Civil Aviation Authority
Islamic Republic of Afghanistan

CMS

Contract Management System

Presented by ACAES Team

Technical Document | ACAA

May 20 - 2021

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REVISION HISTORY

Name	Date	Revision Description	Version
Mirwais Farahi	**May 27, 2021**		**Version 1.0**

DOCUMENT APPROVAL

Signature	Printed Name	Title	Date
	Aziz Noor	Revenue Director	23-06-2021
	Sameem Rahami	DG of HKIA	07-07-21

ACRONYMS AND ABBREVIATIONS

The following table describes the abbreviation and acronymous used throughout this Software Requirements Specification.

Abbreviation	Meaning
USAID	U.S. Agency for International Development
ACAA	Afghanistan Civil Aviation Authority
ACAE	Afghanistan Civil Aviation Enterprise Solution
CMS	Contract Management System
SRS	Software Requirements Specification
DSS	Data Storage System
HTTPS	Hypertext Transfer Protocol Secure
FTP	File Transfer Protocol
SSL	Secure Sockets Layer
AODB	Airport Operational Database

1 INTRODUCTION

1.1 PURPOSE

The Software Requirements Specifications Document (SRS) is for the Contract Management System (CMS) within the context of Afghanistan Civil Aviation Enterprise Solution (ACAE) for Afghanistan Civil Aviation Authority (ACAA) supported by USAID. The requirements are gathered from ACAA departments and analyzed for the purpose of this document. The main purpose of this SRS is to work as a guideline to develop and implement CMS that fulfills all the organization requirements. Furthermore, it will illustrate system constraints, interface, and interactions with other external applications. The document is also intended to be proposed to the business owners and involved departments of ACAA for their approval and is a reference for developing the first version of the system for the development team.

1.2 DOCUMENT CONVENTIONS

The SRS document uses few different font sizes for clear distinction. In addition, main headings are numbered with whole numbers like 1. Introduction, 2. Overall Description. The subheadings are numbered with decimals like 1.1 Purpose, 1.2 Document Conventions.

1.3 INTENDED AUDIENCE AND READING SUGGESTIONS

The document is intended to be read by ACAA directors, head of ACAA departments, managers of ACAA departments, project managers, developers, testers, users, and documentation writers. The document is organized into 5 parts as 1. Introduction, 2. Overall Description, 3. External Interface Requirements, 4. System Features, 5. Other Nonfunctional Requirements, and 6. Other Requirements. All the parts are independent but reading the whole file in a sequential manner helps the reader to understand well the Contract Management System.

1.4 PRODUCT SCOPE

ACAA is having contracts with shopping stores inside airports, fuel contractors, ACAA parking contractors and other business holders who are using ACAA property or ACAA services at airports. The charges vary from contract to contract, and it depends on type of contract. There is manual process for contract management. Hence, a Contract Management System (CMS) will assist the organization in contract creation, execution, and analysis to maximize operational and revenue collection from the contractors. In addition, the airlines can also be registered with CMS system in order to request for flight permissions, certificates and crew licenses, and receive invoices through an account.

CMS is a web-based application in which the contractors of ACAA will have profile account to manage their contracts relate activities and revenue related activities with ACAA. The System will cover fuel contracts, parking contracts and other property relate contractors in all airports of Afghanistan. In addition, it will manage Airline profile, travel agencies profile and other business contractors with ACAA.

The functionality and Scope of the system is as follows: -

i. Contract details Management (Airline, Travel Agency, Fuel and Property relate contracts and other ACAA sub-contractors).
ii. Fuel contract management.
iii. Parking and other properties contract management.
iv. Report generation.

2 OVERALL DESCRIPTION

This section provides an overall description of the whole system. The basic functionality of the system and interaction with other systems will be explained. Furthermore, describes various types of users that will use the system and available functionality for each type of user. Finally, the constraints and assumptions for the system will be presented.

