5. Soft Component Plan

DEPARTMENT OF CIVIL AVIATION MINISTRY OF TRANSPORT AND COMMUNICATIONS THE REPUBLIC OF THE UNION OF MYANMAR JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

# THE PREPARATORY SURVEY FOR THE PROJECT FOR THE IMPROVEMENT OF AIRCRAFT SURVEILLANCE SYSTEM IN THE REPUBLIC OF THE UNION OF MYANMAR

# SOFT COMPONENT (TECHNICAL ASSISTANCE) PLAN

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### **1 BACKGROUND OF SOFT COMPONENT PLAN**

Based on the "Master Plan of National Transportation", which is developed with support from the Japan International Cooperation Agency (JICA) and approved by the cabinet in December 2015, the Government of Myanmar has proceeded to develop the airport facilities in order to meet International Civil Aviation Organization (ICAO) standards and requirements. However, the current aerodrome and en-route surveillance systems are not sufficient, which makes it difficult to accommodate future high traffic demand efficiently. There is no Primary Surveillance Radar (PSR) in the Yangon International Airport, which is the center of air traffic transportation in Myanmar. In addition, PSR is out of service in the Mandalay International Airport. Therefore, non-radar approach control service is provided in both airports. It leads to low airport capacity and causes the occurrence of over work load time in the airports. Due to the current situation, there is a concern about maintaining aviation operational safety and efficiency. Furthermore, the airspace around the Nay Pyi Taw International Airport is the largest in Myanmar since approximately 80% of domestic flights (6,000 flights/year) fly through this air route. Nevertheless, the airspace below 15,000 feet is out of coverage to two en-route radars, which are installed in the Yangon and the Mandalay international airports. Under this condition, separation cannot be shortened, and the increase in traffic demand cannot be managed.

The objectives of this project are to install airport surveillance radar, including primary surveillance radar, for realizing terminal radar approach control in Yangon and Mandalay international airport and deploy en-route surveillance radar in Nay Pyi Taw international airport, which is connected to radar data processing system in Yangon Air Traffic Control Center (ACC), for enforcement of surveillance ability in airspace around Nay Pyi Taw international airport.

At present, radar approach control service is provided in Mandalay international airport. The target position is monitored by en-route surveillance radar, which send target data to Yangon ACC, due to out of service of PSR in Mandalay international airport.

Radar approach control service is provided in Mandalay international airport in Myanmar. However, en-route surveillance radar, which monitor aircraft for air traffic control service for en-route flight in Yangon ACC, is used for the radar approach control due to outage of existing airport surveillance radar. Under this circumstance, installation aircraft surveillance system by Japanese Grant Aid is necessary to realize radar terminal approach control in Yangon and Mandalay international airport, which are predicted significant increase air transportation demand.

Meanwhile, failure of surveillance radar and radar processing systems, which are provided by this Project, have big impact to aircraft operation, therefore, improvement of systems and equipment maintenance method is important factor. In addition, for keeping smooth and stable operation of all equipment in this Project, proceeding following two training and educational programs are necessary;

1: Improvement of equipment operation and maintenance and inspection ability for equipment on

Air Traffic Safety Electronics Personnel (ATSEP)

2: For recovering failure systems immediately, management ability of supply parts

Furthermore, it is necessary to change over new systems from existing systems, which are operating continuously. It is very important to develop transition plan which is arranged by relative authorities in detail, proceed transition test for giving no impact current operation and prepare rule and procedure of transition and failback in emergency case. Therefore, training of learn about procedure from plan phase to transition phase is meaningful.

This project follows roadmap of Myanmar which includes plan to centralize approach control to ATMC. It is expected that there is possibility to affect the safety of aircraft operation by any kind of changes, which are change of organization, hardware and software in air traffic management systems and operational procedures. Therefore, it is necessary to consider solutions for risk mitigation and pick up predictable risks to avoid suffering operational safety by any type of changes which are taken by this Project.

## **2 OBJECTIVE OF SOFT COMPONENT**

The goals of the soft component are to realize such DCA conditions on radar operation and maintenance to make sure that the operation of the new radar system installed through this project is smoothly transferred from the existing radar system and that the ability for sustainable operation and maintenance is developed. The specific goals are as follows:

1) Goal 1: Upgrading ability of operation and maintenance for the radar.

To improve operation and maintenance ability of ATSEPs on each work place through lecture and training of proper method as per operation and maintenance of equipment which is deployed in this Project.

2) Goal 2: Upgrading ability of spare parts management for the radar.

To improve supply management ability of ATSEPs through lecture and training of proper supply management method for equipment which is deployed in this Project.

3) Goal 3: Upgrading ability of planning of operation transition.

To instruct air traffic control operation transition plan preparation to Air traffic controllers (ATCO).

4) Goal 4: Upgrading ability of planning of system transition and troubleshooting.

To support realizing necessary work items for transition from current radar systems to new radar systems, which is deployed in this Project, to ATSEPs through introduction of Japanese example of system transition works. In addition, the Consultant discuss transition work process and necessary documents with person in charge. Via above mentioned tasks, the Consultant support to build ability of proceeding system transition smoothly and adopting trouble by themselves.

5) Goal 5: Upgrading safety management ability of operation transition to the terminal radar control.

To instruct risk analysis method and necessity of risk analysis in integrated terminal radar approach control in ATMC and operational transition to terminal radar approach control to ATCOs.

6) Goal 6: Upgrading safety management ability of operation and maintenance work for the radar. To instruct necessity of risk analysis and operation and maintenance of surveillance radar to ATSEPs. In addition, to instruct risk analysis method on actual job to ATSEPs. Those instruction will realize to take risk mitigation in starting new system operation and are useful for sustainable operation after new systems installation.

### (2) Instructors and Trainees

Air traffic controllers and air traffic control engineers with experience at JCAB will conduct lectures and exercises to controllers in-charge of terminal radar control in the Yangon and the Mandalay International Airports and to CNS personnel in-charge of maintenance and management of equipment.

