

Revenue Management System

Software Requirements
Specification

Technical Document
Draft Version 0.1

Afghanistan Civil Aviation Technical Team

TABLE OF CONTENTS


Revision History.....	3
Document approval.....	4
acronyms and abbreviations.....	5
1 Introduction.....	6
1.1 Purpose.....	6
1.2 Document Conventions	6
1.3 Intended Audience and Reading Suggestions.....	6
1.4 Product Scope.....	6
2 Overall Description	8
2.1 Product Perspective.....	8
2.2 Product Functions	9
2.3 User Classes and Characteristics	10
2.4 Operating Environment	11
2.5 Design and Implementation Constraints	12
2.6 User Documentation.....	13
2.7 Assumptions and Dependencies.....	13
3 External Interface Requirements	14
3.1 User Interfaces.....	14
3.2 Hardware Interfaces	14
3.3 Software Interfaces	14
3.4 Communications interfaces	14
4 System Features	15
4.1 Passenger Service Fee (PAX) and Airport Development Fee (ADF)	15
4.1.1 Description and Priority.....	15
4.1.2 Stimulus/Response Sequences	15
4.1.3 Functional Requirements	15
4.2 Overflight, Landing, Departure, Parking and Lighting Fee	15
4.1.1 Description and Priority.....	15
4.1.2 Stimulus/Response Sequences	16
4.1.3 Functional Requirements	17
4.3 Billing Items and Invoicing.....	17
4.1.1 Description and Priority.....	17
4.1.2 Stimulus/Response Sequences	17
4.1.3 Functional Requirements	18

5	Other Nonfunctional Requirements.....	19
5.1	Performance Requirements	19
5.2	Safety Requirements	19
5.3	Security Requirements	19
5.4	Software Quality Attributes.....	20
5.4.1	Availability	20
5.4.2	Usability	20
5.5	Business Rules	20
6	Other Requirements.....	21
6.1	Maintenance	21
6.2	Documentation	21
6.3	Usability	21
6.4	Transferability.....	21
6.5	System Use and Dissemination Rights.....	21
	References.....	21

REVISION HISTORY

Name	Date	Revision Description	Version
Mirwais Farahi	May 20, 2021		Version 0

DOCUMENT APPROVAL

Signature	Printed Name	Title	Date
	Mr. Amin Metahari	Revenue Deputy Director	16, Jun, 2021

ACRONYMS AND ABBREVIATIONS

The following table describes the abbreviation and acronym 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
RMS	Revenue Management System
ATM	Air Traffic Management
ATC	Air Traffic Control
SRS	Software Requirements Specification
DSS	Data Storage System
HTTPS	Hypertext Transfer Protocol Secure
FTP	File Transfer Protocol
SSL	Secure Sockets Layer
IATA	International Air Transport Authority
AODB	Airport Operational Database

I INTRODUCTION

I.1 PURPOSE

The Software Requirements Specifications Document (SRS) is for the Revenue Management System (RMS) within the context of Afghanistan Civil Aviation Enterprise Solution (ACAE) for Afghanistan Civil Aviation Authority (ACAA) supported by USAID. The information of this SRS document is collected from various department involved for collecting the Revenue of ACAA. The main purpose of this document is to work as a guideline to develop and implement RMS 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.

I.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.

I.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 Revenue Management System.

I.4 PRODUCT SCOPE

The ACAA is performing manually the revenue collection from various sources of revenue across Kabul, Herat, Mazar-i-Sharif, Kandahar international airports and domestic airports. To collect data, the ACAA is not having a consistent format and most of the data cannot be validated. ACAA receives their revenue data directly from subcontractors or directly from airlines that operate in Afghanistan's airports.

The departments of ACAA process the data that is received by subcontractors and airlines to generate invoices and collect the revenue for overflight charges for airspace usage, aircraft landing, aircraft parking, lighting services for aircrafts, passenger service charges, pilot/crew license and aircraft registration fees, airport development fee, utility and rent fee, and parking charges. There is no internal process in ACAA to verify the validity and accuracy of the data that is sent by airlines and other subcontractors. In addition, the statistical departments in four international airports are also making mistakes while adding the revenue data to the IATA portal. Therefore, IATA is also not able to generate invoices for incorrect data sent by statistical department. There is no proper mechanism also to track the generated invoices for airlines. In addition, the airlines are not paying the invoices on-time and the ACAA is not able to properly collect the invoices from airlines.

ACAA revenue monthly reports are generated by the statistical department for the international airports and by the ATM for domestic airports and airfields. The reports are then shared with finance

department of ACAA. There is no mechanism within ACAA to check whether all reports have been delivered each month or to verify the accuracy and validity of reports received.

To address all above problems with revenue collection, there must be an enterprise solution to enhance revenue collection and to generate accurate and timely invoices for all types of revenue. The RMS is a web-based application which brings accuracy and reducing error rates in revenue collection across all ACAA airports. It is an Enterprise Software Solution to streamline the movement of the data, increase accuracy and efficiency, reduce errors, and improve transparency in all sources of revenue collection such as overflight charges for airspace usage, aircraft landing, aircraft parking, lighting services for aircrafts, passenger service charges, pilot/crew license and aircraft registration fees, airport development fee, utility and rent fee, and parking charges. The system would automate the collection, processing, and invoicing of all air navigation service charges. Moreover, system will help revenue involved departments of ACAA to improve their daily activities more mostly relate to revenue collection, managing data and reporting from the system.

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

- i. To build a system through which the departments of ACAA can handle different types of revenue collection, such as overflight fee, passenger services charges, airport development fee, air traffic control fee, landing fee, lighting fee, parking fee, pilot and crew license fee, property rent and electricity charges and fuel fee.
- ii. To automate revenue collection process.
- iii. Data capture and validation.
- iv. Invoice generation and distribution.
- v. Email notification of invoice status (Capability to send notifications to the ACAA, airlines and other business holders of ACAA when the invoice is ready)
- vi. Email reminder notification for non-paid invoices.
- vii. To generate invoice summary reports
- viii. The airlines shall be able to apply for flight permission.

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 to send scheduled and non-scheduled flight details, request for Permission Number, receive invoices for payments and view other necessary information, while the management web portal will be used for managing the information about the flights scheduling, collecting various revenues from the airlines and other stakeholders and overall system management.

The Revenue Collection system 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.