2.1 PRODUCT PERSPECTIVE

This system will consist of two parts: one client web portal and one management web portal. The client web portal will be used by ACAA contractors to view contract details, do their revenue relate tasks this includes receiving invoices, and travel agencies pay ticket tax amount. On the other hand, the management web portal will be used for managing the ACAA contractors account and overall system management. The CMS data will be shared to other modules, such as Revenue Management System, Inventory Management System, and Business Intelligence System.

The CMS will be a module of ACAE solution for ACAA. Figure 1 shows the major components of the overall system, and other system interactions to the system.

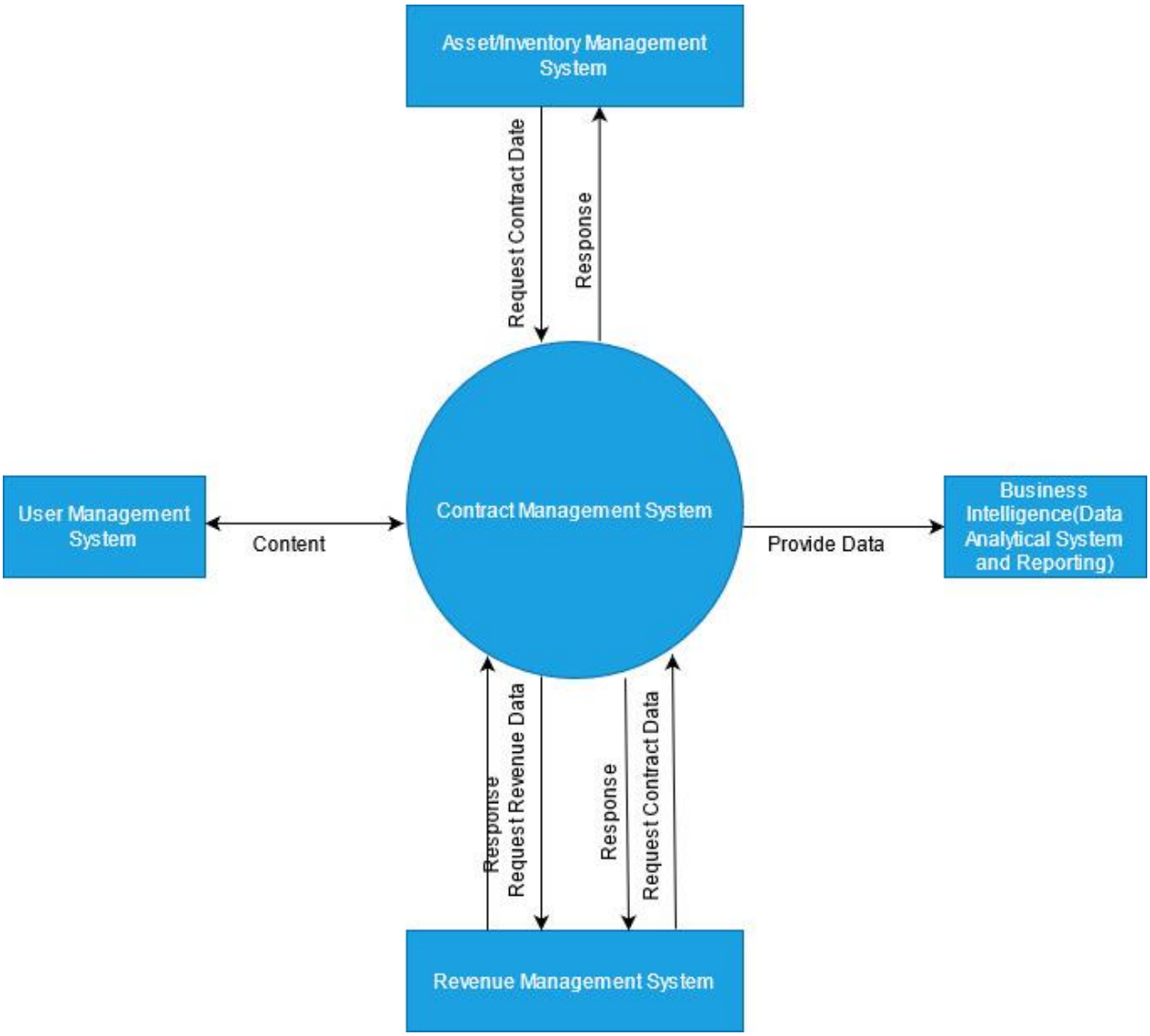

Figure 1: CMS Context Diagram

The system is using a central Airport Operational Database (AODB) to store the data. Both the client and management web portals will communicate with the database. The client web portal will use the database to send requests and get data while management web portal will add and modify data. All the database communication will go over the Internet.

The following list shows the main functionalities of system: -

- Contract details management.
- Contract documents archiving
- Fuel contract management
- Property and rent contract management.
- Parking Contract Management

- Report Generation and Management

2.2 PRODUCT FUNCTIONS

CMS is a standalone system that provides functionality described in the Product functions section. It includes contract details registration and management, documents archiving relate to contract to fulfill software requirements. In addition, CMS has interfaces to the external system, such as Revenue Management System, Asset/Inventory Management System, User Management System and Business Intelligence System.

Any detailed definition of an external system is out of the scope of this document. Figure 2 shows the decomposition of CMS on the functionality area and supported external systems.