(3) Activities

- 1) For Goal 1: to lecture on the operation and maintenance system and the practical job of JCAB, and to instruct about the operation manual and maintenance inspection manual preparation.
- 2) For Goal 2: to lecture on how to implement spare parts management by JCAB, and to instruct about articles management manual and spare parts supply management manual preparation.
- 3) For Goal 3: to lecture on the concept of the Japanese operation transition plan, and to instruct about the transition plan table (draft) preparation.
- 4) For Goal 4: to lecture on the concept of the Japanese radar system transition plan, and to instruct about the transition plan table (draft) preparation.
- 5) For Goal 5: to lecture on safety management related to the maintenance of JCAB, and to instruct risk assessment of risk identification and its mitigation measures preparation.
- 6) For Goal 6: to lecture on safety management related to the operation of JCAB, and to instruct risk assessment of risk identification and its mitigation measures preparation.

# **3** EFFECTS OF SOFT COMPONENT

As the result of soft component, following conditions must be achieved:

- 1) For Goal 1: To improve operational and maintenance ability and learn necessary skill of operation and maintenance for surveillance radar and communication equipment.
- 2) For Goal 2: To improve supply management ability by realizing practical job of supply management for surveillance radar and communication equipment.
- 3) For Goal 3: To proceed organized transition of new terminal radar approach control operation by understanding operational transition concept for starting integrated terminal radar approach control in ATMC.
- 4) For Goal 4: To proceed organized transition for new radar systems' operation by understanding the concept of operational transition procedure of radar system for starting operation in ATMC.
- 5) For Goal 5: To improve safety management ability by realizing necessary knowledge of proceeding risk identification, evaluation and establishment of risk mitigation in operational transition to terminal radar approach control.
- 6) For Goal 6: To improve safety management ability by realizing necessary knowledge of proceeding risk identification, evaluation and establishment of risk mitigation in operation and maintenance of surveillance radar.

## 4 COMFIRMATION OF EFFECTS OF SOFT COMPONENT

- For Goal 1: To instruct about operation manual and maintenance inspection manual preparation, which is for a part of equipment in this Project, and identify level of completion for outputs regarding operation and maintenance ability of surveillance radar and communication equipment.
- 2) For Goal 2: To instruct about part of item management manual and supply management manual preparation and identify level of completion for outputs regarding supply management ability of surveillance radar and communication equipment.
- 3) For Goal 3: To instruct about preparation of operational transition plan for Mandalay International airport and identify level of completion for outputs regarding air traffic operational transition.
- For Goal 4: To instruct about preparation of system transition plan for one of equipment in this
   Project and identify level of completion for outputs regarding system transition.
- 5) For Goal 5: To instruct about preparation of risk management sheet for safety assessment in terms of integrated terminal radar approach control in ATMC and identify level of completion for outputs regarding safety management in air traffic control operation.
- 6) For Goal 6: To instruct about preparation of risk management sheet for safety assessment in one of equipment in this Project and identify level of completion for outputs regarding safety management in air traffic control systems.

# 5 ACTIVITIES (INPUT) OF SOFT COMPONENT

The contents and the scale of activities by Japanese and Myanmar side are planned as shown below:

	4 C T	CO (* 1 IM * 4	
Table 5-1 Goal 1: In	put for Improvement (	i Operational and Maint	enance Addity for Radar

Items	Japanese Side	Myanmar Side
[Achievement]		
To improve the ability of ope	ration and maintenance by learning the nec	essary skill of maintenance for radar and
communication systems.		
1. Activities		
	Activity 1. To lecture on the operation and maintenance system and the practical job of JCAB Activity 2.	ATSEPs who are in charge of maintenance of ATC automation systems:
Necessary technical skill and category	To instruct about the operation manual preparation Activity 3. To instruct maintenance inspection manual preparation	Communication: 2 persons Surveillance: 2 persons ATC automation systems: 2 persons
Current level of technical skill and required level	_	Current: Work ability of each person is different due to proceed system operation and maintenance works based on manuals by system vendors. Some systems are not operated appropriately, because those are operated by failback system due to system failure. Plan: Appropriate maintenance method could be established through preparing operation manual and maintenance inspection manual and developing common operational procedures.
Target Group	_	ATSEPs who are in charge of maintenance of equipment for communication, surveillance and ATC automation systems.
2. Methodology		
Resources	Japanese consultants who are experienced in ATSEP of JCAB (Field assignment 1.0M/M each, Total 2.0M/M)	To provide training facility
Output	Training texts etc.	Operation manual and maintenance inspection manual
3. Contents		

Items	Japanese Side	Myanmar Side
	The Consultant will lecture maintenance	
	system of air navigation facilities, including	
	radar, in Japan and efficient and suitable	
	maintenance method via classroom lecture.	
	In addition, the Consultant will instruct	
	terminal operational procedures of radar	
	approach control center, which provide	
Summary	remote radar approach control service, in	—
	Japan.	
	Regarding preparing operational manual and	
	maintenance inspection manual, the	
	Consultant provide practical training, which	
	includes to refer system manual, operate	
	actual systems and utilize photos of	
	maintenance inspection works.	
	· Classroom lecture of maintenance system	
	in Japan	
	Classroom lecture of operation of terminal	
Contonto	radar approach control center in Japan	
Contents	· Classroom lecture of maintenance	—
	inspection and recovery	
	To prepare operational manual	
	• To prepare maintenance inspection manual	

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Items	Japanese Side	Myanmar Side
[Achievement]		
To improve supply manageme	nt ability by realizing practical job of suppl	ly management for surveillance radar and
communication equipment.		
1. Activities		
Necessary technical skill and category	Activity 1. To lecture on supply management method in JCAB Activity 2. To instruct about the supply management manual preparation for this Project's equipment Activity 3. To instruct supply management manual preparation for this Project's equipment	ATSEPs who are in charge of maintenance of ATC automation systems; Communication: 2 persons Surveillance: 2 persons ATC automation systems: 2 persons
Current level of technical skill and required level	_	Current: ILS in Mandalay International Airport is operated by stand-by system. One factor of this condition is that supply management does not proceed appropriately. Plan: Supply management structure, which have appropriate management ability for supply items, could be established through instructing items and supply management method.
Target Group	_	ATSEPs who are in charge of maintenance of equipment for communication, surveillance and ATC automation systems.
2. Methodology		
Resources	Japanese consultants who are experienced in ATSEP of JCAB (Field assignment 1.0M/M each, Total 2.0M/M)	To provide training facility
Output	Training texts etc.	Goods management manual and supply management manual
3. Contents		· ~
Summary	The Consultant will lecture basic supply management method via classroom lecture. In addition, the Consultant will instruct to prepare goods management manual by practical training. It will be basic material for establishing the procedure of procurement, parts replacement and waste disposal. Furthermore, the Consultant will instruct to prepare supply management manual. It will be basic material for establishing supply management organization, which can promptly cope with storages for same standard spares and transport method of spares.	