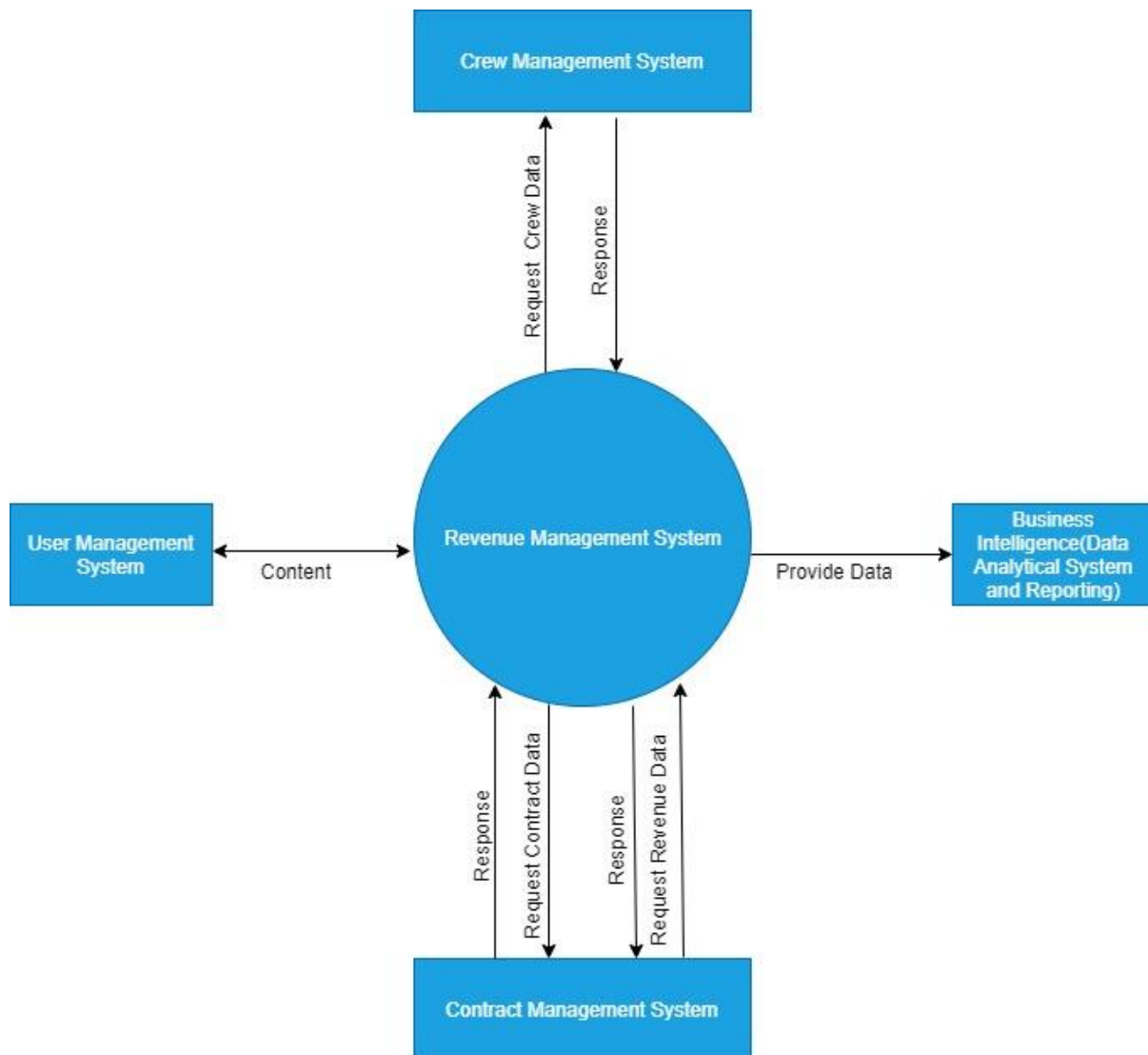


Figure 1: RMS Context Diagram

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: -

- Airline electronically request for flight permission.
- Flight Scheduling (Flight Scheduling by ACAA and flexibility in change of aircraft type and call-sign)
- Electronically send and receive notifications between different departments of ACAA.
- Invoice generation for airlines and other business holders with ACAA.
- Email notifications for invoices.
- To generate invoice summary reports.
- Statistical reports relate to revenue.
- Issuing and printing license and certificate capability to airlines.
- Computerized archiving of documents.
- Restrict and allow user control based on standards and policy of ACAA.

2.2 PRODUCT FUNCTIONS

RMS is a standalone system that provides functionality described in the Product functions section. It includes overflight fee, passenger services charges, airport development fee, air traffic control fee, landing fee, lighting fee, parking fee, pilot and crew license fee, property rent and electricity charges and fuel fee subsystems to fulfill software requirements. In addition, RMS has interfaces to the external system, such as Contract Management System, Ground Handling 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 RMS on the functionality area and supported external systems.

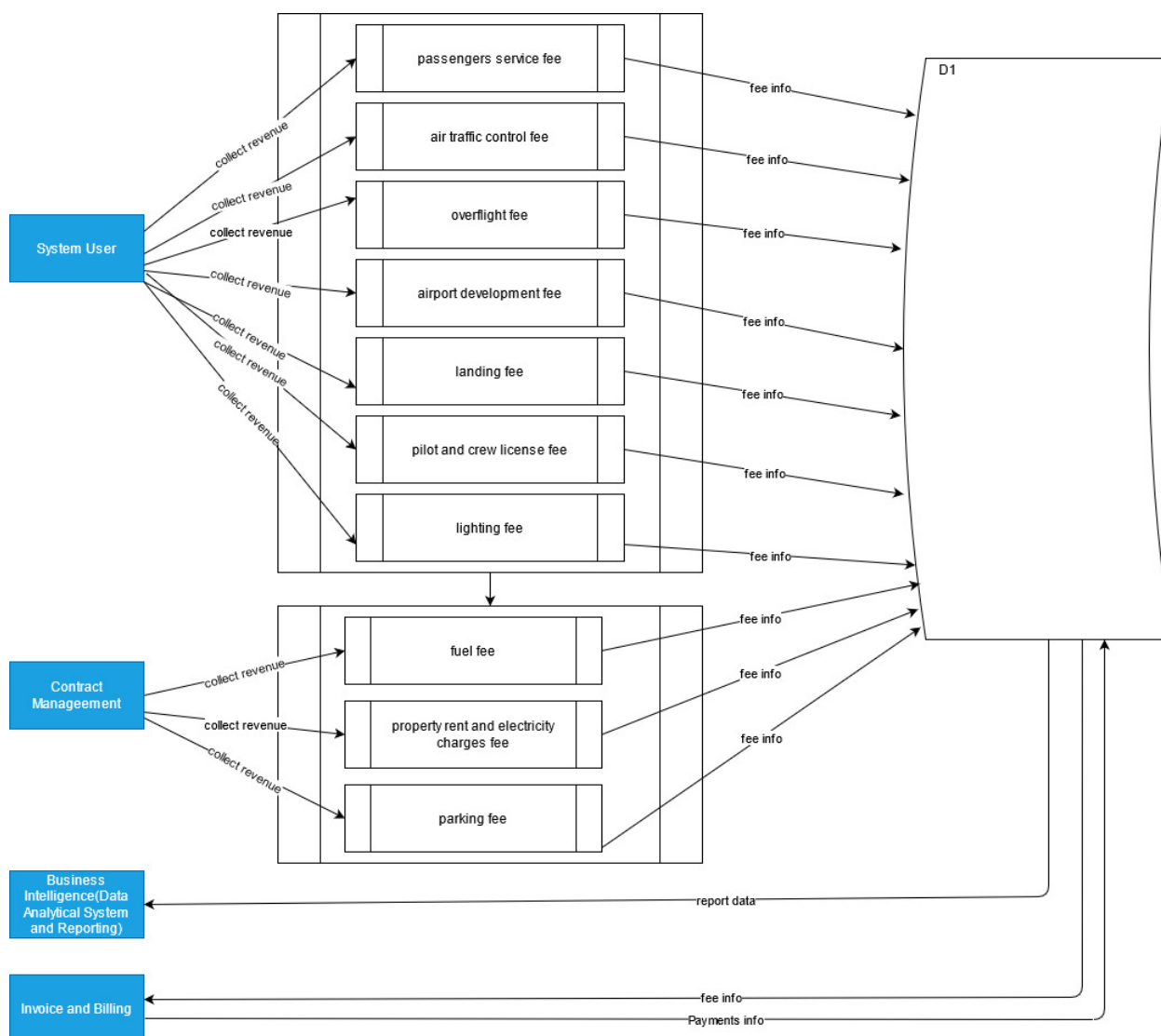


Figure 2: RMS Data Flow Diagram

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

2.3 USER CLASSES AND CHARACTERISTICS

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

- Airlines:** This type of user can only use the system to fill the Permission Number form for scheduled and non-scheduled flights.
- Travel Agencies:** The travel agencies will use their accounts for tax payments of the ticket. The tax slip will be printed along with the ticket for the customer.
- ACAA Staff:** The employees of ACAA are responsible to enter their daily data to the system. They will manage the data related to Revenue and other necessary data in the system. The staff will have access to RMS System based on their TOR and assignment.
- 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 is 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 RMS: -

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: $8GB \times 8 = 64GB$ or $8GB \times 16 = 128GB$
 - 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: $8GB \times 8 = 64GB$ or $8GB \times 16 = 128GB$
 - 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: $8GB \times 8 = 64GB$ or $8GB \times 16 = 128GB$
 - 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 and pilot and crew licenses details, ACAA

properties rent details, data relate to fuel and invoice and billing details must be stored in database.