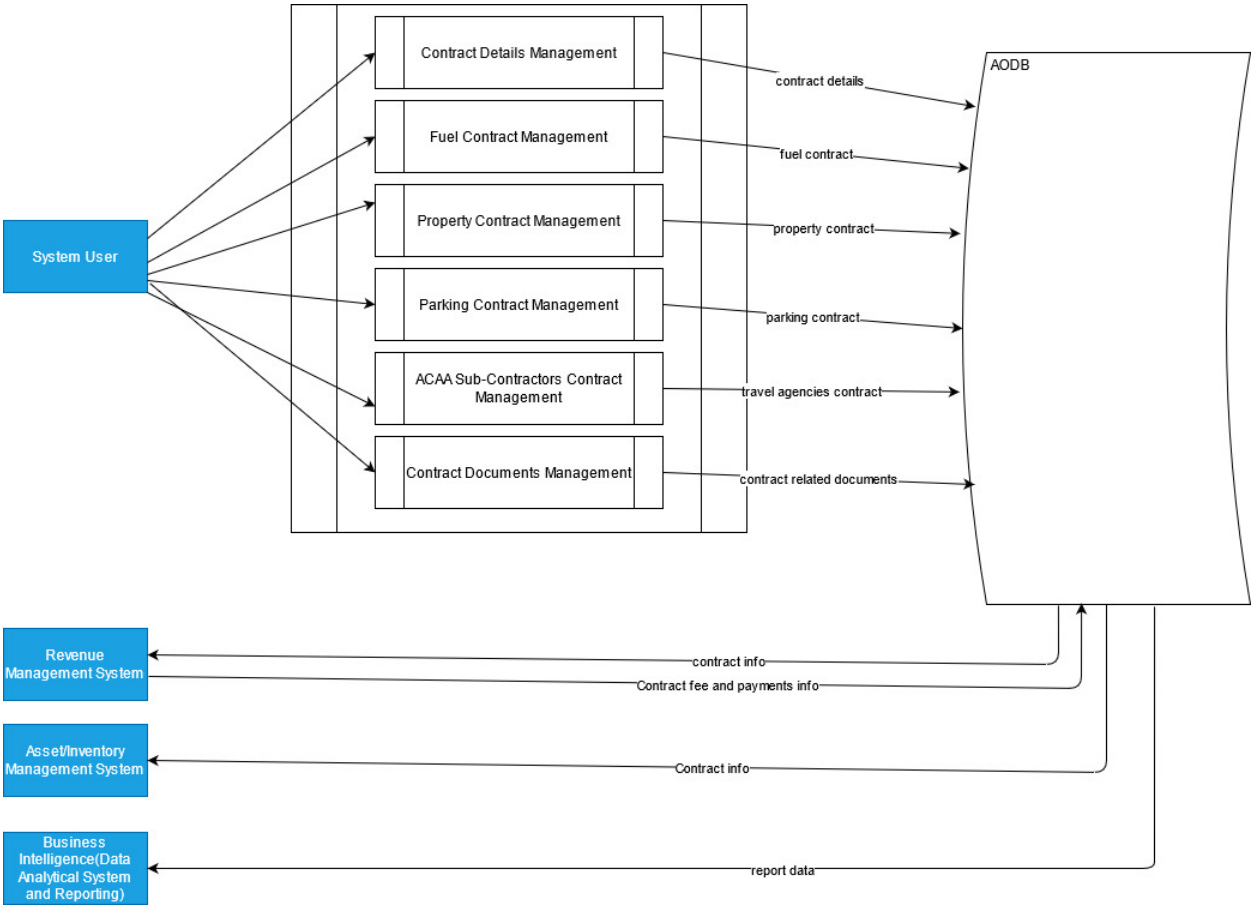

Figure 2: CMS Data Flow Diagram

It is required to have a Data Storage System (DSS) for CMS and all other external systems. CMS stores all the information and data in the DSS of airport called Airport Operational Database (AODB) and the connection between CMS and DSS shall be made through standard interface (ADO .NET and Entity Framework).

2.3 USER CLASSES AND CHARACTERISTICS

There are three types of users to access and use the system. The users are defined as follows: -

i. **Airlines**: This type of user can only use the system to do revenue relate tasks.
ii. **Travel Agencies**: The travel agencies will use their accounts for tax payments of the ticket. View account balance and other details.
iii. **ACAA Staff**: The employees of ACAA are responsible to register ACAA contractors and provide them an account. The staff will have access to CMS System based on their TOR and assignment.
iv. **Administrators**: They are managing the overall system so there is no incorrect information within it. The level of access for administrators shall be defined as system super admins and admins. The super admins are responsible for managing all database users, taking backup, restoring recovery, maintaining the system and there are no system access level restrictions for them. The admins are responsible to create other system users and validate the data of system based on their access level.

2.4 OPERATING ENVIRONMENT

