

Country Name

< Project Name> The Project for Improvement of Equipment of The Manas

Kyrgyz Republic

International Airport



Project Site (source: JICA Project Report)

Air Navigation Facilities:, VHF Omni
-directional Range (VOR) / Distance
Measuring Equipment (DME) (source: JICA)

Inside of the
VOR/DME (source:
JICA)

I. Project Outline

Background

Air transport plays an extremely important role as a means of transport to support socio-economic activities for a landlocked country such as the Kyrgyz Republic. While four international airports and seven domestic airports are operational in the Kyrgyz Republic, the Manas International Airport (MIA) is its largest international airport, with a 4,200 m runway, located approximately 30 km northwest of the capital Bishkek. The airport was built in 1974 and modernized in 1996 under the Bishkek-Manas International Airport Modernization Project, financed through Japanese ODA loan, which included runway improvements and terminal building renovation. As of 2011, 232 international flights and 154 domestic flights per week operated. The number of passengers on international and domestic flights reached approximately 1.17 million and 510,000, respectively, in 2014. In particular, the number of passengers on international flights showed a high average annual growth rate of more than 15% over a six-year period from 2008 to 2014. With MIA accounting for about 60% of the country's air traffic and 43% of domestic traffic, the airport plays an important role as a gateway to other countries and a hub for domestic traffic. Since the number of flights on both international and domestic routes was expected to increase further in the future, there was an even greater need to ensure on-time operations and safety.

However, landing is often impossible during low visibility conditions such as the presence of dense fog, etc., especially in winter, and the aging of air navigation facilities could hinder safe operations. In addition, the ground support equipment for efficient airport operations was aging, and there were concerns about shortages because of aviation demand. Therefore, there was a need to improve air security equipment and ground support equipment at MIA.

Objectives of the Project

The project aims to ensure safe and efficient airport operations by improving maintenance of air navigation equipment and ground support equipment at MIA, thereby contributing to improving the safety and reliability of the airport and aircraft operations.

Contents of the Project

1. Project Site: Manas International Airport, Bishkek city, Kyrgyz Republic (Population: Approximately 5.66 million as of 2014).

2. Japanese side: 1) Procured Equipment: Air Navigation Facilities (Instrument Landing System : ILS¹, VHF Omni-directional Range: VOR / Distance Measuring Equipment: DME²) , Ground Support Equipment for Aircraft (Snow blower, Aircraft Tow Tractor, Belt loaders, etc.), Airport Firefighting Vehicle

2) Consulting Service: Detail Design, Supervision of Procurement (there was no soft component service.)

3. Kyrgyz Republic side:

Preparatory works for installation of the equipment including site preparation, removal of existing structures prior to installation of the equipment, supply of electric power

Implementation Schedule

E/N Date October 26, 2015

G/A October 26, 2015 Completion Date May 30, 2018

Project Cost

G/A Grant Limit: : 1,630 million yen, Actual Grant Amount: 1,540 million yen

Executing Agency

Ministry of Transport and Communications

Main Contractors: Airport Firefighting Vehicle / Ground Support Equipment: Ogawa Seiki

Contracted Agencies

Air Navigation Facilities: NEC Enterprise Solutions, America EMEA

Main Consultants : Joint Venture of the Nippon Koei and the Japan Airport Consultants