- Microsoft .NET technologies will be used for development and SQL Server will be used as an engine and database.
- RMS 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 RMS. 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 RMS 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 RMS to store daily data related to revenue and perform revenue tasks appropriately using the system.

3 EXTERNAL INTERFACE REQUIREMENTS

3.1 USER INTERFACES

The users will interact with RMS 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. Details of the user interface design shall be provided in a separate user interface specification document.

3.2 HARDWARE INTERFACES

The RMS 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 Revenue Management System is a web-based system where it consists of client-web portal and management web-portal for ACAA's business holders and ACAA's employees, respectively. The client-web portal connects with the database to request for flight permissions, certificates and crew license, profile account, receiving invoices and other required activities. The communication between the database and the database-web portal consists of operation concerning managing revenue, invoices, and other internal operations of both ATM and Revenue Directorate.

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 PASSENGER SERVICE FEE (PAX) AND AIRPORT DEVELOPMENT FEE (ADF)

4.1.1 Description and Priority

The passenger service and airport development fee are imposed on the passengers for domestic and international flights. The PAX for domestic and international flights are \$1.000 USD and \$30.00 USD, respectively. The ADF help to fund further development of the airport's infrastructure. It is \$2.00 USD for domestic flight and \$10.00 USD is for international flight per passenger.

4.1.2 Stimulus/Response Sequences

- Stimulus: Airline / Travel Agency (Herein after referred as user) request for Tax payment form for a particular ticket.
- Response: System displays the form for the use to enter ticket details.
- Stimulus: User fill the form and request for Tax payment for the ticket.
- Response: System deduct the PAX and ADF amount for the ticket and generates tax paid slip.
- Stimulus: ACAA request for the details of paid taxes.
- Response: System displays the list of paid taxes of different users.
- Stimulus: ACAA staff scan the slip for verification
- Response: System validate (approve or reject) the tax slip for the ticket.

4.1.3 Functional Requirements

- REQ: -1. Airline / travel agency should be able to generate paid tax slip for a particular ticket.
- REQ: -2. User should be able to view the lists of generated tax slips for booked flights.
- REQ: -3. User should be able to cancel generated tax slip of a particular ticket.
- REQ: -4. User should be able to view account balance and paid taxes.
- REQ: -5. User should be able to print paid tax slip of a particular ticket.
- REQ: -6. ACAA should be able to change the passenger tax fee for international and domestic flights.
- REQ: -7. ACAA should be able to display the list paid tax amounts for tickets.
- REQ: -8. System should generate reports for flights taken place, passenger counts, collected revenue.

4.2 OVERFLIGHT, LANDING, DEPARTURE, PARKING AND LIGHTING FEE

4.1.1 Description and Priority

The ACAA charges overflight fee to the operators of the airlines flying through Afghanistan controlled airspace or territory. The overflight fee is \$700.00 USD per the entry of each aircraft that passes the Afghanistan airspace. The landing fee is imposed to charge an aircraft based on its weight for both domestic and international

flights. It is a per aircraft charge for the use of airfield. The lighting fee is payable by all aircraft taking off or landing on the airports during nighttime or low visibility of daytime. Services of lighting which is being provided to airlines in both international and domestic airports, and the fee for domestic flight is \$20.00 USD and for international flight is \$60.00 USD. The parking fee is payable by any aircraft parking on surfaces intended for this use. It is calculated based on the maximum weight of the aircraft. The parking fee is imposed on all international and domestic aircrafts after 4 hours of landing in Afghanistan's airports. The parking charge is 500 Afghani per ton for international flights. The domestic flights are charges based on grade of airport. The flights in Grade-1 are charged 150 Afghani per ton, and for Grade-2 and Grade-3 50 Afghani and 25 Afghani per ton, respectively. Helicopter is charged 25 afghani per ton in all airports.

4.1.2 Stimulus/Response Sequences

- Stimulus: Airline requests for flight permission form.
- Response: System provides a form for airline to enter flight type (overflight, landing, summer scheduling, winter scheduling and non-scheduled flights), flight route, estimated arrival/departure time and other required details.
- Stimulus: ACAA ATM department requests to display the list of flights requested for permission number.
- Response: System displays the list of requested flights of airlines.
- Stimulus: ACAA sends the approval or rejection. If approved, assign a unique permission number and call sing to the airline or for several aircrafts of an airline for a specific flight route.
- Response: System displays the account status (approved, rejected) and on approval assign permission number to the flights of airline for a particular flight type.
- Stimulus: ACAA ATC requests to save the taken place confirmed flights and cancelled flights.
- Response: System save the request for flights.
- Stimulus: ACAA ATC request to fill the actual departure or arrival time for flights and lighting (if requested by flight captain).
- Response: System save the actual departure or arrival time for flights.
- Stimulus: ACAA Revenue department requests to display the list of confirmed and cancelled flights.
- Response: System displays the list of confirmed and cancelled flights.
- Stimulus: ACAA Revenue department request to generate invoices for all confirmed flights, lighting and for parking duration more than 4 hours based on International and Domestic flights and based on airport grade.
- Response: System generate invoices for the request.
- Stimulus: ACAA Revenue director approve the generated invoices.
- Response: System saves the approval for the generated invoices.
- Stimulus: Airline requests for invoices to do the payments.
- Response: System displays the generated invoice to airline for payment.
- Stimulus: Airline upload the paid slip(s) to the system.
- Response: System saves the uploaded documents relate to invoice.

4.1.3 Functional Requirements

- REQ: -1. Airline should be able to request for change in aircraft type and registration number for a particular route.
- REQ: -2. ACAA ATM should be able to modify flight type, assigned call sign and other details.
- REQ: -3. ACAA should be able to generate invoice for commercial flights and no invoice for VIP, Military, UN, and other emergency flights.
- REQ: -4. ACAA Revenue should be able to add penalty to non-paid invoices.
- REQ: -5. ACAA ATM should be able to view the lists of flights that has permission number.
- REQ: -6. ACAA ATM should be able to approve or reject permission number and parking request for a flight.
- REQ: -7. ACAA ATM should be able to view the lists of approved or rejected flights.
- REQ: -8. ACAA ATM should be able to archive the documents relate to flights.
- REQ: -9. ACAA Revenue shall be able to display the list of paid invoices of flights.
- REQ: -10. System should automatically calculate the delay-time for delayed flights.
- REQ: -11. System should generate reports for confirmed flights, cancelled flights and collected revenue from all types of flights, parking and lighting.

4.3 BILLING ITEMS AND INVOICING

4.1.1 Description and Priority

The ACAA is using handwritten paper invoices and IATA for the clients' payments . The paid invoices are documented. However, it is challenging for ACAA organization which is engaged in multiple businesses. The e-invoice is a well-documented and professional-looking e-receipts generated electronically. It makes the chances of errors comparatively less and easily maintainable for the organization.