The following hardware and software components are required for CMS: -

i. Hardware Components

a. Server Side

- Linux Based Server: Two Linux Centos Servers
  1) First Servers: for running the ERP
     - Operating System: Linux Centos
     - Model: DELL EMC R940xa
     - Ram at least: 8GB*8 = 64GB or 8GB*16= 128GB
     - Ram Type: DDR3
     - Processors: Core i7(at least 7th generation)
     - Internet Bandwidth: 10Mbps
     - SSL Certificates
     - Yearly Operating System License fee: NO
     - SQL server License: YES (have to calculate)
     - Storage: 10 TB

  2) Second Server: for taking backup or use a secondary point to keep the system up and running.
     - Operating System: Linux Centos
     - Model: DELL EMC R940xa
     - Ram at least: 8GB*8 = 64GB or 8GB*16= 128GB
     - Ram Type: DDR3
     - Processors: Core i7(at least 7th generation)
     - Internet Bandwidth: 10Mbps
     - SSL Certificates

- Yearly Operating System License fee: NO
- SQL server License: YES (have to calculate)
- Storage: 10 TB

- Windows Based Server: Two dedicated Windows 2016 servers

1) First Server: for running the ERP
   - Operating System: Windows
   - Model: DELL EMC R940xa
   - Ram at least: 8GB*8 = 64GB or 8GB*16= 128GB
   - Ram Type: DDR3
   - Processors: Core i7(at least 7th generation)
   - Internet Bandwidth: 10Mbps
   - SSL Certificates
   - Yearly Operating System License fee: YES
   - SQL server License: YES (have to calculate)
   - Storage: 10 TB

