AIRPORTS AUTHORITY OF INDIA

SAFDURJUNG AIRPORT

IT DIVISION

BUDGETARY QUOTE

No. AAI/CHQ/ITD/AOCC/2024

Title: "Implementation of
Cloud Based Central AOCC Solution
at 14 Airports with one-year warranty and six-year CAMC"

Date: 15TH October, 2024

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1. Call for Budgetary Quotes

1.1. Budgetary quotes are invited from bidders for "**Implementation of Cloud Based Central AOCC Solution at 14 Airports with one-year warranty and six-year CAMC"**.

1.2. This Budgetary Offer is called to obtain the tentative cost to implement the aforesaid solution as per the BoQ provided under Annexure – I.

1.3. The Budgetary Offer should be submitted on or before 30th Oct, 2024.

1.4. AAI reserves the right to add, modify, amend or delete any of the requirement, as mentioned in this document for Budgetary Offer, at the time of tender.

1.5. The document is for budgetary purpose only. Work shall be awarded following the procurement process of AAI.

1.6. For queries related to the Budgetary Quote, the prospective bidders are advised to send request for clarifications, if any, through email at skmit@aai.aero only.

2. Introduction

2.1. AAI intends to develop a comprehensive solution for Airport Operations Control Center (AOCC). It will be the nerve center for all coordination within an airport. Designed to cater various operational and service requirements for daily airport management system, the AOCC enables seamless management of the terminals allowing viewing and monitoring the overall operations of an Airport for real time inputs and collaborative operations.

2.2. For implementation of this project, AAI is looking for a "Cloud Based Central AOCC Solution", to leverage technology for effective and optimal management of airport information.

2.3. Objective of this document is to outline the Broad Scope of Work (SOW) for this initiative which shall include managing and controlling airport information, the details of which are given at Para-4.

2.4. It will be a common centralized cloud-based solution and will cater to all the airports in scope.

2.5. Contractor shall be entirely responsible for the design and architecture of the system implemented to satisfy all requirements as described in this document including sizing of the required hardware.

2.6. Contractor will design the system as a platform that can easily be replicated across airports as and when required. Also, the system must be scalable and resilient. It must allow easy addition of devices (plug and play) with minimum customization and should be ready for future systems.

2.7. This budgetary quote is called to assess the cost for items mentioned in BoQ as per Annexure-I.

2.8. The project duration will be for 7 Years, post Go-Live of Phase-I Airports. Seven Year period includes 1 Year Warranty/ Defect Liability Period and 6 Year CAMC.

3. Key Objectives of AOCC Central Application

3.1. Airports considered for implementation are Chennai, Kolkata, Pune, Goa, Srinagar, Bhubaneshwar, Indore, Patna, Calicut, Bagdogra, Coimbatore, Varanasi, Chandigarh and Trichy.

3.2. Design and implement processes and applications that help AAI achieve the project vision of Multi-Airport AOCC system and drawing the advantages of integrated and cost-effective framework.

3.3. To optimize airport operations through Standard Processes and implement solution based upon past trends & forecasting to boost improvement in the overall experience of passengers by enhancing the quality of services at AAI airports.

3.4. Establish interfaces with essential Airport System/ Sub-System, that is easy to access, interoperable, simplify airport operations and improve their effectiveness.

3.5. Flight Operations Management:

- 3.5.1. Monitoring and managing flight movements.
- 3.5.2. Allocation of Parking stands
- 3.5.3. Allocation of other Airside and In-Terminal resources.
- 3.5.4. Coordinating with airlines, ground handling teams and Air Traffic Control.
- 3.5.5. Handling flight scheduling, delays and diversions.

3.6. Passenger Services:

- 3.6.1. Managing & Monitoring passenger flow through the terminal (PFMS).
- 3.6.2. Overseeing check-in, security, boarding and baggage claim processes.

3.7. Resource Allocation:

- 3.7.1. Assigning check-in counters, boarding gates and baggage belts.

3.7.2. Optimizing the use of airport facilities and equipment.

3.8. Emergency and Incident Management:

3.8.1. Monitoring for potential safety and security threats / hazards.

3.8.2. Coordinating responses to emergencies such as medical emergencies & incidents, aircraft emergency, bomb threats, security alerts or technical issues with aircraft/ ground equipment.

