributing to the increase of air transport at Kamuzu International Airport.				
Contents of the Project	<ol style="list-style-type: none"> 1. Project Site: Kamuzu International Airport (KIA), Lilongwe 2. Japanese side <ul style="list-style-type: none"> • Procurement of equipment (incl. transportation, installation, adjustment and testing) <ul style="list-style-type: none"> ➢ Air Traffic Control and Communications System ➢ Radio Air Navigation System ➢ Aeronautical Round Lighting System ➢ Emergency Power Supply System • Operation and Maintenance training as Technical assistance (Soft component of Grant Aid) 3. Malawi side: <ul style="list-style-type: none"> • Renovation of buildings and rooms for installation • Removal of existing equipment for installation • Provision of power supply and telecommunication services to each site • Repair of existing main power supply and communication network cables in the site • Repair of existing power cables and isolation transformers for aeronautical ground lights 				
Ex-Ante Evaluation	2010	E/N Date	January 26, 2011	Completion Date	November 2012
		G/A Date	January 26, 2011		
Project Cost	E/N Grant Limit/ G/N Grant Limit: 778 million yen, Actual Grant Amount: 653 million yen				
Implementing Agency	Department of Civil Aviation (DCA), Ministry of Transportation and Public Infrastructure (MTPI)				
Contracted Agencies	Aviation Systems Consultants Co., Ltd.				

II. Result of the Evaluation

1 Relevance
<p><Consistency with the Development Policy of Malawi at the time of ex-ante and ex-post evaluation> This project is consistent with Malawi's development policy of "to prove a safe, efficient, reliable aviation infrastructure that complies with international standards" as set forth in the policy documents including <i>Malawi Growth Development Strategy (MGDS) (2006-2010)</i> and <i>MGDS II (2011-2016)</i>.</p> <p><Consistency with the Development Needs of Malawi at the time of ex-ante and ex-post evaluation> This project met the development needs of Malawi to modernize air navigation systems of KIA to meet the international standards of ICAO.</p> <p><Consistency with Japan's ODA Policy at the time of ex-ante evaluation> This project was consistent with Japan's ODA policy for Malawi to support improvement of transportation and traffic infrastructure as one of the three priority areas agreed at the assistance policy dialogue in June 2009.</p> <p><Evaluation Result> In light of the above, the relevance of the project is high.</p>
2 Effectiveness/Impact
<p><Effectiveness></p> <p>The project objectives were partially achieved. Regarding the coverage of aero-nautical ground lights in key areas in KIA, the airstrip increased from 60% (2010) to 90% (2016), the taxiing way increased from 0% (2010) to 75% (2016), and the tarmac (apron) increased from 70% (2010) to 100% (2015). However, since the collection of the data had never been officially requested to the DCA until this ex-post evaluation was conducted, the data for the time before 2015 was not available at the time of ex-post evaluation. Therefore, it was difficult to confirm the status of coverage of aero-nautical ground lights in key areas between 2012 and 2014 or 2015. Since aero-nautical ground lights are very important system for safety aircraft operation during nights and bad weather, the coverage rate should be maintained at 100%. In this sense, the coverage of aero-nautical ground lights in air stripe and taxiing way did not reach to 100% at the time of ex-post evaluation. According to DCA, one of the two computers to control aero-nautical ground lights broke down two years ago. It was sent to manufacturers in the United Kingdom and they advised that it could not be repaired due to the nature of the fault, and also could not be replaced to new ones because the warranty period had expired. Because of budgetary constraints, the government of Malawi has not replaced it. The effect of this is that only one computer is working and if this one breaks down too, landing lights will have to be controlled</p>

manually from the control board on the ground. While, although the status of landing and take-off failure/accident at KIA was unknown before project implementation, it was confirmed that no serious landing and take-off failure/accident has occurred at KIA since the project completion in 2012.