### Table 5-2 Goal 2: Input for Improvement of Supply Management Ability for Radar

Items	Japanese Side	Myanmar Side
	Classroom lecture of supply management	
	in Japan	
• Classroom lecture of outline of	• Classroom lecture of outline of supply	_
	management system (APPS) in Japan	
	<ul> <li>To prepare goods management manual</li> </ul>	
	• To prepare supply management manual	

# Table 5-3 Goal 3: Input for Improvement of Preparation Ability for Air Traffic Control OperationalTransition Plan (For ATCO)

Items	Japanese Side	Myanmar Side	
[Achievement]			
To proceed organized transition	of new terminal radar approach control operation	tion by understanding operational transition	
concept for starting integrated t	erminal radar approach control in ATMC.		
1. Activities			
Necessary technical skill and category	Activity 1. To lecture on methodology of preparing air traffic control operation transition plan in JCAB Activity 2. To instruct about the air traffic control operation transition plan preparation	ATCOs who are in charge of terminal radar approach control; Yangon International Airport: 2 persons Mandalay International Airport: 2 persons	
		Current: It is necessary for preparing detail air traffic operation plan for integrated terminal radar approach control in Yangon ATMC. However, DCA is lack of experience of similar operational transition.	
Current level of technical skill and required level		Plan: To lecture on methodology of operational transition with air traffic control systems, which includes failback in emergency case and instruct to prepare air traffic control operation transition plan can realize to give no impact on operation in Yangon and Mandalay International Airport and start integrated terminal radar approach control in Yangon ATMC.	
Target Group	_	ATCOs who are in charge of approach control.	
2. Methodology			
Resources	Japanese consultant who are experienced in ATCO of JCAB (Field assignment 0.5M/M, 1 person)	To provide training facility	
Output	Training texts etc.	Air traffic control operation transition plan	
3. Contents			
Summary	The Consultant will lecture on methodology of preparing air traffic control operation transition plan by using practical example of air traffic control system transition in JCAB via classroom lecture. In addition, for smooth and concrete operational transition, the Consultant will instruct to prepare air traffic control operation transition plan by practical training	_	
Contents	<ul> <li>Classroom lecture of outline of air traffic control operation transition due to system transition</li> <li>Practical training of draft plan of air traffic control operation transition</li> </ul>	_	

### Table 5-4 Goal 4: Input for Improvement of Preparation Ability for System Transition Plan and Troubleshooting Ability (For ATSEP)

Items	Japanese Side	Myanmar Side
[Achievement]		
To proceed organized transition	for new radar systems' operation by understa	anding the concept of operational transition
procedure of radar system for s	tarting operation in ATMC.	
1. Activities		
Necessary technical skill and category	Activity 1. To lecture on concept of system transition plan and implementation method in JCAB Activity 2. To instruct about system transition plan preparation	ATSEPs who are in charge of maintenance of ATC automation systems; Communication: 2 persons Surveillance: 2 persons ATC automation systems: 2 persons
Current level of technical skill and		Current: In operational transition, it is necessary that existing equipment in Yangon and Mandalay International airport must be maintained continuously and new radar systems need to be monitored working properly. In case of failure in new radar systems, surveillance systems should switch to existing systems, if necessary. For executing such contingency plan in emergency case, detail operational procedures for system operational works must be developed. DCA is lack of experience of such operational transition.
required level		Plan: Requirements of smooth and safe system transition are to develop transition plan, which includes to identify defect part in case of system failure and switch to standby and existing system from the view point of maintenance. It is realized starting terminal radar approach control operation in Yangon ATMC, no impact of usual operation in Yangon and Mandalay International Airport and maintaining normal status of existing systems through instructing the methodology of system transition in JCAB and system transition plan preparation as per necessary system operation and maintenance works.
Target Group	_	AI SEPs who are in charge of maintenance of equipment for communication, surveillance and ATC automation systems.
Resources	Japanese consultants who are experienced in ATSEP of JCAB (Field assignment 0.3M/M each, Total 0.6M/M, 2 persons)	To provide training facility
Output	Training texts, Outline plan (including planned output, contents of activity, objectives etc.), List of subjects and improvement points	Draft transition plan (System operation work ver.)
3. Contents		

Items	Japanese Side	Myanmar Side
Summary	The Consultant will lecture basic supply management method via classroom lecture. In addition, the Consultant will instruct to prepare goods management manual by practical training. It will be basic material for establishing the procedure of procurement, parts replacement and waste disposal. Furthermore, the Consultant will instruct to prepare supply management manual. It will be basic material for establishing supply management organization, which can promptly cope with storages for same standard spares and transport method of spares.	_
Contents	<ul> <li>Lecture of system transition plan in Japan</li> <li>To organize necessary tasks as per transition of surveillance systems</li> <li>To prepare draft transition plan</li> </ul>	_