4.1.2 Stimulus/Response Sequences

- Stimulus: ACAA Revenue department request to view the generated invoices for different types of revenue, such as overflight fee, passenger services charges, airport development fee, air traffic control fee, landing fee, lighting fee, parking fee, pilot and crew license fee, property rent and electricity charges and fuel fee.
- Response: System displays the list of automatic generated invoices.
- Stimulus: ACAA revenue director or top management approve the generated invoices.
- Response: System saves the approval for invoices.
- Stimulus: User (Airline, Travel Agency, and contractor) request to view the generated invoices for their payments.
- Response: System displays the approved invoices for payments.
- Stimulus: ACAA Revenue department approve the paid invoices.
- Response: System updates the status of paid invoices as paid.

- Stimulus: ACAA Revenue department request to display the lists of paid and unpaid invoices.
- Response: System displays the list of paid and non-paid invoices.

4.1.3 Functional Requirements

- REQ: -1. System should automatically add penalty to the non-paid expired invoices.
- REQ: -2. The penalty percentage rate should be dynamic and the ACAA should be able to change it according to the ACAA policies and regulations.
- REQ: -3. ACAA Revenue department should be able to archive the paid invoices and slips documents.
- REQ: -4. Airline and other business holders should be able to upload the paid invoice slip to the system.
- REQ: -5. ACAA Revenue department should be able to view the collected amount from penalties added to the non-paid invoices.
- REQ: -6. System should send automatic email to the user once the invoice is generated and approved by ACAA.
- REQ: -7. System should send automatic reminder email to the user when the due date for invoice is expiring.
- REQ: -8. System should send automatic email to the user when the penalty is added to the unpaid invoice.
- REQ: -9. System should generate reports of collected revenue for overflight fee, passenger services charges, airport development fee, air traffic control fee, landing fee, lighting fee, parking fee, pilot and crew license fee, property rent and electricity charges and fuel fee.
- REQ: -10. System should generate reports for paid and unpaid invoices.

5 OTHER NONFUNCTIONAL REQUIREMENTS

5.1 PERFORMANCE REQUIREMENTS

Revenue 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, generating the invoices for revenue, 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 their invoices, account details, balance information and upload the documents to their account. Hence, there are four types of users to the RMS, 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 and four international airports of Afghanistan. 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.

REFERENCES

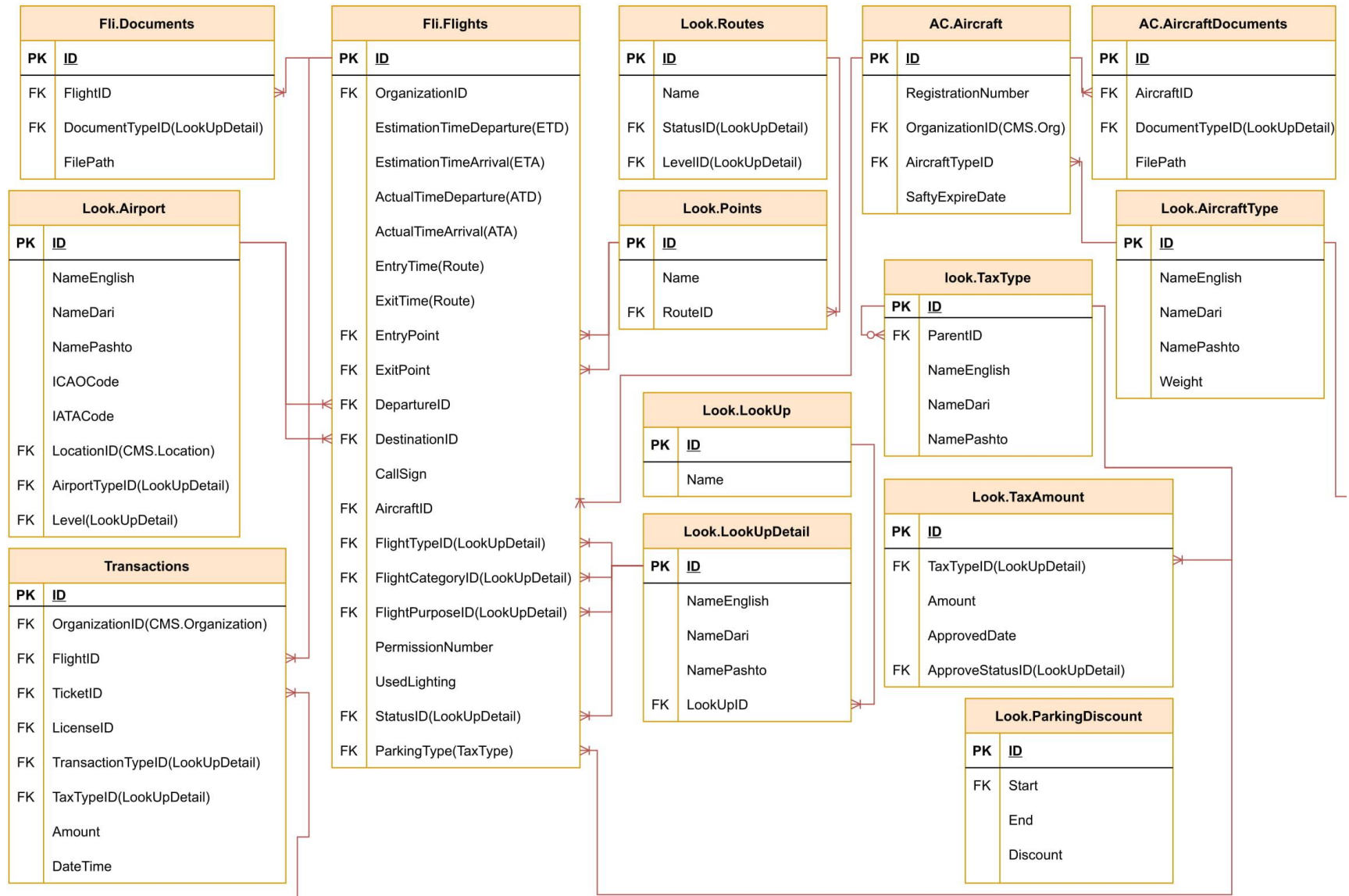
- i. Handoyo, Eko, R. Rizal Isnantoa, and Mikhail Anachiva Sonda. "SRS Document Proposal Analysis on the Design of Management Information Systems According to IEEE STD 830-1998." *Procedia-Social and Behavioral Sciences* 67 (2012): 123-134.
- ii. Ali, Syed Waqas, Qazi Arbab Ahmed, and Imran Shafi. "Process to enhance the quality of software requirement specification document." *2018 International Conference on Engineering and Emerging Technologies (ICEET)*. IEEE, 2018.
- iii. Elliott Sr, Robert A., and Edward B. Allen. "A methodology for creating an IEEE standard 830-1998 software requirements specification document." *Journal of Computing Sciences in Colleges* 29.2 (2013): 123-131.
- iv. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017 'http://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-01-Rev.-3.0_150811.pdf'
- v. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017