3.8.3. Monitoring & Ensuring compliance with safety regulations and procedures.

3.9. Communication and Coordination:

3.9.1. Serving as a central point of contact for all airport stakeholders.

3.9.2. Facilitating communication between airlines, ground services, security and regulatory bodies.

3.9.3. Managing public announcements (PAVA) and information dissemination (FIDS).

3.10. Data Monitoring and Analysis:

3.10.1. Using real-time data and analytics to monitor airport operations.

3.10.2. Tracking key performance indicators (KPIs) and operational metrics.

3.10.3. Identifying and addressing inefficiencies or bottlenecks.

3.11. Facility and Infrastructure Management:

3.11.1. Overseeing the scheduled maintenance of resources and operation of airport facilities.

3.11.2. Managing & Coordinating repairs and expansions.

3.12. Security Management:

3.12.1. Monitoring & Coordinating airport security operations through SOCC.

3.12.2. Implementing security protocols and procedures.

4. Implementation Model and Scalability

4.1. **AOCC Central Application**: Core responsibility is to update & manage flight & airport data through AODB & RMS, analytics, Central Decision Making, Master-Clock for UTC (Coordinated Universal Time), Dashboard and Reporting for various available interfaces; along with network & security infrastructure to enable the participating airports. It is required for central decision making across all airports.

4.2. **Airport Integration Layer:** Business layer which is an intermediate layer between AOCC Central Application and Airport System Interfaces covered under the project scope.

4.3. Provision of scalability is proposed for both Horizontal and Vertical Scalability–

4.3.1. Horizontal Scalability in terms of number of airports interfaces across 14 Airport(s).
4.3.2. Vertical Scalability in terms of tenure extension of the proposed solution. At its sole discretion, AAI may extend the CAMC for another 3 Years, based on satisfactory performance.

5. Key Terminology

5.1. **Airport Operational Data Base (AODB)** is the central database stored within Centralized AOCC on Cloud, to give users and identified integrated systems a single source of shared data, to provide data that are consistent and up-to-date. In addition, it shall provide a data repository, with an appropriate level of security, redundancy and back-up, and flexibility to allow the collection of data from diverse sources and systems, and the manipulation and processing of that data to produce useful information regarding operational and financial activities at the Airport, such as flight information, maintenance and operational information, ground- and air-side activities, among others.

5.2. **Resource Management System (RMS)** is responsible for allocations and provide real-time status of gates, parking stands (non-contact gates) ticket counters, baggage reclaim carousels and baggage makeup-up belts using manual input data and data from electronic interfaces from designated airlines. The RMS objective is that most inputs are provided via an automated fashion through Airport Integration Layer (AIL).

5.3. **Flight Information Display Systems (FIDS)** including Counter Information Display Systems **(CIDS)** and Gate Information Display Systems **(GIDS)** to provide real-time updates of flight information to all passengers through technology such as legacy Split Flaps, plasma television screens and liquid crystal displays (LCDs). The system provides flight information based on schedule time, estimated time, Domestic or International, Arrival or Departure, Terminal/Zone & Airport etc. For the purpose of this tender the scope of FIDS is limited to seamless integration of existing AAI FIDS with proposed AODB/AOCC solution. System also has an in-build API, which can be integrated with Website/ Mobile App.

5.4. **Baggage Handling System (BHS)**: It is a network of automated technologies and systems for Counting & Weighing, Baggage Count, Security and Transportation of Check-in baggage through an airport during flight departure process. BHSs are used to ensure that Check-in baggage is delivered safely and securely to its final destination. The BHS needs up-to-date flight schedules and other information from the AODB to handle baggage efficiently. First and last bag tracking for arriving flights is also linked to the AODB.

5.5. **Baggage Reconciliation System (BRS)**: It is a network of automated technologies and systems to ensure that Check-in baggage is accurately tracked throughout a unique tag,

which is scanned at various checkpoints, including check-in, loading onto the aircraft, and transfer between flights.

5.6. **Public Address and Voice Alarm (PAVA)**: It is a system to broadcast pre-recorded and live messages to loudspeakers all over the airport. System main objective is to provide event-based awareness for passengers by airlines for flight updates. It can be used for evacuation (in case of emergency) or trigger fire alarm.

5.7. **Common Use Terminal Equipment (CUTE):** It refers to a system that allows multiple airlines to share the same airport terminal equipment like check-in desks, bag drop facilities, and boarding gates, essentially enabling different airlines to use the same hardware infrastructure with their own software, thus optimizing space and improving operational efficiency at airports by eliminating the need for each airline to maintain their own dedicated check-in stations.