As qualitative effects of the project, improvements in safety of aircraft operations at KIA by the equipment installed by the project have been confirmed at the time of ex-post evaluation. According to the interviews with two major airline companies which use KIA, Kenya Airways and Malawian Airways as well as the Air Traffic Controllers (ATC), they recognized the tangible improvement in safe and efficient aircraft operations at KIA especially during the night and bad weather after the project completion. For example, aircraft diversions due to bad weather were reduced tremendously after installation of the Instrument Landing System (ILS). DCA considered that the equipment procured by the project met the physical requirement of ICAO standard in terms of air navigation/safety equipment. As JICA technical cooperation project "Project for Capacity Development for Air Navigation Services" (2014-2016) was provided in order to improve the capacity of air traffic controllers based on the outputs of this project, aircraft operations at KIA has been improved in safety and efficiency as well. In addition, it should be noted that the rehabilitation works of runway, taxiway and tarmacs (aprons) implemented in parallel with this project by the assistance of other donors such as the Arab-Bank for Economic Development in Africa and the OPEC Fund for International Development attributed to the above improvements.

As results of trainings on operation of equipment such as ground-to-air communication system and ILS conducted by the project in order to ensure safe and efficient aircraft operation by proper utilization of equipment installed by the project, the competence of personnel in the Telecommunications Engineering Division (TED), KIA has been improved to some extent. TED staff members were able to carry out weekly inspections and where necessary, preventive maintenance of the newly installed project equipment as well as to prepare and utilize the Equipment Maintenance Management Manual.

<Impact>

The project has several positive impacts on the status of air transportation at KIA. The number of take-off and landing increased more than double from 6,044 (2010) to 14,231 (2014). Similarly, the number of passengers increased more than double from 204,800 (2010) to 457,572 (2014). Though there was a decline in domestic cargo volume, the international cargo volume expanded from 4,044,904 tons (2012) to 5,658,238 tons (2015). It is considered that the project as well as the assistance of other donors has contributed to the above positive impacts.

Table 1: Status of Air Transportation at KIA

	Baseline 2010	Actual 2012	Actual 2013	Actual 2014	Actual 2015
No. of take-off and landing (no./year)	6,044	5,635	13,972	14,231	N.A.
No. of passengers (person/year)	204,800	373,479	401,823	457,572	N.A.
Domestic cargo volume (tons/year)	N.A.	296,106	337,884	113,755	80,672
International cargo volume (tons/year)	N.A.	4,044,904	4,594,505	5,107,718	5,658,238

Sources: Department of Civil Aviation (DCA)

Note: No. of passengers include both domestic and international passengers.

No negative impact was observed and no land acquisition and resettlement of people was associated with the project.

<Evaluation Result>

In light of the above, while a certain effect of the project has been observed, it is considered that the improvement with supports by the other donors has contributed to the project effects. Therefore, the effectiveness/impact of the project is fair.

Quantitative Effects

Indicator	Baseline 2010 Baseline year	Target 2015 3 years after completion	Actual 2012 Completion year	Actual 2013 1 year after completion	Actual 2014 2 year after completion	Actual 2015 3 year after completion	Actual Ex-post evaluation year (As of September 2016)
Indicator 1 Coverage of aero-nautical ground lights in Airstrip (%)	60	100*	N.A.	N.A.	N.A.	N.A.	90
Indicator 2 Coverage of aero-nautical ground lights in Taxiing way (%)	0	100*	N.A.	N.A.	N.A.	N.A.	75
Indicator 3 Coverage of aero-nautical ground lights in Tarmac (%)	70	100*	N.A.	N.A.	N.A.	100	100
Supplement information 1 Landing failure/ accident (no./year)	N.A.	N.A.	0	0	0	0	N.A.
Supplement information 2 Take-off failure/ accident (no./year)	N.A.	N.A.	0	0	0	0	N.A.

Source: Department of Civil Aviation (DCA)

Note: *The relevant international standards, such as the ICAO standards, do not necessarily require to fulfill the target value of 100% for the indicators of coverage of aero-nautical ground lights.

3 Efficiency

Although the project cost was within the plan (ration against the plan: 84%), the project period was exceeded the plan (ration against the plan 120%) because a part of procurement process was delayed. Therefore, the efficiency of the project is fair.

4 Sustainability

<Institutional Aspect>

The Department of Civil Aviation (DCA) is responsible for operation and maintenance (O&M) of the project equipment. In particular, Telecommunication Engineering Division (TED) of KIA is directly engaged in charge of O&M of the equipment under the supervision of DCA. There are six competent engineers in TED and 12 engineers with a minimum knowledge and skills in the electronics and telecommunications engineering were recruited additionally in December 2015. However, DCA considered that the number of TED staff was still not enough to conduct the O&M activities effectively at the time of ex-post evaluation.