# Table 5-5 Goal 5: Input for Improvement of Safety Management Ability for Terminal Radar Approach Control (For ATCO)

Items	Japanese Side	Myanmar Side
[Achievement]	·^	
To improve safety management	ability by realizing necessary knowledge of pr	oceeding risk identification, evaluation and
establishment of risk mitigation	n in operational transition to terminal radar app	proach control.
1. Activities		
	Activity 1. To lecture on basic contents in	
	safety management	
	Activity 2.	
	To lecture on safety management for air	ATCOs who are in charge of terminal radar
Necessary technical skill and	traffic control operation in JCAB	approach control;
category	Activity 3.	Yangon International Airport: 2 persons
	To instruct risk assessment preparation for	Mandalay International Airport: 2 persons
	risk identification and mitigation in air traffic	
	control operation transition on system	
	transition	
		Current:
		It is necessary for executing terminal radar
		approach control of Yangon and Mandalay
		International Airport in Yangon ATMC by
		using this Project's equipment to identify
		risk and establish mitigation method as per
		DCA has regulation of active management
Current level of technical skill and	_	bewayer DCA door not have system of
required level		safety management and risk analysis in
required level		practical job
		practical job.
		Plan <sup>.</sup>
		Terminal radar approach control safely and
		certainly in Yangon ATMC realize through
		instruction and lecture methodology of
		safety management and risk assessment in
		JCAB.
Target Group	_	ATCOs who are in charge of approach
		control.
2. Methodology		
	Japanese consultant who are experienced in	
Resources	ATCO of JCAB (Field assignment 0.5M/M,	To provide training facility
	l person)	D'1 // 11 / A' / Off / 1
Output	Training texts etc.	Risk management table (Air traffic control
3 Contonts		operation ver.)
5. Contents	The Consultant will lecture bazard risk and	
	mitigation method and instruct to prepare risk	
	management table (air traffic control	
	operation ver) by instruction of necessity and	
	outline of safety management and risk	
Summary	analysis on air traffic control operation as	-
	well as executing risk assessment for	
	operational transition from the view point of	
	air traffic control operation.	
	-	

Items	Japanese Side	Myanmar Side
Contents	<ul> <li>Classroom lecture of safety management</li> <li>Classroom lecture of safety assessment</li> <li>To prepare risk management table</li> </ul>	_

Table 5-6 Goal 6: Input for Improvement of Safety Management Ability for Operation and
Maintenance of Radar (For ATSEP)

Items	Japanese Side	Myanmar Side					
[Achievement]							
To improve safety management	ability by realizing necessary knowledge of pr	oceeding risk identification, evaluation and					
establishment of risk mitigation	in operation and maintenance of surveillance	radar.					
1. Activities							
	Activity 1. To lecture on basic contents of safety management						
Naccessary technical skill and	Activity 2. To lecture on safety management in JCAB as	ATSEPs who are in charge of maintenance of ATC automation systems;					
category	per maintenance of equipment in this Project	Communication: 2 persons					
	To instruct preparation of risk assessment for	ATC automation systems: 2 persons					
	mitigation and identification risks in this						
	Project's equipment						
	J	Current:					
		It is necessary to maintain surveillance					
		systems, including radar, for realizing					
		radar approach control operation safely					
		and certainly in Yangon and Mandalay					
		International Airport by using this					
		Project's equipment in Yangon ATMC.					
		Therefore, it should execute to identify					
		risks, which intervene safe and certain					
		operation, and establish mitigation. DCA					
Current level of technical skill and	_	has regulation of safety management.					
required level		however, safety management and risk					
		analysis do not execute in practical job.					
		5 1 5					
		Plan:					
		It is able to minimize the impact on aircraft					
		operation by terminal radar approach					
		control in Yangon ATMC through					
		instruction of safety management and risk					
		assessment method on air traffic system					
		operation and maintenance in JCAB.					
		ATSEPs who are in charge of maintenance					
Target Group	_	of equipment for communication,					
		surveillance and ATC automation systems.					
2. Methodology							
	Japanese consultants who are experienced in						
Resources	ATSEP of JCAB (Field assignment 0.3M/M	To provide training facility					
	each, Total 0.6M/M, 2 persons)						
	Training texts for equipment safety						
Output	management and risk assessment etc.	Risk management table (equipment ver.)					
3. Contents	~						
	The Consultant will lecture procedure and						
	practical job of safety management in JCAB						
	and necessity of safety management and risk						
	analysis.						
Summary	In addition, the Consultant will lecture hazard	_					
	risk and mitigation and instruct to prepare						
	risk management table (equipment ver.)						
	thorough proceeding risk assessment to this						
	Project's equipment.						

Items	Japanese Side	Myanmar Side
Contents	<ul> <li>Classroom lecture of safety management for equipment</li> <li>Classroom lecture of safety assessment for equipment</li> <li>To prepare risk management table for equipment</li> </ul>	_

# 6 PROCUREMENT OF RESOURCES FOR IMPLEMENTATION OF SOFT COMPONENT

It is taken as a plan to dispatch instructors from Japan who is conducting the lecture of equipment inspection maintenance, supply management, system transition and safety assessment. Therefore, the soft component is planned to implement by a contracted consultant direct support type.

For above mentioned lecture, instructors should have necessary knowledge and expertise for lecture. Therefore, it is desirable that instructors are experienced in ATCO and ATSEP in JCAB. It is planned to dispatch those well experienced Japanese experts as instructors.

Equipment in this Project consist of various type of systems, which are surveillance radar, automation system, console, communication systems etc. Those are maintained different experts who are divided by radar and surveillance data processing systems and communication systems. Therefore, it is necessary to provide two different type of lecture by two instructors who are in charge of radar and automation systems and communication systems. It follows job descriptions of ATSEPs in DCA who have each expertise in communication, navigation and surveillance.

# 7 IMPLEMENTAION SCHEDULE

Implementation schedule of soft component included in the Project is shown in the table below.

The lecture of Goal 1 and 2 is for ATSEPs. On the other hand, the lecture of Goal 3 and 6 is for ATCOs and ATSEPs. However, the contents of lecture are different for each expert. Therefore, the lecture is provided to each group of ATCO and ATSEP. The detail contents of each group are described in following section.

	Mon	th	1	2	3	4	5	6	7
Year	r/Month		Sep. 2020	Oct. 2020	Nov. 2020	Dec. 2020	Jan. 2021	Feb. 2021	Mar. 2021
Grant Aid Procurement			Se	tup/Installatior					
		Aid			In	itial Operation	/Guidance		
		I					Acceptance Ir	l hspection/Han	dover
	Goal 1	CNS Personnel							
	Goal 2	CNS Personnel							88 
tivities	Goal 3	Air Traffic Controller							
Act	Goal 4	CNS Personnel							***
	Goal 5	Air Traffic Controller							3
	Goal 6	CNS Personnel							

 Table 7-1 Soft Component Implementation Schedule

### 7.1 Training Contents for Air Traffic Controller (ATCO)

Target group of this training is four (4) ATCOs, who are in charge of approach control in Yangon and Mandalay International airport, and two (2) persons from each airport attend to the training. Instructor is one specialist of air traffic control operation.