Agent: N/A

II. Result of the Evaluation

Summary

1. This project intends to provide air navigation safety equipment and ground support equipment, etc., contributing to enhancing the safety and efficiency of the airport.
2. The objective is consistent with Kyrgyzstan's development policy, the country's need for improved air transport safety and efficient airport operations as effective development of the aviation sector ensures sustainable economic development, and Japan's aid policy. It is also consistent with other Japanese assistance and support from other donors and has high relevance and consistency. Clarified through the preceding Manas International Airport Modernization Project (L/A signed: 1996), the Airport Construction, Operation and Maintenance Planning Training (Training Program related ODA Loan: 2012) and Aviation Security country training in 2014, which provided opportunities to learn the state-of-the-art operation and management methods and aviation security systems of actual Japanese airports, etc., aligned the safety with operational needs. It also complements the support of other assistance agencies. In the ex-post evaluation, it was confirmed that operations during adverse weather conditions with low-level clouds and low visibility have improved and that ground support equipment and other equipment have been upgraded to prevent significant delays and accidents. Improvement in both incidence and duration of delays, common during the winter season, was confirmed, enhancing the safety and reliability of the airport and aircraft operations. In 2020, however, the occurrence of the COVID-19 pandemic significantly decreased aircraft operations, but from 2021 onwards, the number of scheduled flights has recovered and new routes have been developed to accommodate the increasing number of flights. Based on this information, the effectiveness and impact of the project is high. Although the project period was slightly longer than planned, the project costs are still within the plan and the efficiency of the project is high. As there are generally no problems with the operation and maintenance management system, technology, and finances, the

¹ Radio equipment that displays the course of entry when an aircraft lands on a runway (Instrument Landing System: ILS) is a landing aid device that emits directional radio waves to an aircraft approaching for landing, indicating the exact direction of the runway, angle of approach process and position on the approach course. When landing by ILS, the runway sight distance (the maximum distance at which the pilot of an aircraft on the runway centre line can see the runway centre line lights, etc.) and the landing decision altitude (the height above the end of the runway at which the decision to land or go-around is made) are determined according to category. The higher the category number, the lower the landing decision altitude, which allows for landing in bad weather and at low visibility.

² A radio device that provides aircrafts with directional and distance information from an all-directional radio beacon station.

sustainability of the project effect is high,. In light of the above, this project is evaluated to be highly satisfactory.

Overall Rating ³	A	Relevance & Coherence	③ ⁴	Effectiveness & Impacts	③	Efficiency	③	Sustainability	③
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<Special Perspectives Considered in the Ex-Post Evaluation/Constraints of the Ex-post Evaluation>

In January 2017, before the aircraft equipment provided under the project became operational, a cargo flight crashed near MIA due to poor visibility, killing all four crew members and 35 residents near the airport.

Due to the spread of COVID-19, local information necessary for evaluation was collected through remote surveys from Japan. Interviews with the implementing agency, MIA, and others conducted online by the evaluator.

1 Relevance/Coherence

< Consistency with the Development Policy of Kyrgyz Republic at the period of ex-ante evaluation>

Under *the Medium-Term Development Program for 2012–2014* (formulated in 2012), the Kyrgyz Government identified the urgent need to upgrade and modernize aviation security equipment, and under the Civil Aviation Development Strategy for 2013–2020 (formulated in 2013), the government stated that effective development of the aviation sector would ensure sustainable economic development in Kyrgyzstan. The project is in line with these policies, as one of the objectives of *the Strategy for Aviation Development 2013–2020* is to improve air transport safety and strengthen airport security as a guarantee for the sustainability of Kyrgyzstan’s economic development.

< Consistency with the Development Needs of Kyrgyz Republic at the period of ex-ante evaluation>

While aviation demand is expected to increase, the aviation security equipment is aging. As a result there are concerns about the impact on on-time and safety operations. The modernization of the equipment at MIA, the main airport, is an urgent issue for safety and efficient operation of the airport, and this project corresponds to these needs.

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

In the Country Assistance Plan for Kyrgyzstan (2012), the transport sector, including MIA under the project, is identified as one of the priority areas in the “Maintenance and improvement of transport infrastructure and mitigating regional disparities.” Therefore, the project was in line with the policy of Japan towards the Kyrgyz Republic during the Ex-Ante Evaluation.

<Internal Coherence>

The Airport Construction, Operation and Maintenance Planning Training (Yen loan account training: 2012), as well as the 2014 national training, were highly appreciated by the implementing agencies for effectively bringing together various stakeholders, including the aviation administration, the maintenance and management of MIA, and the implementing agencies responsible for aviation safety, to gain knowledge on how to make the airport safer through the utilization of equipment to be developed under the project. As there are limited opportunities to receive direct on-site briefings on operating the latest airport safety equipment, the series of training, which provided opportunities to deepen the understanding of improving airport safety equipment, is considered to have had a synergistic effect on the maintenance and management of the equipment maintained under the project.