5.8. **Common Use Passenger Processing Systems (CUPPS):** It refers to a system that has ability to process passenger check-ins, handle boarding passes and baggage tags, and provide access to airline-specific applications and services.

6. Tentative High-Level Architecture of the AOCC Central Application

With increase in air traffic volume and that multiple stake holders requiring same information, an effective information management at airports has become critical. In its approach to effective information management, the AAI is visioning for an enterprise-wide single approach for management of multiple airports to cater to all sizes and categories of airports under its control, thus drawing the advantages of integrated and cost-effective framework.

6.1. The proposed system must be a centralized cloud-based solution, including but not limited to the Layers/ Modules described hereunder.

6.2. The proposal constitutes a centralized application which constitutes of Airport Operational Data Base (AODB), Resource Management System (RMS) for airport resources i.e. Gates, Aircraft Stands, Check-in Desk, Carousel, First-Bag Last-Bag (FBLB), Baggage Handling, Flight Information Display System (FIDS) etc. The proposed central application will be deployed on a centralized cloud, either on internal or external AAI cloud (synchronised between DC & DR).

6.3. To exchange data from various sub-system available at Airport with Centralized AOCC, different interface mechanism(s) will be used. Based upon their functionality, airport interfaces are classified as Central, Local and Console. The High-Level Architecture

described below is only a tentative Draft to further explain AOCC, to be implemented across 14 airports:

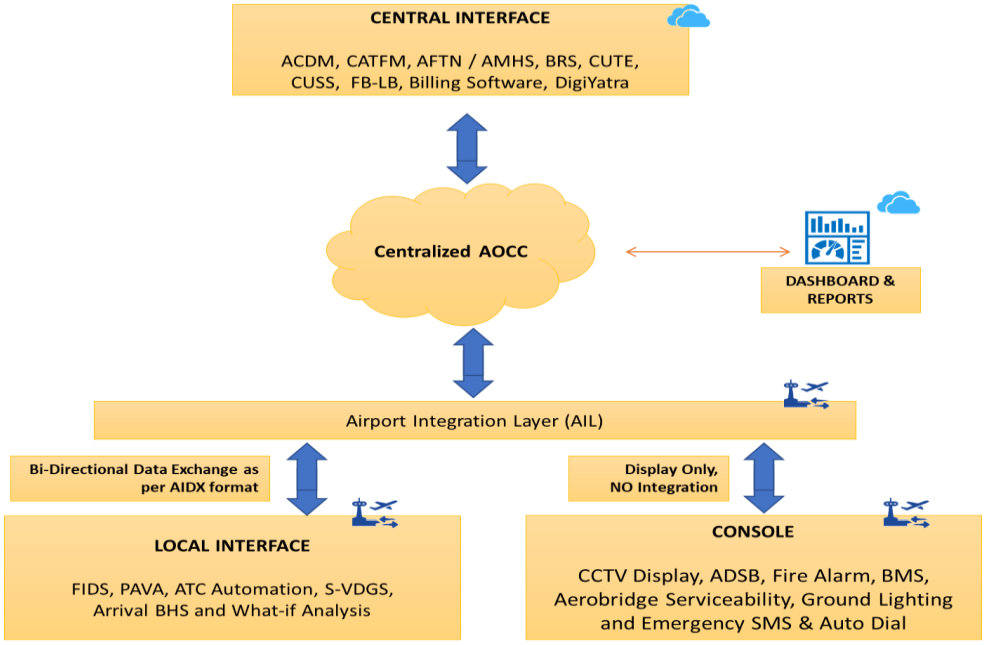

Figure 1 Comprehensive Overview of Interfaces in AOCC

6.3.1. **Central (Pan-India) Interface:** Integration is done between Source System (common across all airports) and Central AOCC Cloud for all airports under consideration. Uni-directional/ Bi-directional data exchange would be provisioned centrally through AOCC.

Total 09 Interfaces are considered namely: ACDM, CATFM, AFTN / AMHS, BRS, CUTE, CUSS, FB-LB, Billing Software, DigiYatra

6.3.2. **Local Interface:** Integration is done individually between Local Airport Source and Destination System at respective AOCC/ IT Core room. These integrations are locally controlled and monitored. Specific parameter(s) of data exchange, as relevant for each Source System at the Airport, will be configured individually with central AOCC.