In January, 2017, the Cabinet of Malawi approved a bill to establish the Civil Aviation Authority (CAA) and the bill will be debated and it is expected to be passed by the parliament by the end of February, 2017. In the case where CAA is established, the Authority can be more powerful to recruit and retain necessary personnel and to ensure financial resources as well. It is expected that retention and recruitment of personnel will be addressed satisfactorily by an autonomous CAA to be established near future.

<Technical Aspect>

In addition to the O&M training by the project, DCA provided several training courses covering various components of air navigation and O&M of the equipment, and TED technicians participated to the related training courses. The manuals prepared by the project such as the Equipment Inspection Manual, the Equipment Ledger, and the Spare Parts Management Log have been fully utilized for inspection and diagnosis of the equipment.

As mentioned above, the technical capacity of TED has been improved to some extent and they can conduct weekly inspections, preventive maintenance of the equipment newly installed by the project as well as to prepare and utilize the Equipment Maintenance Management Manual.

<Financial Aspect>

DCA received 200 million Malawian kwacha (MWK) in 2013, 350 million MWK in 2014, and 250 million MWK in 2015 for the O&M budget. However, according to DCA, allocated budgets are not sufficient to exercise the sufficient O&M activities for the project equipment including procurement for spare parts.

<Current Status of Operation and Maintenance>

At the time of ex-post evaluation, the most of the project equipment has been maintained in good condition except the aero-nautical round lighting system since DCA has been carrying out weekly inspections and preventive maintenance as much as possible under the limited manpower and budgetary condition. As mentioned earlier, the computer for switching on/off the landing lights have broken down and its repair has been suspended for over two years due to unavailability of maintenance budget for replacement. In the case that TED cannot deal with troubles by themselves, they normally outsource the maintenance to the private companies. DCA indicates that there are challenges in procurement of spare parts and consumables due to financial and other reasons. It is expected that necessary spare parts can be more easily procured by the improvement in financial resources when the Civil Aviation Authority is established with more power.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the institutional, financial and current status of operation and maintenance aspects of the implementing agency. Therefore, the sustainability of the project effect is fair.

5 Summary of the Evaluation

The project objectives were mostly achieved. The coverage of aero-nautical ground lights in key areas the airs partially met their respective target values. After the project, the tangible improvement in safe and efficient aircraft operations at KIA especially during the night and bad weather were observed. The project has several positive impacts on the number of take-off and landing, the number of passengers and the international cargo volume at KIA. Those improvements were also attributed by the JICA technical cooperation project and the airport rehabilitation projects by other donors. For sustainability, slight problems have been observed in terms of the institutional, financial and current status of operation and maintenance aspects of the implementing agency due to limited human and financial resources. Regarding efficiency, the project period was longer than the plant due to a delay in a part of procurement process.

Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations to implementing agency:

- In order to meet ICAO standards, the DCA should make a continues effort to put in place regulatory reforms such as establishment of an Independent Civil Aviation Authority and an independent Air Traffic Investigations Body as recommended by ICAO in collaboration with related government ministries and agencies. It is expected that establishment of the autonomous CAA will mitigate performance challenges faced by the current DCA.

Lessons learned for JICA:

- The preparatory survey of this grant aid project (2010) studied the supply and procurement conditions of spare parts in Malawi such as availability of local agents/representatives of suppliers, the procurement procedure of spare parts in the Malawi government, and after-sale service by the suppliers. However, the ex-post evaluation found that DCA faced difficulties in procurement of some spare parts and consumables due to the existing government procurement regulation. For example, DAC tried to import a toner of printers from other countries such as South Africa because it was not available in the domestic market. However, the existing government procurement regulation did not allow an advance payment to the service providers but no company would deliver the toner without an advance payment. Therefore, when studying the supply and procurement conditions of spare parts of the project equipment, more attention should be paid on the details of the procurement procedure and regulations of the counterparts and sharing the information with stakeholders.
- The project conducted the O&M training for the counterpart staff as a technical assistance of this grant aid project in the soft component. However, the training program mainly focused on the operation of the project equipment but not on the maintenance of the equipment. In order to strengthen the technical capacity of TED for the maintenance of equipment, the training program in the soft component more focusing on the maintenance aspect including establishment of maintenance manuals of each equipment can be more effective.



Control Console



ILS- Glide Path



ILS - Localizer



Control Room