< External Coherence>

Before the project, the tarmac, runway, and control tower were constructed with assistance from USA. Subsequently, the provision of equipment under the project led to a comprehensive improvement in airport safety. The synergistic effect of the project is high, as the surrounding infrastructure (from the USA) and equipment (from Japan) have been developed. Furthermore, the International Civil Aviation Organization (ICAO) has provided technical assistance intermittently since 2017, targeting aviation safety and applying modernized equipment.⁵ The implementing agencies have coordinated and utilized the support of other donor agencies to ensure safe operations and efficient airport operations, and synergies with the project can be confirmed, so external consistency is high.

3 A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

4 ④: Very high, ③: High, ②: Moderately low, ①: Low

⁵ No Country Left Behind” success: a Significant Safety Concern resolved!. Retrieved February 2022, from ICAO website: https://www.icao.int/EURNAT/Pages/news_articles/NoCountryLeftBehind-success.aspx

<Evaluation Result>

In light of the above, the relevance and coherence of the project are high⁶.

2 Effectiveness/Impacts⁷

<Project logics for impact realization >

At the time of the Ex-Ante Evaluation, MIA played an important role as a gateway to other countries and as a hub for domestic transport, and the number of international and domestic flights was expected to increase, requiring the guarantee of on-time operations and safety. The project was implemented to improve the safety and reliability of aircraft operations (impact) by enhancing air navigation and ground support equipment (output) to ensure on-time operations and safety (outcome) to cope with the increased number of flights. Figure 1 summarizes the logistics of the project from its implementation to the development of its impact, as envisaged during planning.

