International Civil Aviation Organization

The First Meeting of Air Traffic Management Automation System Task Force of APANPIRG (ATMAS TF/1)

Web-conference, 28 – 30 October 2020

Agenda Item 4: ATM Automation System implementation by States

CHALLENGES IN IMPLEMENTATION OF ATM AUTOMATION SYSTEM

(Presented by India)

SUMMARY

This paper presents the challenges faced during implementation of ATM Automation System in different phases of project. This paper also provides some suggestions to address the challenges. It is envisaged that the information provided in the paper may be used by the ATM Automation Systems Task Force in finalizing the guidance material for the ATM Automation System.

1. INTRODUCTION

1.1. States and ANSPs have been deploying CNS and ATM automation systems to cope with increasing challenges of growing air traffic and optimally managing the skies in line with the ICAO objective of Seamless ANS. However, during the deployment process ANSPs face various challenges right from the tender stage to final system acceptance stage. It is a common experience of various ANSPs that implementing ATM Automation system is a complex task in terms of Time, Money & graceful acceptance of ATM Automation system by the user.

1.2. While implementing ATM Automation system by any ANSP, there are mainly two phases of project i.e. Pre-Contract stage and Post Contract phase. Well drafted operational and system requirement specifications for ATM Automation system can very well reduce the number of challenges as the level of scope changes in both the stages of project.

1.3. Recently, India has successfully commissioned a new ATM Automation system at Delhi International Airport and Delhi ACC. The various issues faced and lessons learnt during the execution of this project have been described below categorized into pre and post contract phases

2. DISCUSSION

2.1. PRE-CONTRACT PHASE:

2.1.1. Definition of Scope of Work: Purchaser should have clarity while finalizing System Architecture of ATM Automation system indicating configuration of System in terms of Controller & maintenance working positions, level of redundancy required at different level, level of recording requirement, mode of communications with external Stake holders, Power distribution requirement etc. Any ambiguity or less clarity in defining system Architecture may result in implementation issues and

will have major financial impact as well as affect the project time-line. A mandatory requirement in terms of "Quality assurance level requirement" needs to be well defined like Quality of Test in accordance with ISO-9001-20XX specifications or DO-278A/ED-109A assurance level or Valid CMMI Level xx as per requirement. It is a good practice to ask supplier for a dedicated Quality Assurance Program (QAP) manager who should be responsible for Quality of documentation. It is essential that the QAP Manager shall not be same person as the Program Manger.

2.1.2. Project Cost Estimation: A well-defined scope of work will help in preparing a more accurate estimate of the project. Prospective suppliers will ascertain the estimated cost in a more realistic manner. Quality of Hardware & peripheral equipment like Monitors, Flight Strip Printers, Printers etc shall be selected from the latest version available in the market to avoid obsolesce in near future. It is also necessary to clearly define the level of Operational Maintenance support that is required during Operationalization of ATM Automation System.

2.1.3. Project Time-Line: Time-line of project is a very important activity and shall be framed in a realistic manner. Activities which can be run in parallel shall be identified. Site-readiness, availability of external systems like ASMGCS, AMSS/AMHS, Met system also contribute a lot for timely completion of project. It is observed that additional manpower is required to operate the system in parallel. There should be sufficient manpower available for testing the ATM Automation system during shadow mode of operation. Suppliers take time to resolve the software issues designed as per customer requirement. It is essential that the supplied software shall be thoroughly tested by the QA team and tested at site in real environment before putting the ATM System into operation.

2.1.4. Tender Evaluation and selection of bidder: It is observed that bidders claim to comply with all the requirements projected by purchaser without providing elaborate technical details to prove the methodology adopted in achieving the functionality. It is a good practice to depute the same team of officers who have finalized the Technical and Operational requirements of the system to evaluate and conduct Technical discussion on methodology of fulfilment of critical requirements with prospective bidders, to understand in depth the strategy to achieve the functional requirements. Selection of a successful supplier can then be based on **Quality** cum Cost **Based Selection** (QCBS) criterion (provided the local regulations permit to do so).

2.2. POST CONTRACT PHASE :

2.2.1. Project Monitoring Group: During implementation of ATM Automation system, there are different groups involved like ATSEPs, ATCOs, External system suppliers, Decision making Officers (Management), Safety officer and Regulatory authorities etc. It is a good practice to create a dedicated Project Monitoring group (PMG) drawn from all the concerned stakeholders, who shall be responsible for monitoring various activates, Time lines, scheduling activities etc. The PMG will be responsible for keeping a running record of the progress of implementation, a record of various decisions, coordination with external stake holders and reporting the progress to Higher Management.

2.2.2. System Evaluation, HMI customization & prototype testing: This is an important activity and shall be performed before starting System evaluation. Group of ATCOs and ATSEPs shall be involved in finalizing the HMI of the system in coordination with supplier. Sufficient time is required to be given to this activity. Supplier shall also be given time to modify the system HMI as per the feedback given by purchaser. Some of the main points to consider are;

- System Design Review (SDR) and System requirement review (SRR) shall be completed after thoroughly examining the system design document submitted by supplier. At this stage any gap in understanding the System requirement by supplier shall be mutually agreed and properly recorded;
- This is an important milestone to avoid any dispute with the supplier at the time of project implementation;
- System Evaluation process starts from Factory Acceptance Test (FAT);
- FAT procedures shall be well examined before deputing officers for FAT;
- FAT duration shall be realistic. All critical functionalities projected in Tender shall be thoroughly tested during Factory acceptance test; and
- Supplier shall also resolve the System anomalies observed during FAT before dispatching the Systems to actual site.

2.2.3. **External Interface Integration & Installation Phase:** It is important to invite supplier to start Installation of system after completing the prerequisite agreed as per the contract like:

- Dust free environment, Air conditioning system in place, Power supply source is in place,
- Availability of External systems ASMGCS, AMSS, MET etc,
- Surveillance data to be integrated is available & ATC Consoles are available.
- ASMGCS Integration: It should be noted that sometime ASMGCS Supplier provides Processed video data which cannot be used & processed by ATC Automation system supplier. ICD Details of ASMGCS and ATM Automation system should be shared well in advance to achieve the functionality described in Operational requirement.
- AIDC Implementation: Rationality of AIDC ICD version should be ensured and defined in scope of work.
- Radar & MET radar data protocol should also be defined in scope of work which is required to be integrated with ATC Automation system.

2.2.4. **Database Creation Phase:** This is an important activity and shall be completed in time before starting testing Phase. It is normal practice that FAT is conducted based on the Database created by Supplier for different customers. This activity shall start as early as possible in coordination with supplier. Normally, in such contract supplier provides training and may depute his manpower to complete this exercise as per the terms of the contract.

2.2.5. **Training & Testing Phase**: Training to ATSEPS and ATCOs is normally provided before Factory Acceptance test as well as after installation of the System. Hands on Training is a very important activity. Supplier provides the training to Trainers who will further provide the training to other Officers. Manpower constraint is a big challenge for purchaser while conducting training. Working on different HMI is also very difficult and needs to be absorbed gradually. System Testing, Quality Assurance Audit, Site Acceptance Test, System Reliability & Stability Test (SRST), System Anomalies resolution & Transitional phase are required to be monitored on continuous basis which results in timely acceptance of the system.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and
b) discuss any relevant matter as appropriate

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