The training will start from the end of February 2021 (initial operation and guidance by manufacture will be done approximately 50%). Because training participants will understand operational risk very well under operating new equipment. The training schedule and dispatch plan of instructor are shown as follows:

### Table 7-2 Training Schedule and Dispatch Plan (For ATCO) (M/M)

Item		Janua	nry 2021	Number of Instructor	M/M
1	Goal 5: Safety Management			1	0.50
4 Goal 3: Operational Transition				1	0.50
				Total MM	1.0

### Table 7-3 Training Schedule (For ATCO)

Day	First Month
1	Moving Day (Japan to Yangon)
2	Visit DCA & Meeting, Check training facilities
3	Lecture of Safety Management (ICAO Concept and Regulations)
4	Case Study of Safety Management in JCAB
5	Methodology of Risk Management
6	Lecture of Internal Safety Audit
7	Reporting the Results of Training
8	Preparation of Lecture
9	Example of Risk Management/ Practical Training of Risk Analysis
10	Evaluation of Risk Analysis
11	Extracting Hazard on System and Operational Transition
12	Risk Management of Specific Hazard
13	Risk Management of Specific Hazard
14	Reporting the Results of Training
15	Preparation of Lecture
16	Classroom Lecture for Operational Transition Plan
17	Preparation of Operational Transition Plan Table
18	Preparation of Operational Transition Plan Table
19	Preparation of Operational Transition Plan Table
20	Preparation of Operational Transition Plan Table
21	Reporting the Results of Training
22	Preparation of Lecture
23	Evaluation of Operational Transition Plan Table
24	Evaluation of Operational Transition Plan Table
25	Evaluation of Operational Transition Plan Table
26	Review of Operational Transition Plan Table
27	Evaluation of Output, Meeting with DCA
28	Reporting the Results of Training
29	Reporting the Results of Training, Moving Day (Yangon to Japan)
30	Arrival in Japan

### 7.2 Training Contents for Air Traffic Safety Electronics Personnel (ATSEP)

Target group of this training is six (6) ATSEPs, including each two (2) persons who are in charge of communication, surveillance and automation systems. Instructors is two specialists, who consist of one communication system specialist and one surveillance and automation systems specialist. Because equipment of this Projects includes various type of systems, including surveillance radar and automation systems, consoles for air traffic controller and communication control equipment. Therefore, it is necessary for some instructors who are specialist each different system.

Training schedule is total two months, which consist of two training courses for Goal 1 and Goal 2, 4 and 6. Duration of each training is one month. In addition, three (3) weeks intervals will be set among two training courses. This interval is necessary for following reasons;

- Trainees develop various reports and materials of maintenance inspection and operation manual for this Project.
- > To evaluate effectiveness of training and review the contents of lecture.
- > To consider difficulties of attending lecture for long period due to their own practical job.

At result of considering above mentioned factors, dividing a training plan into two courses is preferable for attendances. The training schedule and dispatch plan of instructor are shown in following tables.

In this training plan, the contents of preparation for each manual is as follows;

(1) Operation Manual

To lecture outline of operation manual, operation of deployed equipment and changing items in various parameters, and to instruct practical training of preparation for operation manual and hold presentation session for their outputs.

(2) Maintenance and Inspection Manual

To lecture outline of maintenance and inspection manual and major maintenance inspection items for installed equipment, and to instruct practical training of preparation for maintenance and inspection manual and hold presentation session for their outputs.

(3) Goods Management Manual

To lecture regulations as goods in Japan and procedures for procurement of spare parts, repair and waste disposal, and to instruct practical training of preparation for operation manual as equipment parts and hold presentation session for their outputs.

(4) Supply Management Manual

To lecture outline of Aeronautical radio facilities Parts and Provision System (APPS) in JCAB and supply management, including storage standards, storage methodology, shipment and acceptance, and to instruct practical training of preparation for supply management manual and hold presentation session for their outputs.

-						
	Item	Jan 2021	Feb	Mar	Instructor	M/M
1	Goal 1:					
	Operational				0	2.00
	Maintenance				2	2.00
	Inspection					
2	Goal 2:				0	0.00
	Supply Management				2	0.80
3	Goal 6:				0	0.00
	Safety Management				2	0.60
4	Goal 4:				0	0.00
	System Transition					0.60
					Total MM	4.00

 Table 7-4 Training Schedule and Dispatch Plan (For ATSEP) (M/M)
 (M/M)

### Table 7-5 Training Schedule (For ATCO)

Day	First Month	Day	Second Month
1	Moving Day (Japan to Yangon)	1	Moving Day (Japan to Yangon)
2	Visit DCA & Meeting, Check training facilities and deployed equipment	2	Outline of Supply Management
3	Classroom lecture of equipment maintenance management system	3	Outline of APPS
4	Classroom lecture of operation in terminal radar approach control unit	4	Preparation of Goods Management Manual
5	Classroom lecture of practical job for inspection, maintenance and recovery	5	Preparation of Goods Management Manual
6	Classroom lecture of practical job for inspection, maintenance and recovery	6	Preparation of Goods Management Manual
7	Reporting the Results of Training	7	Reporting the Results of Training
8	Preparation of Lecture	8	Preparation of Lecture
9	Preparation of Operation Manual	9	Preparation of Supply Management Manual
10	Preparation of Operation Manual	10	Preparation of Supply Management Manual
11	Preparation of Operation Manual	11	Preparation of Supply Management Manual
12	Preparation of Operation Manual	12	Preparation of Supply Management Manual and Evaluation Outputs
13	Evaluation Outputs of Operation Manual	13	Classroom Lecture of Safety Management
14	Reporting the Results of Training	14	Reporting the Results of Training
15	Preparation of Lecture	15	Preparation of Lecture
16	Preparation of Maintenance and Inspection Manual	16	Classroom Lecture of Safety Assessment
17	Preparation of Maintenance and Inspection Manual	17	Preparation of Risk Management Table for Equipment in This Project
18	Preparation of Maintenance and Inspection Manual	18	Preparation of Risk Management Table for Equipment in This Project
19	Preparation of Maintenance and Inspection Manual	19	Evaluation Outputs of Risk Management Table
20	Preparation of Maintenance and Inspection Manual	20	Classroom Lecture of Transition Plan
21	Reporting the Results of Training	21	Reporting the Results of Training
22	Preparation of Lecture	22	Preparation of Lecture
23	Preparation of Maintenance and Inspection	23	Classroom Lecture of Transition Plan