Project Timeline

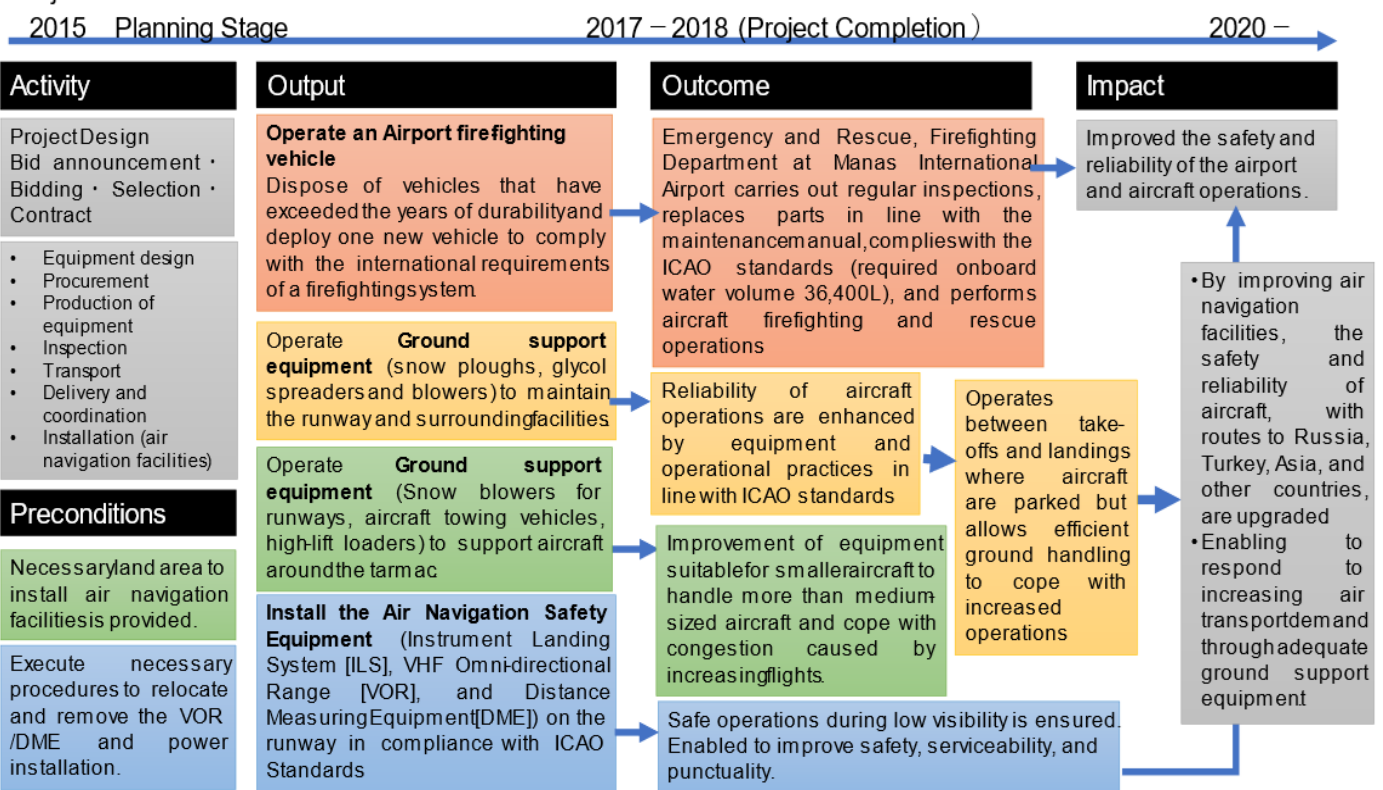


Figure 1 Logics of the Project

At the time of the project planning, due to the age of the air navigation equipment at MIA, there was a risk of problems with airport operations during inclement weather when clouds are at a low-level and low visibility occurs, often resulting in impossible landing, especially in the winter. Furthermore, the airport's firefighting vehicles were extremely dilapidated and did not meet ICAO standards.⁸ Upgrading air navigation equipment through the project and the ability to provide more accurate radio frequency operational support from a greater distance were expected to contribute to increased safety by expanding the range of weather conditions in which it is possible to land safely. In addition, new snow and glycol⁹ spreaders (snow ploughs) and blower vehicles were expected to reduce the time required for airport maintenance during snowfall, contributing to safety and efficiency in aircraft operations, as well as to the efficiency of airport operations. Furthermore, the provision of firefighting vehicles was expected to improve the firefighting system to meet international requirements. In the analysis of effectiveness in the ex-post evaluation, based on the above logic, the improvement of the visibility distance on the runways after 2018, when the aircraft under the project was put into operation, the status of the firefighting system meeting international requirements¹⁰ was checked and efficient operation of aircraft take-off and landing, safety,

⁶ Relevance: ③, Coherence:③

⁷ When providing the sub-rating, Effectiveness and Impacts are to be considered together.

⁸ ICAO specifies standards for the deployment of airport firefighting vehicles by airport category.

⁹ Chemicals that lower the freezing point of water and have a de-icing effect.

¹⁰ Refers to ICAO security standards. An airport's category for rescue and firefighting is determined by the maximum aircraft (aircraft length and fuselage width) normally

service rate, and on-time performance of the implementing agencies were verified. Concerning the impact, a questionnaire survey of airlines sought their views on meeting the increasing demand for aircraft operations and improving safety and reliability.

<Effectiveness>

(1) Visibility distances on runways

The target visibility distance on the runway of more than 200 m was achieved with the equipment installed during the project. The project upgraded the air navigation equipment to enable instrument approaches and landings even when visibility is reduced by providing highly accurate aeronautical information. The ILS Category IIIA operation was achieved per the original target for the operational category¹¹ that uses it to approach and land on the intended runway. Being able to provide a more accurate radio frequency operational support has contributed to increased safety.

(2) Fire-fighting systems that meet international requirements

At the time of planning, MIA owned six fire engines, four of which were 13 years beyond their useful life and did not meet the ICAO security standards (36,400 L of water is required onboard) for aircraft firefighting and rescue. With the provision of one new fire engine under the project, the total onboard water volume of the three vehicles meets the ICAO security standards.