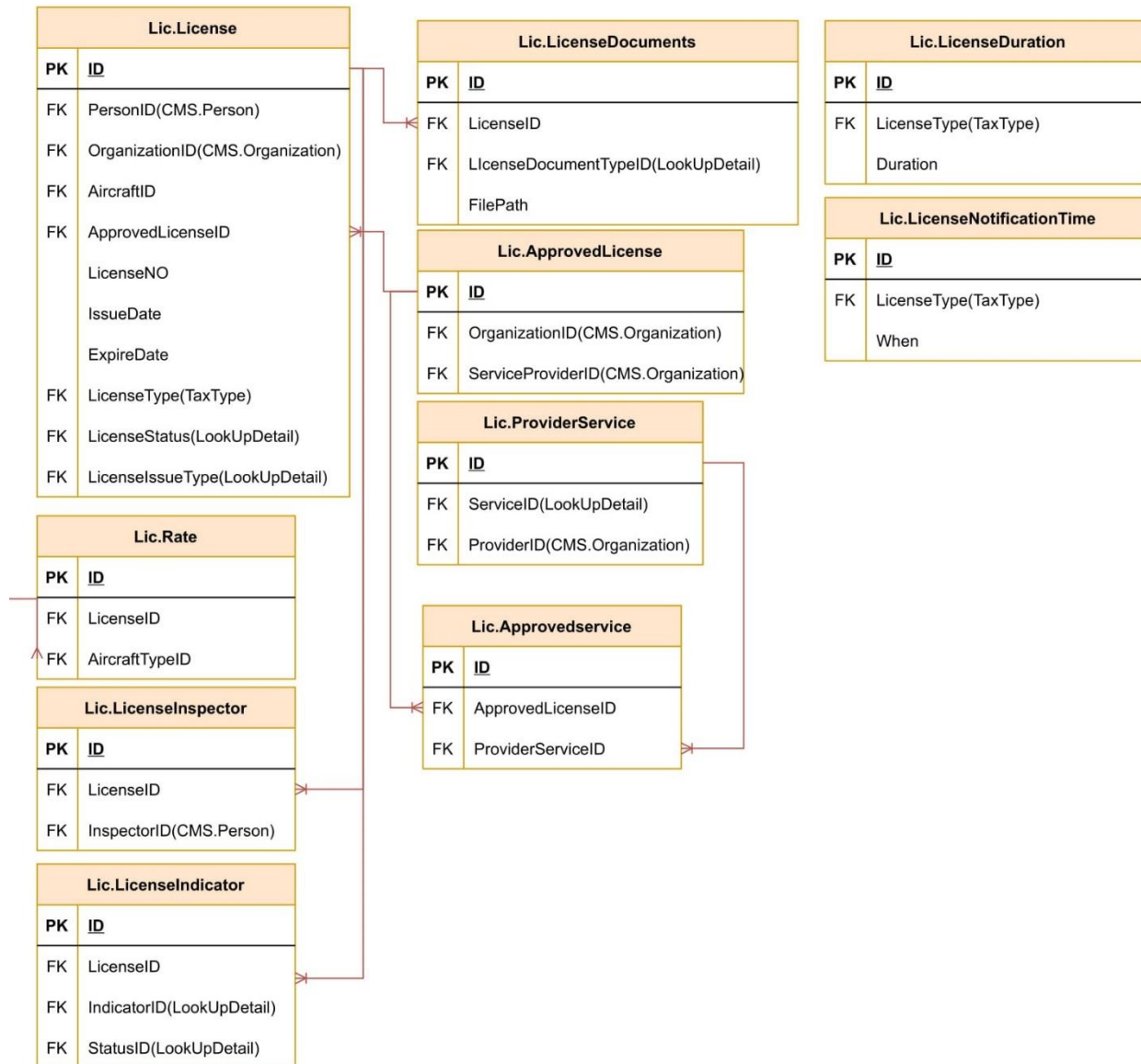
- vi. 'https://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-02-Rev.-3.0_151014.pdf'
Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017
'http://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-04-Rev.-3.0_151014.pdf
- vii. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017
'https://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-05-Rev.-3.0_151014.pdf'
- viii. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan. 2017
'https://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-09-Rev.-3.0_150812.pdf'
- ix. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017
'http://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-10-Rev.-3.0_151014.pdf'

Appendix A: Analysis Models

I. Entity Relation Diagram for RMS

RMS ERD





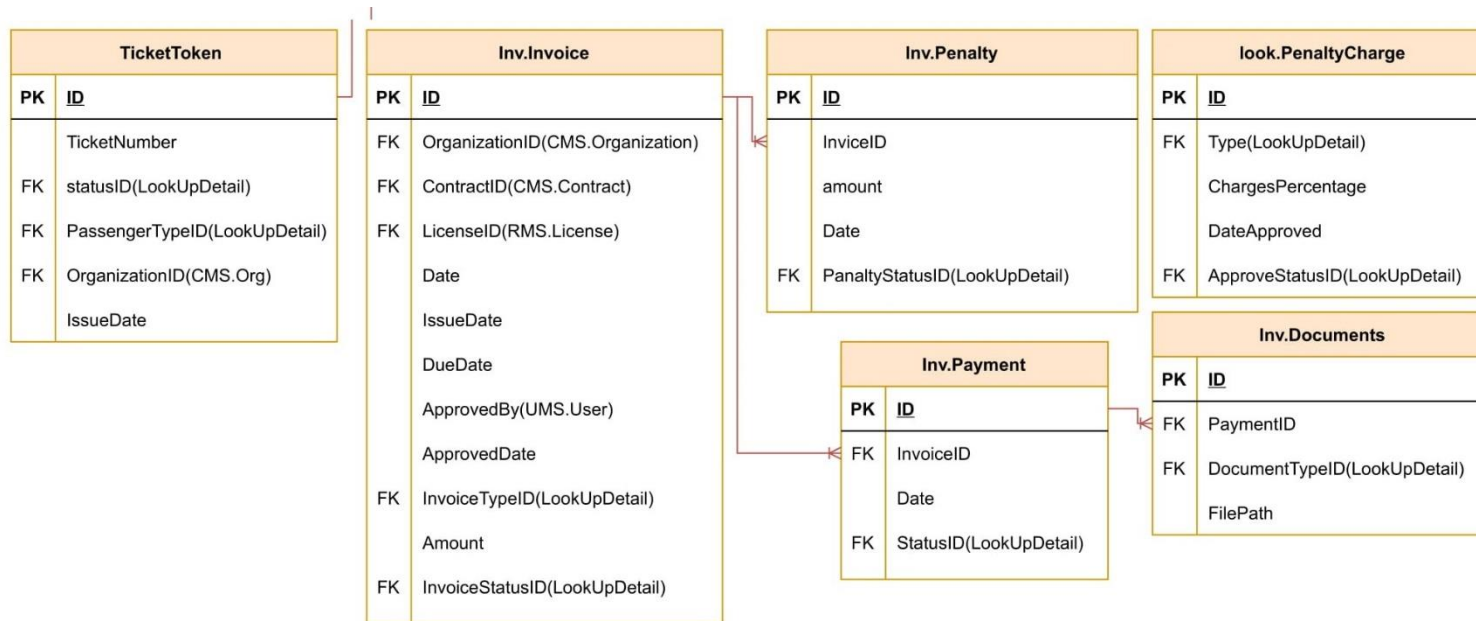
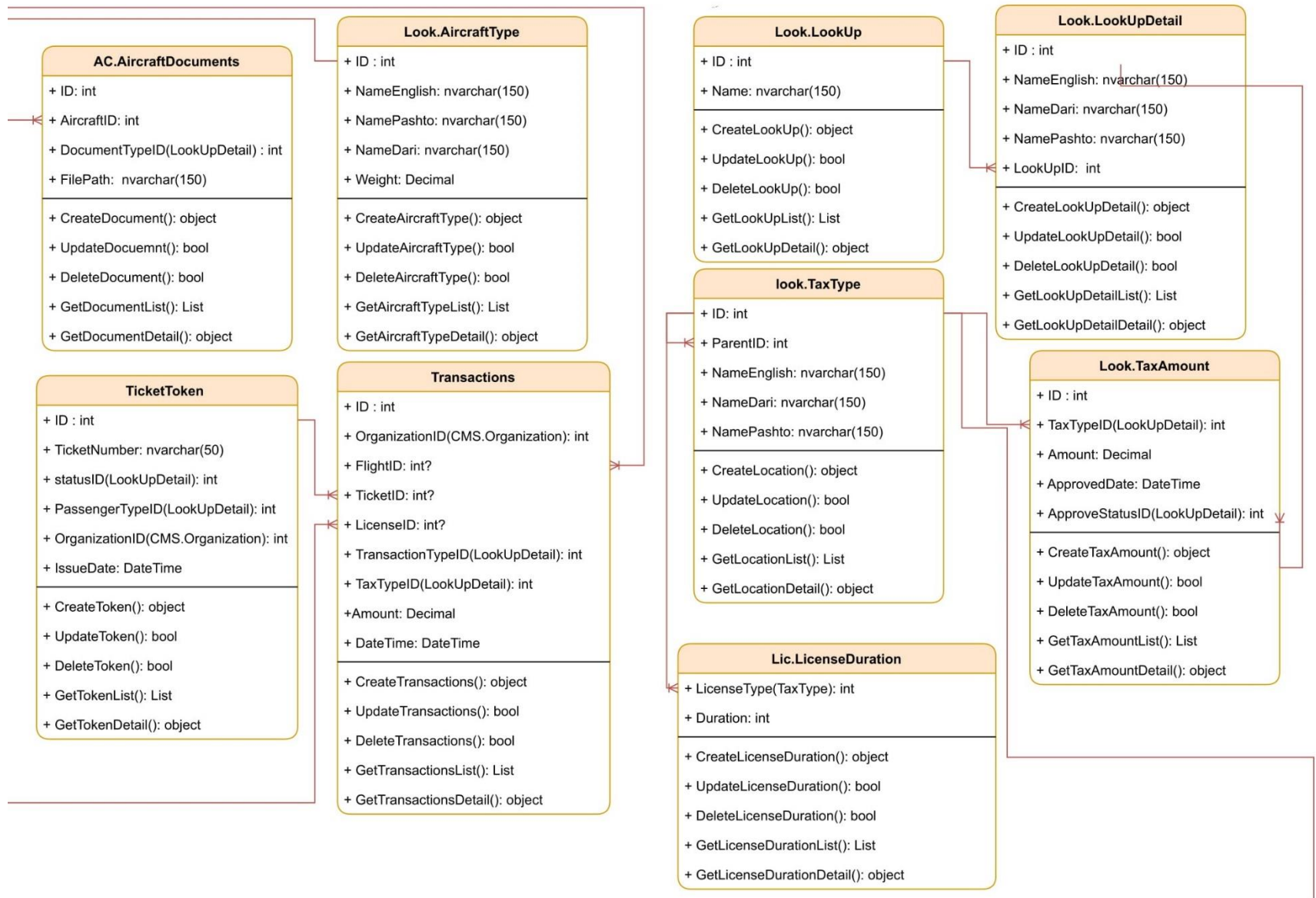