2) Second Server: for taking backup or use a secondary point to keep the system up and running
   - Operating System: Windows
   - Model: DELL EMC R940xa
   - Ram at least: 8GB*8 = 64GB or 8GB*16= 128GB
   - Ram Type: DDR3
   - Processors: Core i7(at least 7th generation)
   - Internet Bandwidth: 10Mbps
   - SSL Certificates
   - Yearly Operating System License fee: YES
   - SQL server License: YES (have to calculate)
   - Storage: 10 TB

b. Client Side
   - Code i3 Laptop or Desktop with 4GB Ram or higher version

ii. Software Components

a. Server side
   - Ubuntu Server or Windows Server 2016 or higher version
   - Docker server or Apache server
   - Dot Net Framework 5 or higher version
   - Visual Studio Software: Visual Studio is an integrated development environment for writing, compiling, and debugging the C# .NET code.
   - SQL Server 2019: SQL Server to create and maintain database records of the system.
   - SQL Server Management Studio: It is a software application first launched with Microsoft SQL Server 2005 that is used for configuring, managing, and administering all components within Microsoft SQL Server.

- NodeJS: Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.
- Git: Git is software for tracking changes in any set of files, usually used for coordinating work among programmers collaboratively developing source code during software development.
- Microsoft IIS Web Server and Apache Web server to deliver HTML content to the system users.

b. Client Side
- Close source (windows 7, 8, 10) or open source (Ubuntu, Linux) operating system.
- Web browser (Mozilla Firefox, Google chrome, Internet explorer) latest version
- Internet connectivity

2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS

- The information of all users, overflight details, passenger count for every flight, flight landing details, parking details, certificate relates to airlines, travel agencies and other ACAA contractors must be stored in database.
- Microsoft .NET technologies will be used for development and SQL Server will be used as an engine and database.
- CMS is a web-based system, and it must be running 24 hours a day.
- Users may access from any computer that has browser and Internet connection.
- Users must have their correct usernames and passwords to enter their online accounts and do activities.
- The ACAA Software and Information Technology Technical staff will be responsible to maintain the delivered system.

2.6 USER DOCUMENTATION

User Manual Guide: A guideline for new users on how to use the CMS. This guide outlines the best practices for training a new user to use the system appropriately. In addition, training programs will be provided for the system users.

Technical Manual Guide: Technical manual document will be used by technical staff of ACAA for the system maintenance. Moreover, training sessions will be conducted for the technical staff.

2.7 ASSUMPTIONS AND DEPENDENCIES

It is assumed that the CMS system will work correctly with windows and Linux operating systems environments.

The following dependencies shall be there after system implementation in ACAA: -

- Agreement and support from senior management in other to use system.
- ACAA staff in various departments must have Computer in their office to use system.
- Network infrastructure must there to provide connectivity from end user to sever.
- ACAA staff should know the usage of CMS to store ACAA contractor's data.

3 EXTERNAL INTERFACE REQUIREMENTS

3.1 USER INTERFACES

The users will interact with CMS through a web-based interface. There shall be a friendly user interface for non-technical and technical users. In addition, an error web page will be used for unexpected system operations stating the cause of the error.

3.2 HARDWARE INTERFACES

The CMS is a web application, and for normal function of the system, it needs to interact with a Web server, Database server, Storage server, and required hardware to support operating system in server computer.

3.3 SOFTWARE INTERFACES

The Contract Management System is a web portal, and it shall be developed under windows operating system using the following series of web development tools. The communication between the database and CMS consists of operation concerning profile management, airline requests such flight permission and licenses for crew and certificates.

3.4 COMMUNICATIONS INTERFACES

The architecture for communication shall follow the client-server model. The communication between client and server shall be maintained using a REST compliant web service and must be served over HTTPS protocol and the communication must be stateless. The FTP protocol shall be used to transfer files between client and server.

4 SYSTEM FEATURES

This section of the SRS describes requirements for the system's features.