	Manual					
9.4	Preparation of Maintenance and Inspection	94	Preparation of Transition Plan for			
24	Manual	24	Equipment in This Project			
95	Preparation of Maintenance and Inspection	95	Preparation of Transition Plan for			
20	Manual	20	Equipment in This Project			
96	Preparation of Maintenance and Inspection	96	Preparation of Transition Plan for			
26	Manual	26	Equipment in This Project			
97	Evaluation Outputs of Maintenance and	97	Evaluation Outputs of Transition Plan,			
21	Inspection Manual, Meeting with DCA	21	Meeting with DCA			
28	Reporting the Results of Training	28	Reporting the Results of Training			
20	Reporting the Results of Training, Moving Day	20	Reporting the Results of Training, Moving			
29	(Yangon to Japan)	29	Day (Yangon to Japan)			
30	Arrival in Japan	30	Arrival in Japan			

# **8 OUTPUT OF SOFT COMPONENT**

Output of soft component will be as follows:

- (1) Submission to the Client
- 1) Final Report of Soft Component (technical assistance) on the Completion of Activities
- 2) Training Text
- (2) Submission to JICA
- 1) Soft Component Implementation Status Report
  - a) Initial Objective and Output
  - b) Implementation Status of Activities as Initial establishment
  - c) Output at Present (Test Result)
  - d) Comment from the Client
- 2) Soft Component Completion Report
  - a) Summary of the Project (Name of the Project, Date of E/N, Limit of the Project cost by E/N, Consultant Contract Cost)
  - b) Summary of the Soft Component (Cost, Background, Planed Objective, Planed Output, Planed Activities, Engaged Personnel, Participants of the Client, Implementation Schedule (Period and M/M), Actual Activities, Status of the Output Result)
  - c) Issues and Recommendations for achieving objective and continuous & developing effectiveness
  - d) Attached Documents (Implementation Schedule, List of Participants of the Client, Log of Participants, List of Output (Name of Output Documents, Name of Producer, Summary)
  - e) Appendices (Output: Completion Report to the Client, produced manual, text, test results, others: Photos, news articles, etc.)

# 9 OBLIGATION OF RECIPIENT COUNTRY

- (1) To provide necessary facilities for training (training room, equipment, etc.)
- (2) To dispatch attendances of this training program and pay expenses for stay in Yangon

6. Other Relevant Data

**Outline Design Drawings** 

### System Diagram

- 1. Total Radar System Diagram
- 2. VCCS Diagram
- 3. SIM Diagram
- 4. VHF Air-Ground Communication System Diagram

#### **Yangon International Airport**

- YA-1 Airport Layout Plan
- YA-2 ASR/SSR, MSDPS, Console System Diagram
- YA-3 Radar Site Layout Plan
- YA-4 Radar Building Layout Plan
- YA-5 Radar Building Elevation Plan
- YA-6 Radar Building Section Plan
- YA-7 Radar Building Equipment Plan
- YA-8 Radar Antenna Tower Elevation Plan
- YA-9 Radar Antenna Tower Grounding System
- YA-10 ATMC Equipment Room Layout Plan
- YA-11 ATMC Approach Control Unit Layout Plan
- YA-12 ATMC Radar Simulator Room Layout Plan
- YA-13 Power Cable and Remote Control Cable Route
- YA-14 Radar Site Power Supply System

### **Mandalay International Airport**

- MA-1 Airport Layout Plan
- MA-2 ASR/SSR, MSDPS, Console System Diagram
- MA-3 Radar Site Layout Plan
- MA-4 Radar Building Layout Plan
- MA-5 Radar Building Elevation Plan
- MA-6 Radar Building Section Plan
- MA-7 Radar Building Equipment Plan
- MA-8 Radar Antenna Tower Elevation Plan
- MA-9 Radar Antenna Tower Grounding System
- MA-10 Power Cable and Remote Control Cable Route
- MA-11 Radar Site Power Supply System

#### Nay Pyi Taw International Airport

- NA-1 Airport Layout Plan
- NA-2 ASR/SSR, MSDPS, Console System Diagram
- NA-3 Radar Site Layout Plan

- NA-4 Radar Building Layout Plan
- NA-5 Radar Building Elevation Plan
- NA-6 Radar Building Section Plan
- NA-7 Radar Building Equipment Plan
- NA-8 Radar Antenna Tower Elevation Plan
- NA-9 Radar Antenna Tower Grounding System
- NA-10 Power Cable and Remote Control Cable Route
- NA-11 Radar Site Power Supply System




































	PROJECT NAME:	THE PROJECT FOR IMPROVEMENT OF AIRCRAFT SURVEILLANCE	DATE:	Sep. 2018
	DD ANUTALC TITLE		SCALE:	N/A
JAPAN AIRPORT	DRAWING TITLE:	YANGON INTERNATIONAL AITPORT RADAR SITE POWER SUPPLY SYSTEM	DRAWING No.:	YA-14
Conscentio, Inc.				