Total 06 Interfaces are considered namely: FIDS, PAVA, ATC Automation, S-VDGS, Arrival BHS and What-if Analysis.

6.3.3. **Console (for Sub-Systems Not Connected with AOCC):** There is no systemic integration with AOCC. Such consoles will only be provided to monitor the activity and aid in decision making in respect of local unconnected Sub-Systems. No data exchange with Central AOCC.

Total 07 Interfaces are considered namely: CCTV Display, ADSB, Fire Alarm, BMS, Aerobridge Serviceability, Ground Lighting and Emergency SMS & Auto Dial.

6.3.4. Airport Integration Layer (AIL) is an Intelligent Business layer based on open standards and AIDX data format to integrate identified airport systems with AOCC Central Application. Resource Management System (RMS) will be the part of AIL. This is a common layer which will act as a middle layer across all 14 airports under scope.

6.4. AOCC system is proposed to have alert feature along with Dashboard & Reporting for features like Optimum Resource Utilization, Demand Forecasting, Schedule Monitoring, Reduce Congestion in Operational Area, Utilization Monitoring, Auto Allocation based on Flight Schedule, Statistics and Historic reports.

6.5. AOCC system must have a capability to Auto recording of chocks on – chocks off time of aircraft on all parking stands through API integration, if available from the external system.

6.6. AOCC system must have a capability to Capture, Record and Analyze FB-LB Data through API integration, if available from the external system.

6.7. AOCC should be designed on Plug and Play feature for services integration and central application deployment at airports, having flexibility to scale down or scale up as per airport operations requirement. This is applicable for both interfaces and airport under AAI control.

6.8. AOCC must be integrated with MET data for Alerts for winds above 15 knots and visibility below RVR 550 to be displayed at identified points in air side.

6.9. AOCC should have feature to manage connected airports resources remotely and provide a real-time dashboard for decision making. AODB ensures that the core airport processes for Passengers, Flights and Baggage take place in a coordinated and synchronised manner as well as providing the information needed by every stakeholder within the airport. It improves data accuracy and traceability and reduces manual errors. All integration required for information exchange with external services across airports must comply to IATA Airport Information Data Exchange (AIDX) standard.

6.10. AOCC system must have airport specific Aircraft Emergency and all other contingency plans i.e. Auto SMS and recorded calling to all concerned as required specific to airport operations. SOP to be provided by Operations directorate.

7. Ownership of the Solution and Bespoke Development

7.1. AAI is looking to develop a comprehensive solution for AOCC implementation where the ownership & Intellectual Property Rights (IPR) of the entire Solution will be with AAI.

7.2. It is preferred that the entire solution is developed in a bespoke development model, where the source code, object code, configuration and all other relevant materials, artefacts etc. of all bespoke development shall be the property of AAI and AAI shall own all Intellectual Property Rights (IPRs) for them. All material related to such bespoke development shall be treated as confidential information. Bidder shall have no right to market/ sell the software, without prior written permission of AAI.

7.3. Bidders has an option to propose a Commercial-Off-the-Shelf (COTS) solution for the Central AOCC, which aligns with AAI's operational requirements. In addition to the COTS solution, bidders must provide a comprehensive customization plan to ensure full compliance with AAI's specific needs. Key Considerations are detailed below:

7.3.1. **Prior Approval:** During System Design Phase, Successful Bidder must obtain approval from AAI for their proposed COTS solution and customization plan to meet operational requirements. This approval process will involve a thorough evaluation of the solution's suitability and adherence to the RFP requirements.

7.3.2. **Assumptions and Conditions:** Bidders must clearly outline any assumptions and conditions made during the development of their proposal. This transparency will help AAI understand the scope and limitations of the proposed solution.

7.3.3. **Acceptance or Rejection:** AAI reserves the right to accept or reject any proposal, regardless of whether it is based on a COTS solution or a fully customized solution.

7.3.4. **Ownership and Licensing:** If AAI accepts a COTS-based proposal, the bidder must provide the COTS solution in the name of AAI. This transfer of ownership will grant AAI perpetual control and unlimited license usage for all modules and interfaces developed for the AOCC. This will enable AAI to utilize the solution for both existing and future projects.