4.1 CONTRACT DETAILS MANAGEMENT

4.1.1 Description and Priority

Business holders such as airlines, travel agencies, shopping stores inside airports, fuel contractors, ACAA parking contractors and other business holders who are requesting to use ACAA services and properties for their business must have a contract with ACAA. The ACAA is charging businesses holders who are using the organization services and properties. Therefore, the Contract Management System will help the ACAA in managing contract creation, execution, and analysis to maximize operational and revenue collection from the contractors. On the other side, it will help the contractors to use the client portal services while working with ACAA.

4.1.2 Stimulus/Response Sequences

- Stimulus: ACAA request for company (airline, travel agency, and other business holders) registration form.
- Response: System displays the form for the use to enter company and owner details
- Stimulus: ACAA request for contract registration form.
- Response: System displays the contract registration for to enter contract details.
- Stimulus: ACAA request to generate client account for the company.
- Response: System generates an account and provide the user with a username and password for login purpose.
- Stimulus: ACAA upload the contract relate documents.
- Response: System saves the uploaded documents.
- Stimulus: ACAA request to view the list of contractors.
- Response: System displays the list of active and non-active contractors with ACAA.

4.1.3 Functional Requirements

REQ: -1. Airline / travel agency and other business holder should be able to view their accounts and update their profile.

REQ: -2. System should generate reports from active and non-active contractors.

REQ: -3. ACAA should be able to deactivate an account.

REQ: -4. ACAA should be able to modify the company account details.

REQ: -5. ACAA should be able to modify contract details as per new contract terms and conditions.

4.2 FUEL CONTRACT MANAGEMENT

4.1.1 Description and Priority

ACAA charge the fuel contractor based on the quantity of fuel that the contractor is bringing to ACAA for airlines. The amount of 1000 Afghanis will be charged per ton of fuel. The quantity of fuel will be validated by ACAA staff and based on that the contractor will be charged. The system will automatically calculate the charges amount for contractor. The invoice and billing of Revenue Management System will generate the invoice for charged amount.

4.1.2 Stimulus/Response Sequences

- Stimulus: ACAA request to view the form for fuel.
- Response: System provides a form to fill the fuel quantity per ton, date and other details.
- Stimulus: ACAA request to display the charge amount for fuel.
- Response: System displays the charged amount for fuel.

4.1.3 Functional Requirements

REQ: -1. System should generate reports for delivered fuel and paid invoices.

REQ: -2. The fuel invoice generation and processing should be managed by Revenue Management System.

4.3 TRAVEL AGENCY CONTRACT MANAGEMENT

4.1.1 Description and Priority

The travel agencies must be registered with ACAA and there should be an account provided to them. They are paying the tax amount directly to ACAA account for a particular ticket. The agencies must deposit an amount to the ACAA account in advance to pay the tax for a ticket. The tickets without tax slip will be not accepted in the airport.

4.1.2 Stimulus/Response Sequences

- Stimulus: ACAA request to add advance balance amount.
- Response: System saves the travel agency paid amount balance to the agency account.
- Stimulus: Travel Agency request to view account balance.
- Response: System displays the account balance to the agency

4.1.3 Functional Requirements

REQ: -1. System should calculate tax amount for a particular ticket and deduct from balance amount.

REQ: -2. System should generate reports for active and non-active accounts.

4.4 PROPERTY AND PARKING CONTRACT MANAGEMENT

4.1.1 Description and Priority

The ACAA is charging businesses who are having property relate contracts. The property rent is collected monthly-based, and the business owners are charged for electricity usage as well. In addition, the contractors for parking slots inside various airports of Afghanistan are also charged monthly-based according to the amount mentioned in the contract. The payments will be handled in Revenue Management System.

4.1.2 Stimulus/Response Sequences

- Stimulus: ACAA request to view the list of contractors.
- Response: System displays the list of contractors.
- Stimulus: The contractor request to display the list of paid rents and other charges.
- Response: System displays the requested details.

4.1.3 Functional Requirements

REQ: -1. ACAA should be able to change rent amount and electricity charges amount.

REQ: -2. System should generate the required reports of property and the property contractors.