	NIPPON KOFLCO, LTD	PROJECT NAME:	THE PROJECT FOR IMPROVEMENT OF AIRCRAFT SURVEILLANCE	DATE:	Sep. 2018
	L JAPAN AIRPORT CONSULTANTS, INC.	DRAWING TITLE:	MANDALAY INTERNATIONAL AIRPORT RADAR SITE POWER SUPPLY SYSTEM	SCALE:	N/A
				DRAWING No.:	MA-11






















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		DRAWING TITLE:		SCALE:	N/A
CONSULTANTS, INC. RADAR SITE POWER SUPPLY SYSTEM NA-11	Consultants, Inc.		RADAR SITE POWER SUPPLY SYSTEM	DRAWING No.:	NA-11

7. References

# TECHNICAL MEMORANDUM ON THE PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF AIRCRAFT SURVEILLANCE SYSTEM IN THE REPUBLIC OF THE UNION OF MYANMAR

Based on the Minutes of Discussion dated 16 May 2018 signed by Mr. Min Lwin, Director General of Department of Civil Aviation, MOTC and Mr. Hiroyuki Ueda, Leader of Preparatory Survey Team of JICA, the Survey Team held technical discussions with officials concerned of the Government of Myanmar for the above-captioned survey to wrap-up the works carried out during their stay in the Myanmar.

In the course of technical discussions and field survey, the both sides confirmed the main items described in the attached sheets.

Yangon, 5 June 2018

m. Mos

Masaaki Uehara Consultant Leader JICA Survey Team

Min Lwin Director General Department of Civil Aviation, MOTC

#### ATTACHMENT

#### 1. Basic Technical Requirements of the Systems

The detailed system configuration of each project component will be designed with the following basic technical requirements:

- The system equipment characteristics will follow and conform to any relevant ICAO Standards and Recommended Practices (SARPs), and other related national or international regulations and practices.
- The designs for the system will take into account human engineering considerations; for example, Human-Machine Interface (HMI) of the operational and technical position will be of window type, multi-color and user-friendly graphical environment.
- The hardware of radar system, data processing system and relevant systems should be as much as practicable Commercial Off-The-Shelf (COTS) products with state-of-the-art technology.

#### 2. Equipment Configuration of the Systems

System equipment configuration for each system based on the basic technical requirements is shown in the following Table;

Note: Further analysis for equipment configuration of each system will be implemented during the works for the preparation of Draft Final Report & Equipment Specifications by the Survey Team.

#### 2.1 Radar System

# 2.1.1 Airport Surveillance Radar /Secondary Surveillance Radar System (ASR/SSR) at Yangon International Airport

No.	Equipment	Q'ty	Unit	Place
1	ASR/SSR Antenna	1	set	Radar site
2	ASR Transmitter	1	set	
3	ASR Receiver	2	set	
4	SSR Interrogator	2	set	
5	Local Control and Monitoring System	1	set	
6	Maintenance Display (Local)	1	set	
7	Radar Data Recording System	1	set	
8	Wave Guide	1	set	
9	Dehydrator	1	set	
10	GPS Clock Receiver	2	set	
11	Power Distribution Box	1	set	
12	Data Transmission System 1	1	set	

Table 2.1.1 ASR/SSR Equipment Configuration at Yangon International Airport



13	Uninterruptible Power Supply	1	set	
14	Engine Generator	1	set	
15	Radar Tower	1	set	
16	Radar Building	1	set	
17	Remote Control and Monitoring System (ASR/SSR)	1	set	ATMC
18	Maintenance Display (Remote)	1	set	Equipment Room
19	Radar Performance Monitor	1	set	
20	Data Transmission System 2	1	set	



Figure 2.1.1 Yangon ASR/SSR System Diagram

# 2.1.2 Airport Surveillance Radar /Secondary Surveillance Radar System (ASR/SSR) at Mandalay International Airport

		12		
No.	Equipment	Q'ty	Unit	Place
1	ASR/SSR Antenna	1	set	Radar site
2	ASR Transmitter	1	set	
3	ASR Receiver	2	set	
4	SSR Interrogator	2	set	
5	Local Control and Monitoring System	1	set	
6	Maintenance Display (Local)	1	set	
7	Radar Data Recording System	1	set	
8	Wave Guide	1	set	
9	Dehydrator	1	set	
10	GPS Clock Receiver	2	set	
11	Power Distribution Box	1	set	
12	Data Transmission System 1	1	set	
13	Uninterruptible Power Supply	1	set	

Table 2.1.2 ASR/SSR Equipment Configuration at Mandalay International Airport



14	Engine Generator	1	set	
15	Radar Tower	1	set	
16	Radar Building	1	set	
17	Remote Control and Monitoring System (ASR/SSR)	1	set	Airport Operation
18	Maintenance Display (Remote)	1	set	Building
19	Radar Performance Monitor	1	set	Equipment Room
20	Data Transmission System 2	1	set	
21	Power Distribution Box with UPS	1	set	



Figure 2.1.2 Mandalay ASR/SSR System Diagram

# 2.1.3 Secondary Surveillance Radar System (SSR) at Nay Pyi Taw International Airport

rubie zine bort Bquipinent configuration at may 1 ji rubi international impor	Table 2.1.3 SSR	Equipment	Configuration	at Nay Pyi Taw	International Airpor
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No.	Equipment	Q'ty	Unit	Place
1	SSR Interrogator	2	set	Radar site
2	Local Control and Monitoring System	1	set	
3	Maintenance Display (Local)	1	set	
4	Radar Data Recording System	1	set	
5	GPS Clock Receiver	2	set	
6	Power Distribution Box	1	set	
7	Data Transmission System 1	1	set	
10	Uninterruptible Power Supply	1	set	
11	Engine Generator	1	set	
12	Radar Tower	1	set	
13	Radar Building	1	set	
14	Remote Control and Monitoring System (SSR)	1	set	Airport Operation
15	Maintenance Display (Remote)	1	set	Building
16	Radar Performance Monitor	1	set	Equipment Room

7 Data Transmission System 2	1	set	
8 Power Distribution Box with UPS	1	set	







### 2.2 ATM System

### 2.2.1 Multi Sensor Data Processing System (MSDPS)

Table 2.2.1	<b>MSDPS</b>	Equipment	Configuration	
-------------	--------------	-----------	---------------	--