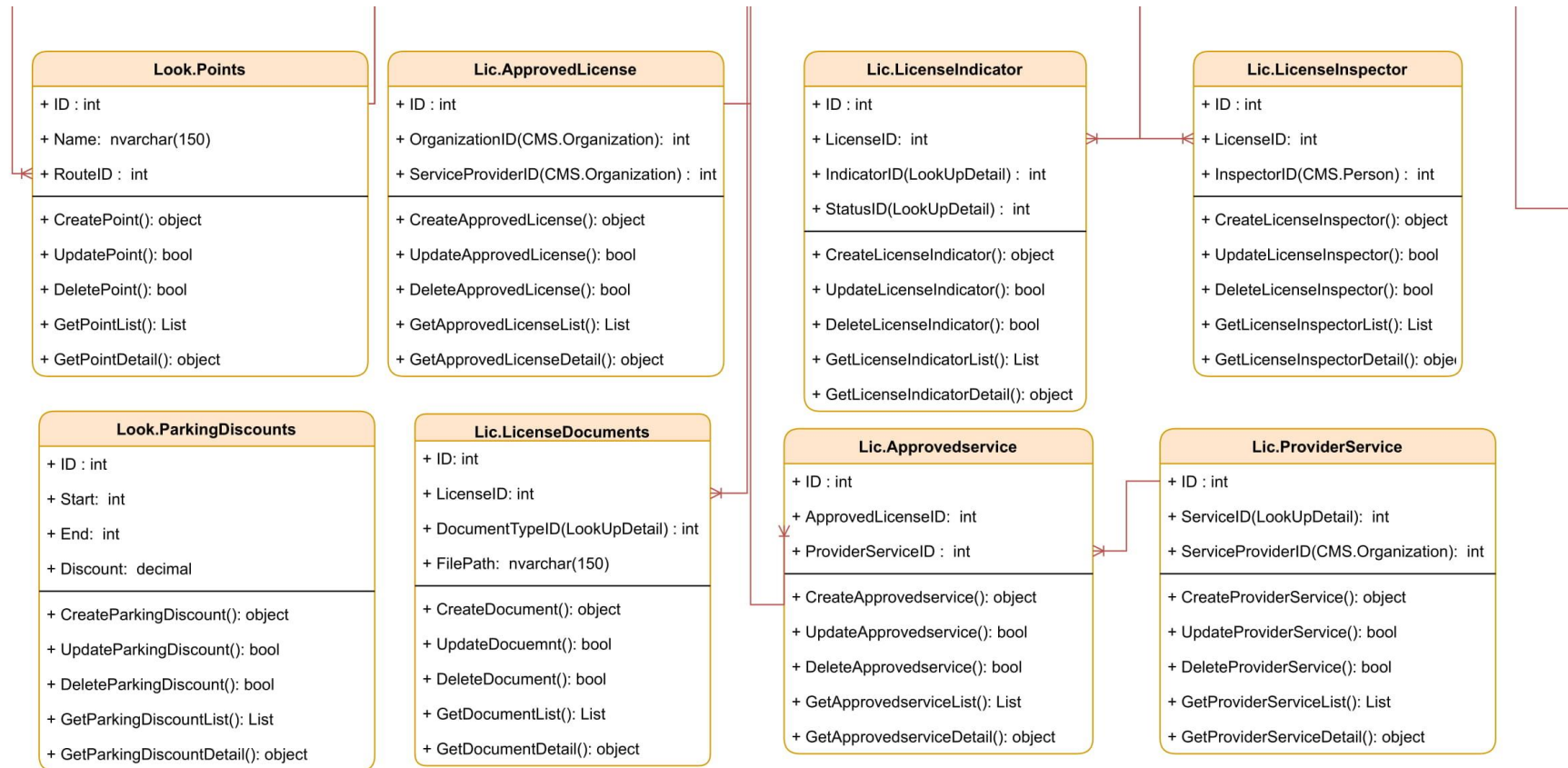
Figure 3: Entity Relation Diagram for all sub-systems of RMS