Table 1 Pre-post comparison of effectiveness indicators

Indicators	Baseline 2014	Target (2019) after completion	Actual (Responded by questionnaire in 2022)
Weather condition when aircrafts are able for landing. (Visible distance at runway)	More than 350 m (ILS Category II)	More than 200 m (ILS Category IIIA)	More than 200 m (ILS Category IIIA)
Percentage of landing / take off aircraft under the condition which satisfy international requirements on fire and rescue at MIA. (%)	0	100	100

Source: Questionnaire Survey and interview

Note: ILS Category II is a runway sight distance (the distance at which the pilot of an aircraft on the centerline of the runway can see the runway markings, runway lights or runway centerline lights) of 350 m or more and the decisive height (the approach limit height for a precision approach, at which point, if no visible markings necessary to continue the approach are seen, the aircraft must initiate a return approach) of 30 m or more but less than 60 m. The precision instrument approach and landing is an operation of not less than 30 m and not more than 60 m. Category III, on the other hand, refers to precision instrument approaches and landings where the runway sight distance is 200 m or more and the decisive height is less than 30 m or not set.

(3) MIA's flight delays in winter (indicative information)

In order to verify the efficient operations and reliability of the project at MIA, the status of delayed flights at the airport was reviewed and used as a reference to determine the effectiveness of the project. The changes in flight delays provided are shown in Table 2. The percentage of flights delayed during the winter season, when most departure delays occur due to weather conditions, in 2012 exceeded 7% but was below 5% in 2021. In the same season, the number of hours of delay per flight also decreased from 1.66 to 1.15. There has been an improvement in delay rates and delay times during the winter and throughout the year.¹² In light of this, it is estimated that “safer operations” and “more efficient airport operations” have been accomplished.

Table 2 Delayed Flights in MIA

	2012		2013		2019		2021	
	Number of flights departed (A)	Number of flights delayed due to weather conditions (B)	A	B	A	B	A	B
Number of flights departed in Winter (November–March)	2,084	149	2,677	153	3,248	162	2,092	102
Number of flights departed per year	5,336	160	7,049	174	8,416	177	5,792	115

used by that airport. The largest aircraft in service at MIA is a Boeing 747, which falls under category 9 according to ICAO security standards and, therefore, must meet the criteria accordingly.

¹¹ ICAO's all-weather operations manual, classified as categories I, II, and III (A, B, and C).

¹² Note that 2020 was omitted from the comparison due to the extremely low number of flights taking off in the year (2,704) due to the spread of Covid-19 pandemic.

Delay rate during winter (B÷A)	7.1%	5.7%	5.0%	4.9%
Delay time / flight during winter (unit: hour)	1.66	1.18	1.38	1.15
Annual delay rate (B÷A)	3.0%	2.5%	2.1%	2.0%
Annual delay time / flight (unit: hour)	1.62	1.27	1.43	1.05

Source: Evaluation Team based on the provided data by the MIA

<Impacts>

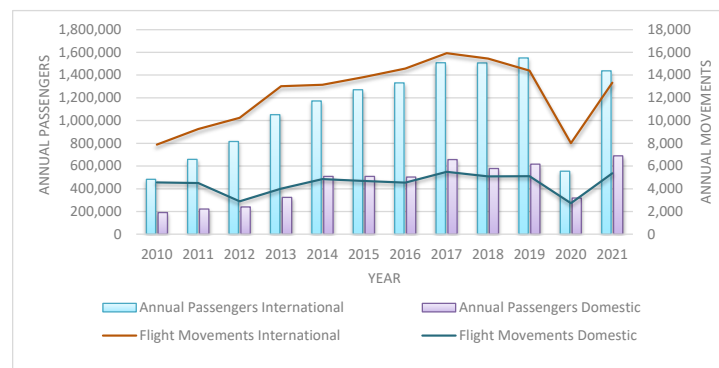
The airlines serving in MIA were asked for opinions on the project's goals of (i) ensuring safe operations and (ii) efficient airport operations through a questionnaire, to which three airlines responded. The evaluation of operations and services of the airlines following the provision of equipment by the project is positive, with the ground equipment improving, staff being satisfied with the service they receive, no accidents or risk hazards, and no particular complaints from pilots or ground staff about the MIA. It is assumed that the airlines understand that ground handling has become more efficient with updated ground support equipment. It was also reported that the number of scheduled flights has consequently increased since the curbing of COVID-19 cases.