7.4. AAI acknowledges the need for usage of certain Commercial-off-the-Shelf (COTS)/ Proprietary/ Open Source Products which may provide basis for the required Bespoke Development of the solution, such as OS, Anti-Virus, Database etc. For cases where usage of such Commercial-off-the-Shelf (COTS)/ Proprietary/ Open Source Products is the only option to meet the Project Requirements, Perpetual & Unlimited Licenses, free from any kind of limitation in terms of usage, time period or any other conditions, may be provided only with prior written approval of AAI.

7.5. The ownership of all hardware and licenses required for the Project shall be with AAI. All necessary Licenses must be provided on or before Go-Live of the Solution, sufficient in all respect to satisfy the offered solution for the entire duration of the Project.

8. Project Duration

8.1. Project will be implemented in two Phases as detailed below:

8.1.1. **Phase 1:** Project will be implemented at 6 Airports i.e. Chennai, Kolkata, Pune, Goa, Calicut and Trichy within a period of 6 Months from the Date of Commencement of Work.

8.1.2. **Phase 2:** Project will be implemented at 8 Airports i.e. Bagdogra, Bhubaneshwar, Coimbatore, Srinagar, Indore, Patna, Varanasi and Chandigarh within a period of 12 Months from the Date of Issue of Airport Clearance from AAI post Go-Live of Phase-1.

8.2. The End-to-End Solution Development, including System Requirement Finalization, Design, Development, Testing, Implementation on Cloud Platform, Commissioning and any other required process; must be completed within specified timelines.

8.3. Initial Site Survey for finalization of requited Hardware and Infrastructure must be completed within 1 Month from Date of Commencement of Work.

8.4. All required delivery and installation of required Hardware must be completed within 3 Months from Date of Issuance of Delivery Clearance.

8.5. All required Infrastructure Setup at any particular Airport must be completed within 3 Months from the Date of Issuance of first Delivery Clearance for that particular airport.

8.6. The overall time allowed for Go-Live of the Solution shall be 18 Months from the Date of Commencement of Work, for the initial set of Airports mentioned under Worksites.

8.7. 1 Year Warranty shall be applicable from date of Go-Live of the Phase-1.

8.8. 6 Years CAMC shall be applicable post completion of Warranty Period. All airports will be co-terminus with Phase-1airport Go-Live date i.e. CAMC for all 14 airports will be co-terminus after 7 years from Phase-I Go-Live date.

Annexure-I

Budgetary Quote Submission Form
(Required on Bidder's letter head)

Sl. No.	Item Description	Qty	Units	Unit Rate	Total Cost
1	**Sub-head 1: One Time Implementation of AOCC Central Application**				
1.1	End-to-End Development/ Deployment of AOCC Central Application on cloud with AODB for Phase 1 Airports, Intelligent Business layer with customization of rules/ rule set, Central cloud Interface & UTC Timing and Predictive analytics using AI & ML, including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live.	1	Lot		
1.2	End-to-End Extension and Configuration of Existing AOCC Central Application on cloud with AODB for Phase 2 Airports including Intelligent Business layer with customization of rules/ rule set, Central cloud Interface & UTC Timing and Predictive analytics using AI & ML, based upon Airport clearance by AAI, Post Phase 1 Go-Live.	8	Lot		
1.3	Central (Pan-India) Interface Integration and Networking with AOCC Central Application including provision of Business layer, as a Central interface handshaking (including network infrastructure), including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live, for each Interface.	9	Lot		
1.4	End-to-End Development/ Deployment of Software for Central (Pan-India) Interfaces within AOCC Central Application. Development includes central and airport specific convertor/ wrappers/ API for continuous bi-directional data flow as per IATA AIDX format between central AOCC, along with SOP and ICD), AOCC resource rules, AOCC business process rules, transition rules, errors &warning, including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live, for each Interface.	9	Lot		
1.5	End-to-End Development/ Deployment of Dashboard & Reporting Layer on Cloud with OLAP functionality including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live.	1	Lot		