2. Class Diagram for RMS

RMS Class Diagram







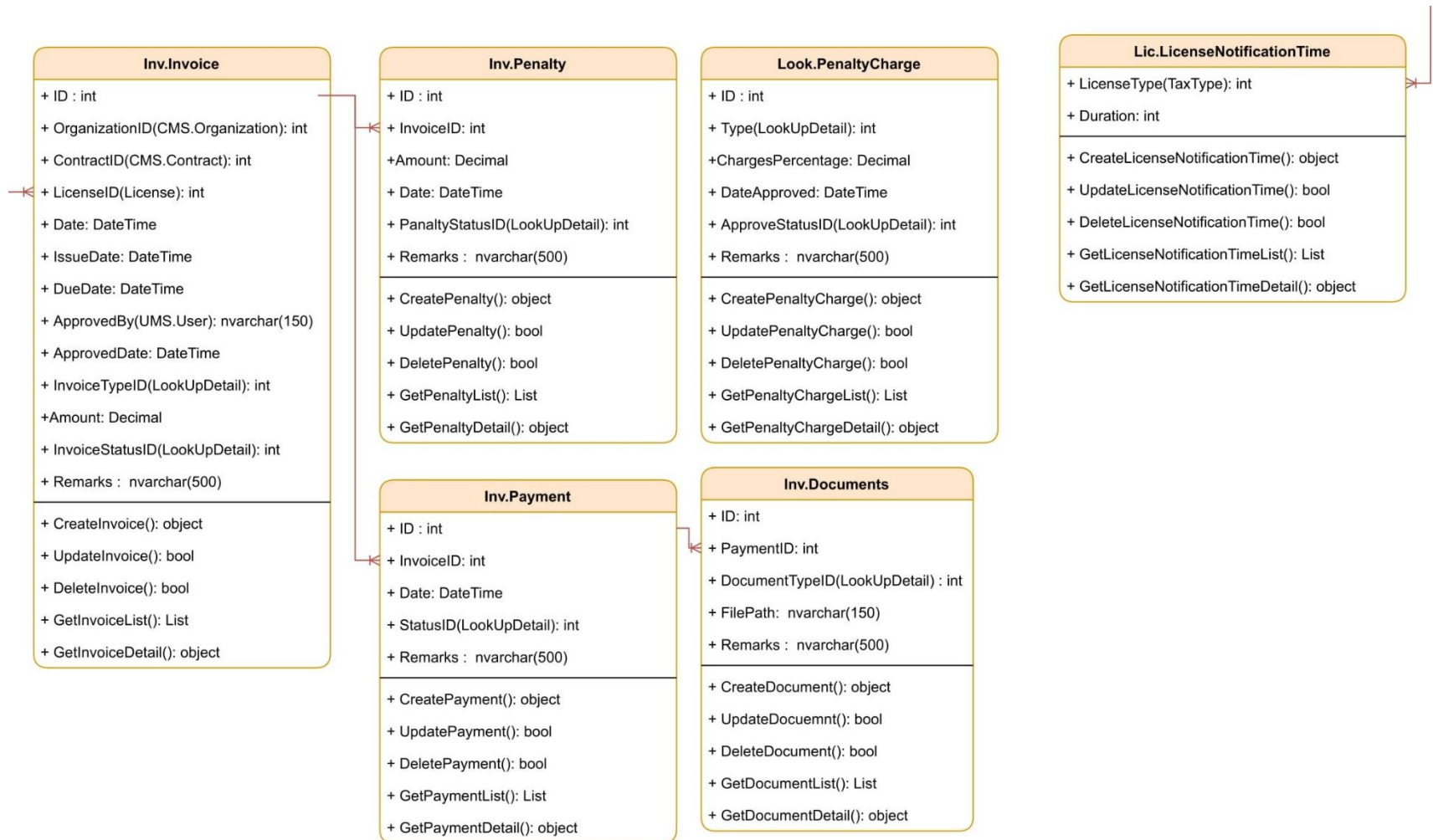


Figure 4: Class Diagram for all sub-systems of RMS

3. Sequence Diagrams

I. Sequence Diagram for passenger Fee and Airport Development Fee

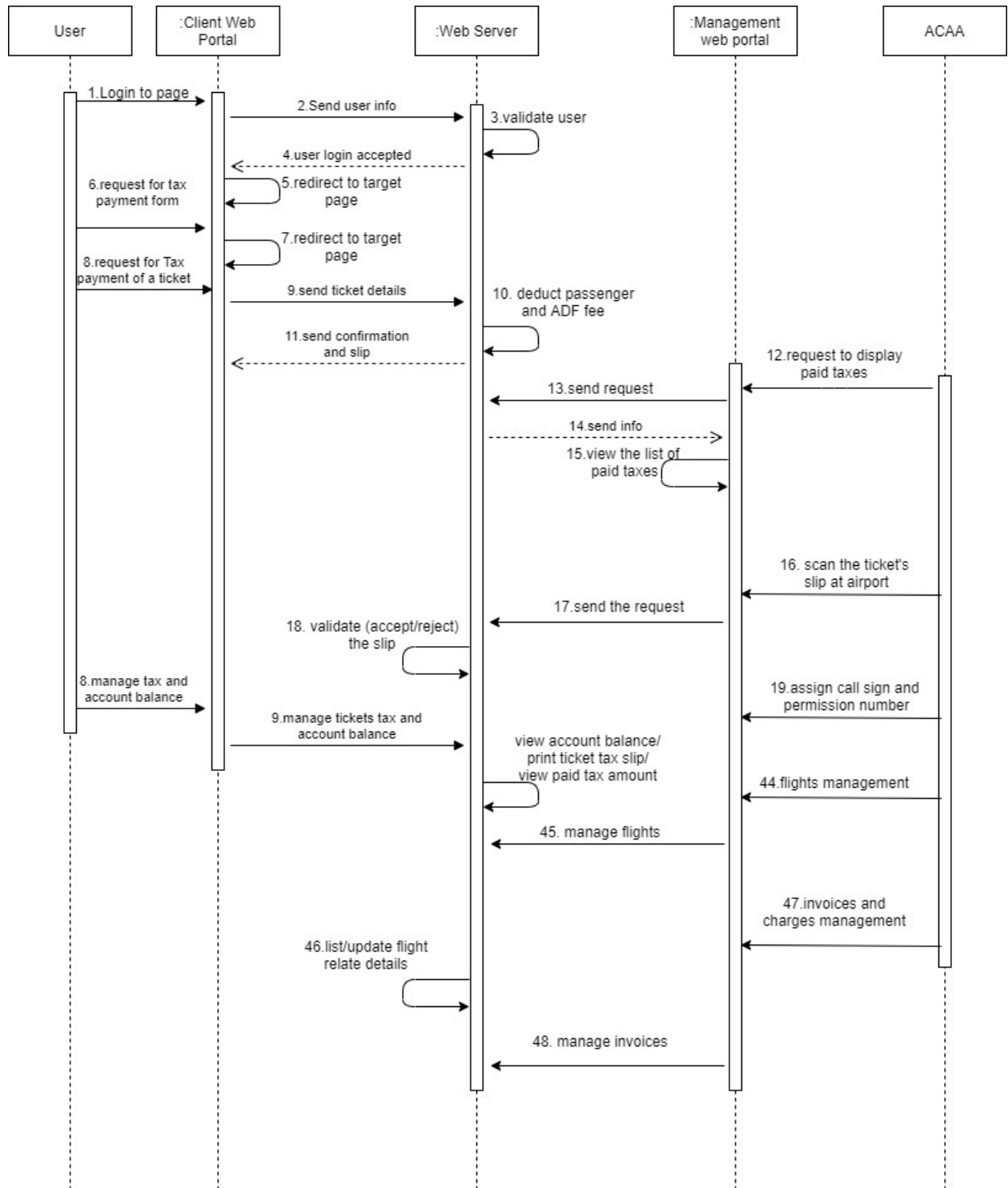


Figure 5: Sequence Diagram for passenger Fee and Airport Development Fee