The annual number of passengers and aircraft take-offs and landings in MIA are shown in Figure 2. The annual number of passengers increased in 2019 after starting the operations of the equipment under the project, while the number of aircraft departures and arrivals decreased. Air Kyrgyzstan, an airline of the Kyrgyz Republic, gradually reduced its international flights in 2015 due to aircraft shortages, withdrew its license renewal in 2017, and ceased operations in 2018, together with domestic flights; while Air Bishkek, also from the Kyrgyz Republic, ceased operations in 2017. Similarly, Air Manas from the Kyrgyz Republic cancelled flights to Istanbul, Urumqi, Delhi, Moscow, and Tashkent and almost ceased operations in 2019. Thus, the decline in the number of aircraft arrivals and departures could be attributed to the fact that the domestic airlines of the Kyrgyz Republic suffered from financial difficulties at the time. On the other hand, as shown in Table 3, some foreign airlines increased the number of flights in 2019, and the passenger numbers did not decrease (as shown in Figure 2). Changes in flight destinations that may contribute to enhanced regional connectivity were observed in the increased number of flights to and from Russia, Kazakhstan, Turkey, the Middle East, and China (Table 3).

The number of movements are considerably decreased due to Covid-19 pandemic but it is on the way to recovery. In addition, it is considered to have become possible to respond to the increase of the number of services.

<Other positive and negative impacts>

At the time of planning, the project was deemed to have minimal undesirable effects on the environment and was classified as Category C under the JICA Guidelines for Environmental and Social Considerations (2010). Resettlement or land acquisition were not necessary as the site for



Source: JICA Evaluation Team based on the provided data by the MIA

Figure 2 MIA's flight movements and passengers

Table 3 Number of take-offs from MIA to main destinations per year

Destinations	2014	2015	2016	2017	2018	2019	2020	2021
Moscow (Russia)	1,331	1,602	1,626	1,844	1,626	1,588	375	461
Novosibirsk (Russia)	366	455	453	462	476	441	92	35
Istanbul (Turkey)	1,166	1,618	1,753	1,716	1,867	1,588	670	1284
Almaty (Kazakhstan)	286	364	403	451	472	542	133	315
Tashkent (Uzbekistan)	153	169	135	107	218	182	69	162
Ulaanbaatar (Mongolia)	130	155	157	155	155	157	0	0
Dubai (United Arab Emirates)	173	216	206	263	388	397	125	384
Sharjah (United Arab Emirates)	0	124	150	200	0	85	31	75
Shanghai (China)	77	203	140	112	203	140	112	99

Source: : JICA Evaluation Team based on the provided data by the MIA

the equipment installation is within the airport compound.

<Evaluation Result>

Considering the evaluation above, the project has generally achieved the planned effects. The provided equipment is being used as planned, and the expected effects, such as contributing to safe operations and efficient airport management, are realized. Delays in aircraft take-off during the winter season, which was a concern, have improved. Regarding the impact of improving the safety and reliability of the airport and aircraft operations, in a questionnaire survey, airlines that regularly operate MIA also gave favorable evaluations regarding the operation of the airport. It was confirmed that the number of flights in service has increased. Furthermore, no undesirable social (including human rights and gender equality) or environmental impacts have been observed. Therefore, the effectiveness and impacts of the project are high.

3 Efficiency

<Output>

The outputs shown in Figure 1 materialized as planned. The Ministry of Transport and Communications (MOTC) was the implementing agency during the project, which carried out various supervision tasks since the opening of MIA, while the Department of Aviation was in charge of the overall project. Once the existing equipment was relocated to the spare runway, the airport safety equipment, VOR/DME was installed in phases around the runway. This process was devised by MIA under the direction of the Department of Aviation to minimize impacts of the runway closure on airport operations.