5 OTHER NONFUNCTIONAL REQUIREMENTS

5.1 PERFORMANCE REQUIREMENTS

Contract Management System must be interactive and there must be less delays in each action-response of the system. There should be low delay in performance and below 2 seconds while opening the forms, saving the filled forms, popping of error messages, saving the sessions or settings, and displaying the data.

5.2 SAFETY REQUIREMENTS

Information should be securely transmitted to the server without any changes. The system must secure the sensitive data. In addition, to improve the performance, the data should be divided into sensitive data and insensitive data. The insensitive data can be retrieved rapidly, and the sensitive data is encrypted/ decrypted using Encryption algorithms. Moreover, the following safety and protection should be considered: -

- User should be prevented, to the extent possible, from entering wrong data. Such as:
    - Phone number should have 10 digits initiated by 07 or 02.
    - No letter should be inserted on numeric fields.
    - No number should be inserted on property tax field.
    - Email format should be considered in email field.
    - System should pop up a proper message if sensitive information is not entered.
- System should only be able to upload files in PDF, JPG format, and file with EXE and BAT formats should be prevented.
- User should enter his password after the first log in.
- System should prevent accepting simple password.

5.3 SECURITY REQUIREMENTS

There must be proper security mechanism for the system to avoid possible hacking of the system. The following web security practices should be considered in the development phase.

- Sanitize inputs at the client-side and server-side.
- Encode request/response.
- Use HTTPS for domain entries.
- Use only current encryption and hashing algorithms.
- Do not allow for directory listing.
- Do not store sensitive data inside cookies.
- Check the randomness of the session.
- Set secure and HttpOnly flags in cookies.
- Use TLS not SSL.
- Set strong password policy.
- Do not store sensitive information in a form's hidden fields.
- Verify file upload functionality.
- Set secure response headers.

- Make sure third-party libraries are secured.
- Hide web server information.

In addition,

- Different and adequate system access levels should be defined.
- Different users such as director, manager, employee, and other officials should have special access to the system.
- System data should be accessed to users in a safe way and only based on rights.
- All log in steps and processes should be carried out under SSL protocol in an encrypted manner.
- Users' personal data should be stored on an exclusive server in an encrypted and protected way.

5.4 SOFTWARE QUALITY ATTRIBUTES

5.4.1 Availability

While saving the information or uploading the files to the system in case the internet service gets disrupted, the information or files can be saved again.

5.4.2 Usability

The system should be easy to handle and should operates in the most expected way with no delays. In addition, it should perform according to needs and transverse quickly between its states.

5.5 BUSINESS RULES

The ACAA top management and employees must have access to the system according to their duties and responsibilities. The ACAA policies and regulations must be considered while defining access levels for the ACAA staff. In addition, the airlines, travel agencies and other contractors should be provided an account as a user to view account details, balance information and upload the documents to their account. Hence, there are four types of users to the CMS, such as super admins who are having access to the whole system and system configuration, admins who are the top management of ACAA, user accounts for ACAA staff and user accounts for airlines, travel agencies and other contractors.

6 OTHER REQUIREMENTS

6.1 MAINTENANCE

- Software should be developed in a standard way.
- Clarity and readability of source code should be preserved.
- Technical documents about system development should be provided to ACAA.

6.2 DOCUMENTATION

- In addition to given project, all documents should be delivered written.
- After project delivery, online back-up will kick start.
- A CD containing all information about system capabilities along with step-by-step approach will be delivered.

6.3 USABILITY

- System should be developed as generally expected with learning facilitation.
- System should instruct user to undertake different functions of the system.

6.4 TRANSFERABILITY

- Users and system data should be stored in a central room at ACAA using the software; and connection to central database will be possible by installing system on another server.

6.5 SYSTEM USE AND DISSEMINATION RIGHTS

- The system will be designed to be used by ACAA. All its rights will be reserved for ACAA, and no other person or agency will have commercial rights or system code to the system. ACAA has the right to change the code and project structure, after it is delivered.