II. Sequence Diagram for Overflight, Landing, Departure and Parking Fee

Afghanistan Civil Aviation Enterprise Solution

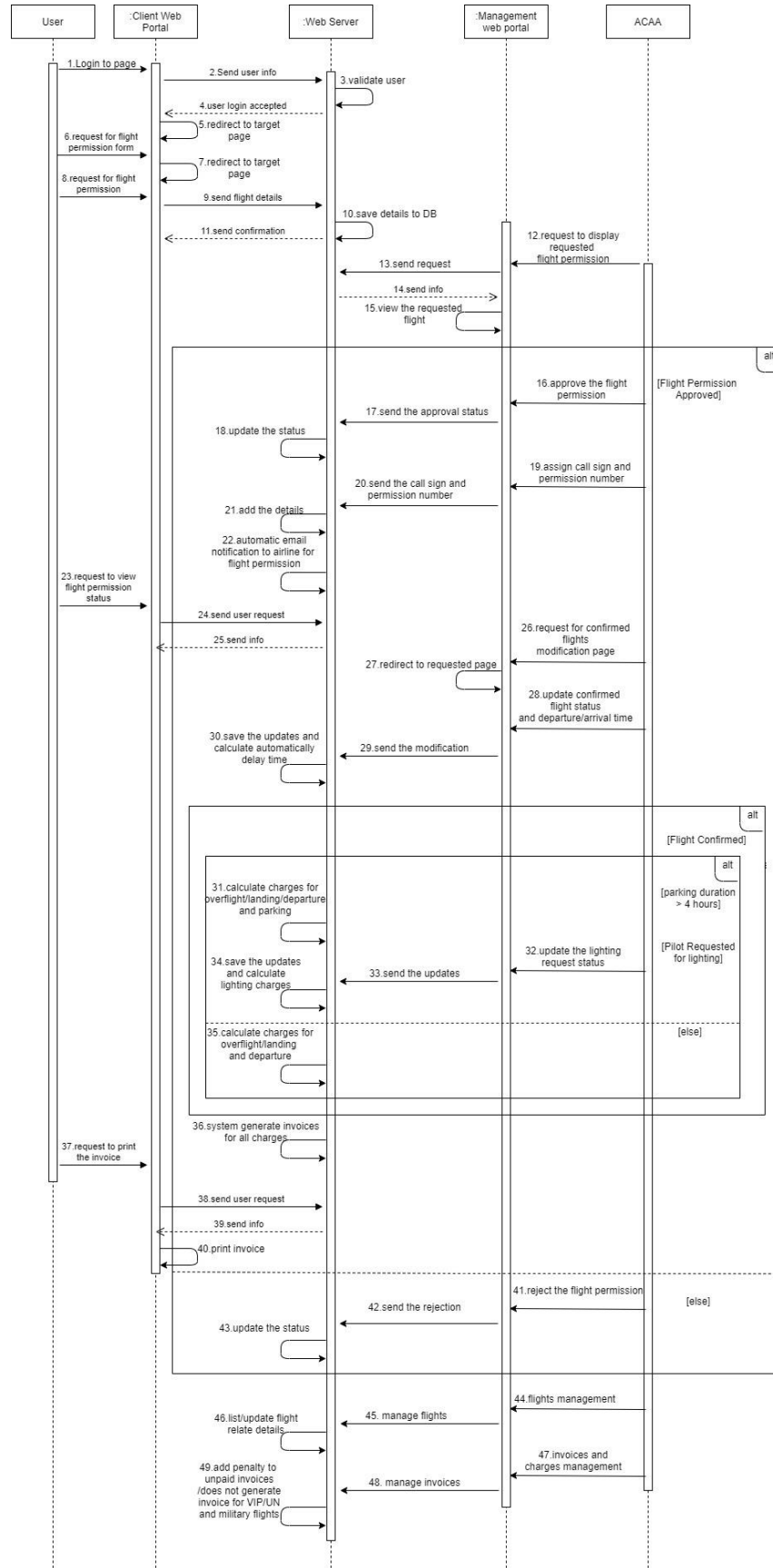


Figure 6: Sequence Diagram for Overflight, Landing, Departure and Parking Fee

III. Sequence Diagram for Billing Items and Invoice

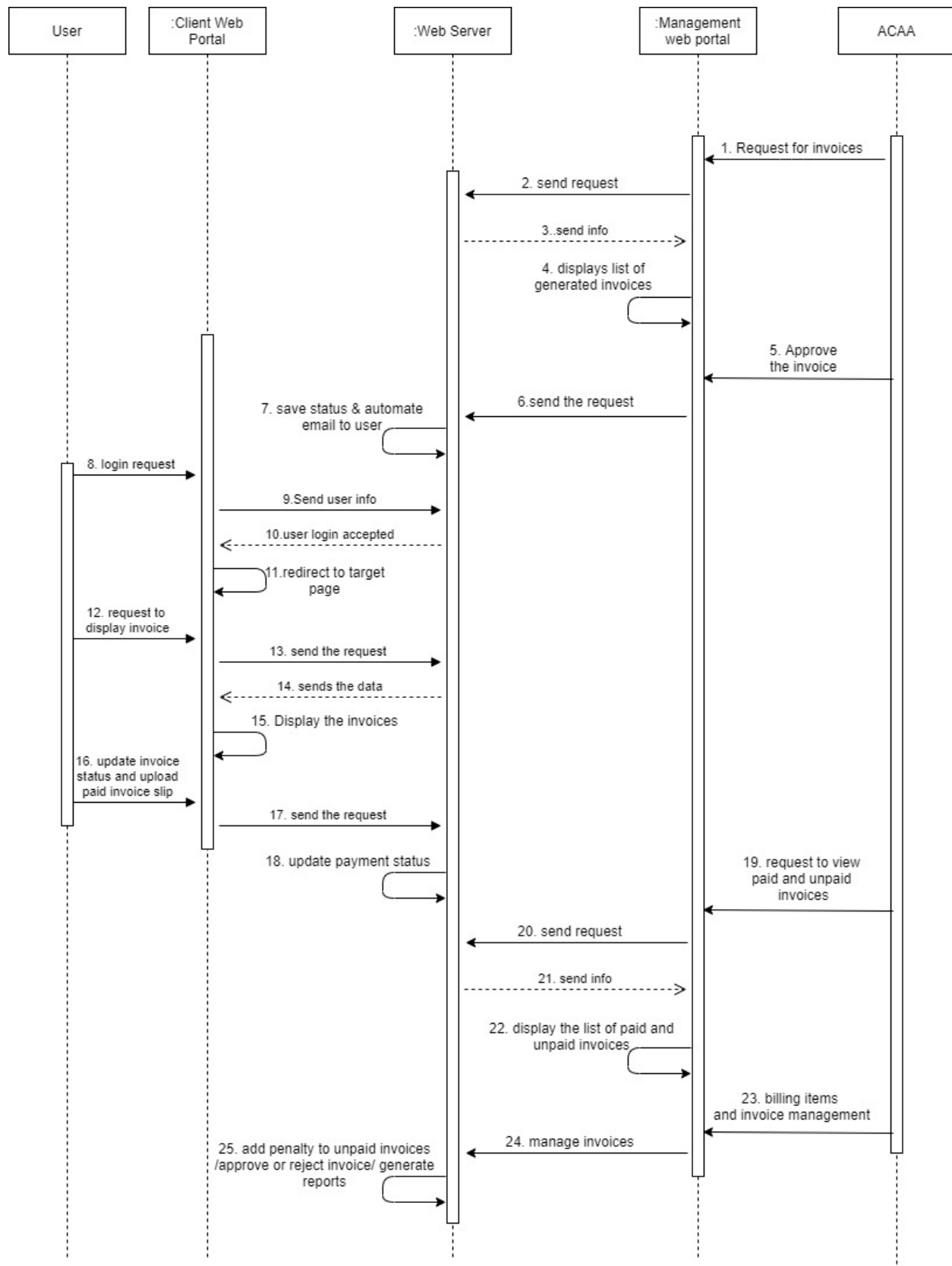


Figure 7: Sequence Diagram for Billing Items and Invoice