No.	Equipment	Q'ty	Unit	Place
1	Surveillance Data Processor	2	set	ATMC Equipment Room
2	Flight Data Processor	2	set	
3	Network Communication System	2	set	
4	GPS Clock Receiver	2	set	
5	Recording and Replay System	2	set	
6	Technical Monitoring and Control System	2	set	
7	Radar Data Display	1	set	
8	Flight Data Display	1	set	
9	Power Distribution Box	1	set	
10	RDD Console	2	set	ATMC
11	FDD Console	2	set	Mingaladon Approach
12	Supervisor Console	1	set	Control Unit
13	Radar Data Display	3	set	
14	Flight Data Display	3	set	
15	RDD Console	2	set	ATMC
16	FDD Console	2	set	Mandalay Approach

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17	Radar Data Display	2	set	Control Unit
18	Flight Data Display	2	set	
19	RDD Console	1	set	ATMC
20	FDD Console	1	set	Nay Pyi Taw Approach
21	Radar Data Display	1	set	Control Unit
22	Flight Data Display	1	set	
23	Tower Radar Display	1	set	Yangon Control Tower
24	Flight Data Display	1	set	
25	Tower Radar Display	1	set	Mandalay Control tower
26	Flight Data Display	1	set	
27	Tower Radar Display	1	set	Nay Pyi Taw Control
28	Flight Data Display	1	set	Tower

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Figure 2.2.1 MSDPS System Diagram

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# 2.2.2 Voice Communication Control System (VCCS)

N			TT	DI
No.	Equipment	Q'ty	Unit	Place
1	Voice Communication Switching Equipment	1	set	ATMC Equipment
2	Controller Working Position	11	set	Room, APP Room,
2-1	Touch Entry Device	12	ea	
2-2	Plug-In-Panel	12	ea	
2-3	Loudspeaker	24	ea	
2-4	Footswitch	12	ea	
3	Technical Monitoring and Control System	1	set	
4	Master Clock System	1	set	
4-1	Master Clock Unit	1	set	
4-2	Desk Mount Slave Clock	11	ea	
5	Voice Recorder	1	set	
6	Accessary	-	-	
6-1	Headset	24	ea	
6-2	Handset	11	ea	

Table 2.2.2 VCCS Equipment Configuration

Outline of the system diagram is as shown below:



Figure 2.2.2 VCCS System Diagram

# 2.2.3 Radar Control Training Simulator System (SIM)

Table 2.2.3	SIM	Equipment	Configuration
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No.	Equipment	Q'ty	Unit	Place
1	Surveillance Data Processor	2	set	ATMC Equipment Room
2	Flight Data Processor	2	set	

3	SIM Server	2	set	
4	Network Communication System	2	set	
5	GPS Clock Receiver	2	set	
6	Recording and Replay System	2	set	
7	Technical Monitoring & Control System	2	set	
8	Radar Data Display	2	set	ATMC Simulator Room
9	Flight Data Display	2	set	
10	Instructor / Pseudo Pilot Workstation	1	set	
11	Pseudo Pilot Workstation	1	set	
12	Voice Communication Switch	1	set	
13	Voice Communication Panel	4	set	
14	RDD Console	2	set	
15	FDD Console	2	set	



Figure 2.2.3 SIM System Diagram

## 2.3 Integration of new SSRs Data to En-route MSDPS (Top Sky-ATC) at Yangon ATMC

Radar data from new SSRs at Yangon, Mandalay and Nay Pyi Taw will be integrated into En-route MSDPS (Top Sky-ATC) by Myanmar side.

Outline of system diagram is as shown below:

2

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Figure 2.3.1 Integration System Diagram



Figure 2.3.2 Radar Data Connection Diagram

2

#### 2.4 VHF Air-Ground Communication System for Approach Control

No.	Equipment		Unit	Place	
Yan	gon International Airport				
1	VHF Air-Ground Transmitter/Receiver (main and stand-by)	2	set	Yangon ATM Center	
2	VHF Antenna		set	Equipment Room	
3	Technical Monitoring & Control System	1	set		
Mandalay International Airport					
1	VHF Air-Ground Transmitter/Receiver (main and stand-by)	2	set	ATC Operation Building	
2	VHF Antenna		set	Equipment Room	
Naypyitaw International Airport					
1	VHF Air-Ground Transmitter/Receiver (main and stand-by)	2	set	ATC Operation Building	
2	2 VHF Antenna		set	Equipment Room	

Table 2.4.1 VHF Air-Ground Communication System Equipment Configuration

Outline of each system diagram is as shown below:



Figure 2.4.1 VHF Air-Ground Communication for Approach Control System Diagram

# 2.5 Responsibility of the Works to be implemented by the Myanmar Side Which will not be funded with the Grant

- > Land clearing such as cutting trees and removing bushes for radar site.
- > Construction of access road for Mandalay radar site entrance portion.
- > Provision of electric power supply feeder for Radar site at three airports.



- > Provision of water supply, toilet and maintenance house if necessary.
- > Security fence for Radar Site for each airport will be installed by the Myanmar side.
- Radar Remote Control and Monitoring System and Maintenance Display will be installed in the Mandalay and Nay Pyi Taw Operation Building. Installation space and power supply for the equipment should be provided by the Myanmar side.
- RDD and FDD will be installed in the Control Tower for each airport. Installation space and power supply for the equipment should be provided by the Myanmar side.
- Meteorological information such as wind, QNH, temperature for approach controller working position should be provided by the Myanmar side.
- > Leased landline circuit between Yangon Mandalay and Yangon Nay Pyi Taw
- > Leased VSAT circuit between Yangon Mandalay and Yangon Nay Pyi Taw
- 2.6 Technical Confirmation
  - > Provision of Interface Control Document (ICD) of Top Sky-ATC by Myanmar side
  - > Assignment of ASR transmitting frequency by Myanmar side

### 3. Clarification of Collected Data and Information

The Survey Team requested further collaboration with DCA for clarification of data and information collected as well as for collection of additional data and information if such necessity arises. The Myanmar side accepted the request.

#### 4. Confidentiality

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Since this Technical Memorandum includes outline specifications of the equipment to be provided by the Project, both Japanese and Myanmar sides confirmed that this Technical Memorandum should be treated as confidential, taking into consideration a fair and transparent competition for the supply of the equipment.