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Appendix A: Analysis Models

1. Entity Relation Diagram for CMS

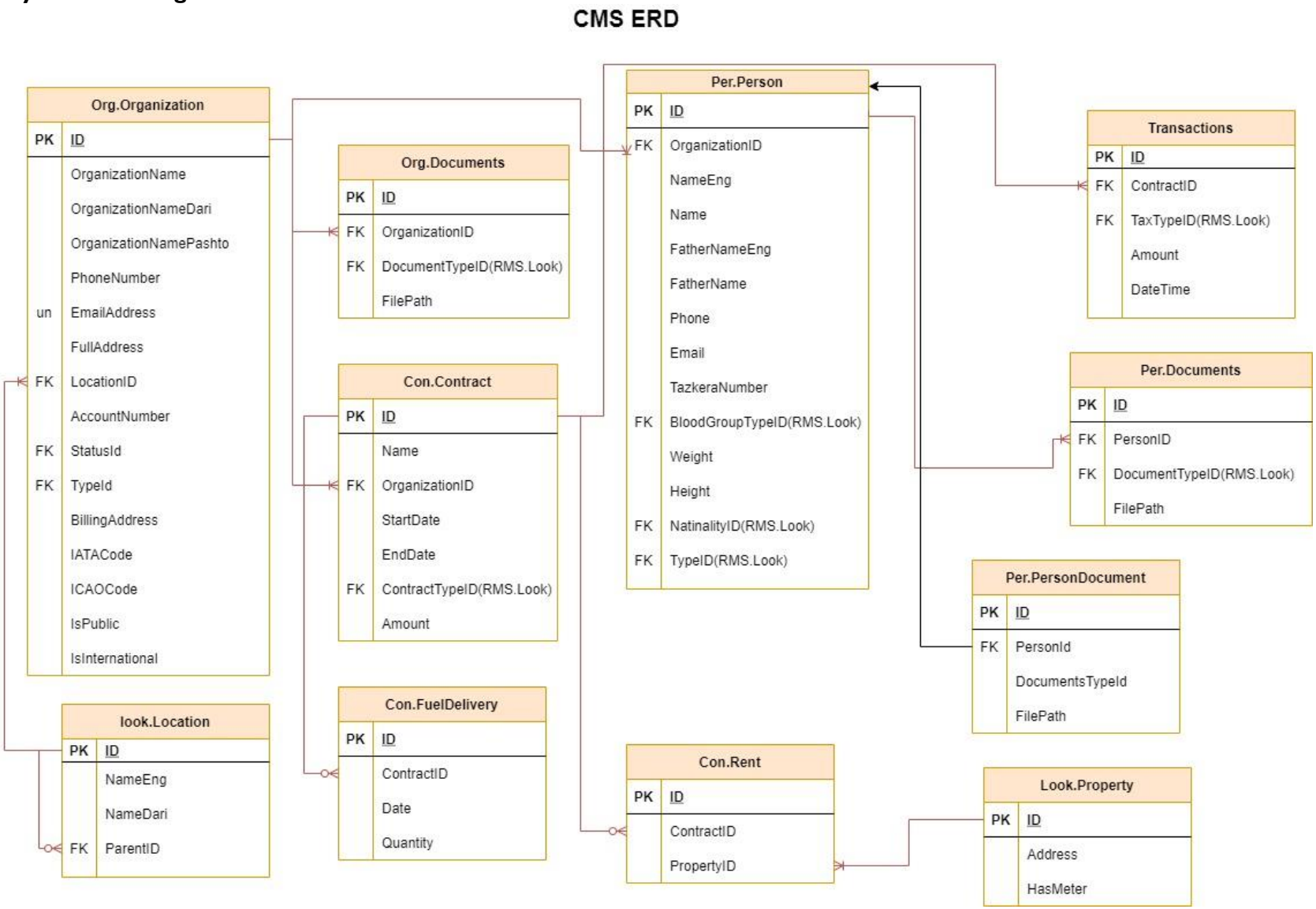

Figure 3: Entity Relation Diagram for CMS


Civil Aviation Authority
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