<Project cost>

The total project cost of this project was 1,540 million yen against the planned amount of 1,630 million yen, which was within the plan (95.4 % of the plan). The side of the Kyrgyz Republic assumed the cost of removing the existing equipment, which amounted to less than 1% of the total project cost. The share of the project cost by the Kyrgyz Republic increased significantly due to the phased installation of the equipment described above, but this is considered to be necessary.

<Project period>

The actual duration of the project was 28 months (December 2015–September 2016), while the planned duration was 26 months (August 2014–March 2018). The project period was 108% of the planned project period due to the delays in the tendering process and unforeseen delays in maritime transport from the Kyrgyz Republic side.

<Evaluation Result>

As described above, although the project cost was within the plan, the project period slightly exceeded. However, since the project was generally efficient with respect to outputs, the efficiency of the project is high.

4 Sustainability

< Policy and System>

The Aviation Development Strategy 2016–2020, promulgated in 2016, clearly states that the project includes the modernization of airport equipment, ground equipment, and firefighting vehicles. *The National Development Strategy (2019–2040)* also indicates the importance of modernizing the airport infrastructure of MIA to be one of the hub airports in Central Asia, which supports the project from a policy and institutional perspective.

< Institutional/Organizational Aspect>

Air traffic control and safety management equipment and air navigation equipment, VOR/DME, are owned, operated, and maintained by Kyrgyzstan Aeronavigation (KAN). The air navigation equipment, ILS, and other ground support equipment are owned, operated, and maintained by Manas International Airport Company. As shown in Table 4, the number of MIA staff has been increased and

Table 4 Staff of the Operation and Maintenance in MIA

	2014	2022
Airport Terminal Maintenance Service Department	22	40
Ground Handling	80	109
Transport / Special Equipment	187	177
Emergency and Rescue, Fire-fighting Department	68	68
Operation and maintenance of ILS	-	15

Source: JICA Evaluation Team based on the provided data by MIA

streamlined in line with the aviation demand and the need to introduce new aircraft, and KAN, which manages the VOR/DME, assigned 9 out of 48 full-time personnel with over 10 years of experience. MIA considers this structure to be sufficient for maintenance and management. The organizational structure of the implementing agency was well-established at the time of the ex-post evaluation and considered appropriate.

<Technical Aspect>

Seven participants from the MOTC and MIA participated in the Training on Airport Construction, Operation and Maintenance Planning (Yen loan account training) in 2013, before the project was launched, and visited Fukuoka and Narita airports. The implementing agencies recognized that the site visits contributed significantly to raising safety awareness. MIA provides professional and advanced training for employees engaged in airport operation according to training programmes approved by the Civil Aviation Authority of the Kyrgyz Republic and in accordance with the requirements of national legislation and safety standards required for international airports, as well as the practices recommended by ICAO.¹³ In addition, according to reports and other information from MIA and ICAO, training sessions conducted intermittently by ICAO from 2017 to 2019, following the previously mentioned accident, are considered to have resulted in enhancing the awareness and competence of employees. MIA strengthened its efforts to improve technical capacity by establishing a new training department in April 2022. Based on the above, it is concluded that there are no particular problems with the technical aspects of the operation and maintenance of the project.

<Financial Aspect>

The financial situation at MIA from 2014 to 2020 is shown in Table 5. In 2020, the number of flights fell sharply due to COVID-19, resulting in extremely low profits because of the reduced revenues. However, the situation is recovering with the increasing number of flights according to the flight data in 2021, and the financial situation is deemed acceptable.

Table 5 Cashflow of the MIA

Unit: Million Kyrgyz Som

Fiscal Year	2014	2015	2016	2017	2018	2019	2020	2021
Total Revenue	2,589.5	3,372.6	4,162.3	4,202.7	4,331.8	4,739.9	2,479.1	6,826.7
Total Expenditure	2,028.8	2,092.6	2,352.3	2,607.1	2,791.2	2,845.8	2,419.6	3,070.3
- Human Resources	837.3	1,002.0	1,151.0	1,271.7	1,331.7	1,378.8	1,093.1	1,593.7
-Operation Cost (Fuel, etc.)	252.1	263.7	269.9	267.7	296.4	274.5	199.9	254.3
- Others	887.1	629.7	912.7	1002.7	1122.5	1120.9	1091.9	1,132.8
Profit	560.7	1,280.0	1,810.0	1,595.5	1,540.6	1,894.1	59.5	3,756.4
Non-operating financial income and expenditure	364.9	239.8	-58.3	377.5	354.7	165.8	666.8	207.2

Note: Fiscal Year is from April 1 to March 31.