1.6	End-to-End Development/ Deployment of Airport Interface Layer including RMS with auto-allocation of rules, integration with AOCC Central Application including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live.	1	Lot		
2	**Sub-head 2: Enablement of Designated AAI Airports across the country (each airport basis)**				
2.1	Enablement, Integration, Connectivity & associated Network Infrastructure for Phase – I Airports between Airport Interfaces and Airport Integration Layer, including dedicated dual network link for bi-directional data exchange, including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live.	6	Lot		
2.2	Enablement, Integration, Connectivity & associated Network Infrastructure for Phase – II Airports between Airport Interfaces and Airport Integration Layer, including dedicated dual network link for bi-directional data exchange, including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live, based upon Airport clearance issued by AAI, Post Phase 1 Go-Live.	8	Lot		
2.3	End-to-End Development/ Deployment of Local Interfaces at Airports under Phase 1 and their integration with Airport Integration Layer. Development includes central and airport specific convertor/ wrappers/ API for continuous bi-directional data flow as per IATA AIDX format between central AOCC, along with SOP and ICD), AOCC resource rules, AOCC business process rules, transition rules, errors &warning, including UAT, Production Go-Live and 1- Year Warranty from Date of Go-Live, for each interface.	34	Lot		
2.4	End-to-End Extension and Configuration of Local Interfaces at Airports under Phase 1 and their integration with Airport Integration Layer. It includes central and airport specific convertor/ wrappers/ API for continuous bi-directional data flow as per IATA AIDX format between central AOCC, along with SOP and ICD), AOCC resource rules, AOCC business process rules, transition rules, errors &warning, based upon Airport clearance issued by AAI, Post Phase 1 Go-Live	45	Lot		
3	**Sub-head 3: Data Migration**				
3.1	Data Migration from existing AOCC and integrating with new AOCC	1	Lot		

4	**Sub-head 4: 1st Year of CAMC for AOCC Central Application and 14 Airports post warranty**				
4.1	1st Year CAMC for AOCC Central Application	1	Lot		
4.2	AOCC Cloud for Phase-1 Airports (1st Year), all inclusive	1	Lot		
4.3	AOCC Cloud for Phase-2 Airports (1st Year), all inclusive	1	Lot		
4.4	1st Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		
5	**Sub-head 5: 2nd Year of CAMC for AOCC Central application and 14 Airports post warranty**				
5.1	2nd Year CAMC for AOCC Central Application	1	Lot		
5.2	AOCC Cloud for Phase-1 Airports (2nd Year), all inclusive	1	Lot		
5.3	AOCC Cloud for Phase-2 Airports (2nd Year), all inclusive	1	Lot		
5.4	2nd Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		
6	**Sub-head 6: 3rd Year of CAMC for AOCC Central application and 14 Airports post warranty**				
6.1	3rd Year CAMC for AOCC Central Application	1	Lot		
6.2	AOCC Cloud for Phase-1 Airports (3rd Year), all inclusive	1	Lot		
6.3	AOCC Cloud for Phase-2 Airports (3rd Year), all inclusive	1	Lot		
6.4	3rd Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		
7	**Sub-head 7: 4th Year of CAMC for AOCC Central application and 14 Airports post warranty**				
7.1	4th Year CAMC for AOCC Central Application	1	Lot		
7.2	AOCC Cloud for Phase-1 Airports (4th Year), all inclusive	1	Lot		
7.3	AOCC Cloud for Phase-2 Airports (4th Year), all inclusive	1	Lot		
7.4	4th Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		
8	**Sub-head 8: 5th Year of CAMC for AOCC Central application and 14 Airports post warranty**				
8.1	5th Year CAMC for AOCC Central Application	1	Lot		
8.2	AOCC Cloud for Phase-1 Airports (5th Year), all inclusive	1	Lot		
8.3	AOCC Cloud for Phase-2 Airports (5th Year), all inclusive	1	Lot		
8.4	5th Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		
9	**Sub-head 9: 6th Year of CAMC for AOCC Central application and 14 Airports post warranty**				
9.1	6th Year CAMC for AOCC Central Application	1	Lot		
9.2	AOCC Cloud for Phase-1 Airports (6th Year), all inclusive	1	Lot		
9.3	AOCC Cloud for Phase-2 Airports (6th Year), all inclusive	1	Lot		
9.4	6th Year CAMC of Designated AAI Airports (Sub-Head 2), all inclusive	14	Lot		

10.1	**Sub-head 10: Provisions for Change Request**				
10.1	Implementation of change request on need basis, as approved by CCB, (Considering 8 Working Hrs per Day, per person)	2000	Person Days		
11	**Sub-head 11: Training Cost**				
11.1	Executive Training and Documentation (2 Days)	1	Lot		
11.2	Admin/ Superuser Training and Documentation (15 Days)	1	Lot		
11.3	Normal User Training and Documentation (5 Days)	1	Lot		
				Total Cost (in INR), exclusive of GST	
				GST @ 18%	
				Total Cost (in INR), inclusive of GST	