Source: MIA

MIA considers modernizing the airport by adopting a public-private partnership (PPP) approach in the future. An agreement between the Ministry of Economy and Commerce and the International Finance Corporation (IFC) in October 2021 considers specific support details and a project pre-feasibility. A study has been accomplished, and the selection of an operating company is under consideration. The ownership and management structure of the maintenance equipment under the PPP scheme will be discussed upon finalizing the operating structure.

Given this information, it can be concluded that the financial situation is generally good, despite the significant effects of the COVID-19 pandemic, and the budget requirement for maintenance and management has been secured. No major problem will be expected.

<Current Status of Operation and Maintenance>

¹³ Менеджмент ОАО "МAM" прошёл обучение по курсу "Система управления безопасностью полетов поставщиков обслуживания" - Международный аэропорт "Манас." (2022). Retrieved May 2022, from www.airport.kg website: <http://www.airport.kg/press-center/news/986>

The operational status of the equipment maintained under the project is good. The equipment is without any problems, and the necessary budget for maintenance has been secured. At the time of the equipment arrival, the supplier explained thoroughly the operation method and manuals on each equipment. The level of technology is appropriate and without particular issues. Four years have passed since the initial use of the equipment in 2018, but appropriate preventive maintenance has been completed in accordance with the manuals. To date, no spare parts have been needed other than those originally serviced. Regarding the air safety equipment (ILS and VOR/DME), alarm problems caused by insects occurred when the equipment was initially installed but was resolved after inspection by the Japanese supplier. This was done within the equipment warranty period, but the aftercare service was carried out without delay, which is commendable.

<Evaluation Result>

As described above, there are no problems in the policy systems, institutional/organizational aspects, technology, finance, and operation and maintenance status. Therefore, the sustainability of the project effects is high.

III. Recommendations & Lessons Learned

- Recommendations to Executing Agency ; None
- Recommendations to JICA

The importance of aviation safety was learned in detail through the training sessions in Japan, which was highly appreciated. Moreover, the effectiveness would be further enhanced if a more strategic collaboration was designed during the Ex-Ante Assessment.

- Lessons Learned

MIA officials have participated in the Airport Construction, Operation and Maintenance Planning Training in 2012, the Aviation Safety training (country focus training) in 2014, and the Aviation Safety Seminar (group training) in 2017 and 2019 after the procurement of the project. The content of these training courses, which included site visits to Japanese airports, was highly valued for being practical and enabling participants to learn the actual operational conditions of aircraft. The group training sessions also received high marks for the opportunity to interact with experts from other countries. As technology related to airport equipment and safety progresses quickly, a high level of interest was expressed regarding regular technical exchanges with the Japanese side. Therefore, it is considered important to invite relevant personnel to the group training in the aviation sector.

IV. Non-Score Criteria

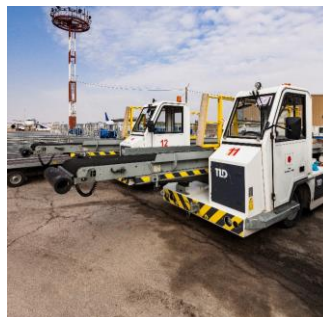
- Adaptation/contribution Evaluation from an objective perspective

Agreements on technical assistance for airport safety were signed between ICAO and the Kyrgyz Government before the project and after 2018 when the project upgraded the equipment. Europe, the USA, Turkey, and other countries provide technical assistance on airport personnel safety on an ongoing basis. These contribute to the safety of MIA and are therefore considered to be an indirect contribution to the project objectives.

- Additionality N/A



Fire fighting Vehicle(source: JICA)



Belt Loader Vehicle(source: JICA)



Snow blowers for runways(source: JICA)