

Afghanistan Civil Aviation Authority

**Revenue Management System**

**Document version I**

**Software Requirements Specification**



Document | Draft Version 1



May 2021 | Kabul, Afghanistan

Technical Team | ACAA

**Table of Contents**

[Revision History 3](#_heading=h.30j0zll)

[Document approval 4](#_heading=h.1fob9te)

[1](#_heading=h.3znysh7) Introduction 5

[1.1](#_heading=h.2et92p0) Purpose 5

[1.2](#_heading=h.tyjcwt) Document Conventions 5

[1.3](#_heading=h.3dy6vkm) Intended Audience and Reading Suggestions 5

[1.4](#_heading=h.1t3h5sf) Product Scope 5

[1.5](#_heading=h.4d34og8) References 6

[2](#_heading=h.17dp8vu) Overall Description 7

[2.1](#_heading=h.3rdcrjn) Product Perspective 7

[2.2](#_heading=h.26in1rg) Product Functions 8

[2.3](#_heading=h.lnxbz9) User Classes and Characteristics 9

[2.4](#_heading=h.35nkun2) Operating Environment 10

[2.5](#_heading=h.1ksv4uv) Design and Implementation Constraints 12

[2.6](#_heading=h.44sinio) User Documentation 12

[2.7](#_heading=h.2jxsxqh) Assumptions and Dependencies 12

[3](#_heading=h.z337ya) External Interface Requirements 13

[3.1](#_heading=h.3j2qqm3) User Interfaces 13

[3.2](#_heading=h.1y810tw) Hardware Interfaces 13

[3.3](#_heading=h.4i7ojhp) Software Interfaces 13

[3.4](#_heading=h.2xcytpi) Communications Interfaces 13

[4](#_heading=h.1ci93xb) System Features 14

[4.1](#_heading=h.3whwml4) Passenger Service Fee (PAX) and Airport Development Fee (ADF) 14

[4.1.1](#_heading=h.2bn6wsx) Description and Priority 14

[4.1.2](#_heading=h.qsh70q) Stimulus/Response Sequences 14

[4.1.3](#_heading=h.3as4poj) Functional Requirements 14

[4.2](#_heading=h.1pxezwc) Overflight, Landing, Parking and Lighting Fee 15

[4.1.1](#_heading=h.49x2ik5) Description and Priority 15

[4.1.2](#_heading=h.2p2csry) Stimulus/Response Sequences 15

[4.1.3](#_heading=h.147n2zr) Functional Requirements 16

[4.3](#_heading=h.3o7alnk) Pilot and Crew License 16

[4.1.1](#_heading=h.23ckvvd) Description and Priority 16

[4.1.2](#_heading=h.ihv636) Stimulus/Response Sequences 17

[4.1.3](#_heading=h.32hioqz) Functional Requirements 17

[4.4](#_heading=h.1hmsyys) Invoice and Billing 18

[4.1.1](#_heading=h.41mghml) Description and Priority 18

[4.1.2](#_heading=h.2grqrue) Stimulus/Response Sequences 18

[4.1.3](#_heading=h.vx1227) Functional Requirements 18

[5](#_heading=h.3fwokq0) Other Nonfunctional Requirements 20

[5.1](#_heading=h.1v1yuxt) Performance Requirements 20

[5.2](#_heading=h.4f1mdlm) Safety Requirements 20

[5.3](#_heading=h.2u6wntf) Security Requirements 20

[5.4](#_heading=h.19c6y18) Software Quality Attributes 21

[5.4.1](#_heading=h.3tbugp1) Availability 21

[5.4.2](#_heading=h.28h4qwu) Usability 21

[5.5](#_heading=h.nmf14n) Business Rules 21

[6](#_heading=h.37m2jsg) Other Requirements 22

[6.1](#_heading=h.1mrcu09) Maintenance 22

[6.2](#_heading=h.46r0co2) Documentation 22

[6.3](#_heading=h.2lwamvv) Usability 22

[6.4](#_heading=h.111kx3o) Transferability 22

[6.5](#_heading=h.3l18frh) System Use and Dissemination Rights 22

# Revision History

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

# Document approval

|  |  |  |  |
| --- | --- | --- | --- |
| Signature | Printed Name | Title | Date |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Introduction

## 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.

## 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.

## 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 the Revenue Management System.

## Product Scope

The RMS is a web-based application which helps ACAA to collect the revenue from airlines and business contractors of ACAA in Kabul, Herat, Mazar-i-Sharif, Kandahar international airports of Afghanistan. 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 Scope of the project is as follows: -

1. To build a system through which the departments of 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.
2. To generate invoices and collect revenue.
3. The airlines shall be able to apply for flight permission.
4. To issue and print certificates and licenses for airlines.

## References

1. 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.
2. 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.
3. 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.
4. 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>’

1. Afghanistan Civil Aviation Regulation | Civil Aviation Authority of Afghanistan 2017

‘https://acaa.gov.af/wp-content/uploads/2019/12/ACAR-Part-02-Rev.-3.0\_151014.pdf’

1. 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>’

1. 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’

1. 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’

1. 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’

# 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.

## 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.

Diagram

Description automatically generated

*Figure 1: RMS Context Diagram*

The system is a data-centric product and there is a need to store the data somewhere. For that, a database will be used. 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 sends requests and receives invoices.
* Electronically send and receive notifications between different departments of ACAA.
* Computerized generation of invoices.
* Computerized achieving of documents.
* Restrict and allow user control based on standards and policy of ACAA.

## 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.

Diagram

Description automatically generated

*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).

## User Classes and Characteristics

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

1. **Airlines**: This type of user can only use the system to fill the Permission Number form for scheduled and non-scheduled flights.
2. **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.
3. **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.
4. **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.

## Operating Environment

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

1. **Hardware Components**
2. 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

1. 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

1. Client Side

* Code i3 Laptop or Desktop with 4GB Ram or higher version

1. **Software Components**
2. Server side

* Ubuntu Server or Windows Server 2016 or higher version
* Docker server or Apache server
* Dot Net Framework 5 or higher version
* SQL Server 2019
* NodeJS

1. 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

## 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.

## 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.

## 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.

# External Interface Requirements

## 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.

## 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.

## Software Interfaces

The Revenue Management System is a web portal, and it shall be developed under windows operating system using the following series of web development tools.

* Visual Studio Software: *Visual Studio is an integrated* ***development*** *environment for writing, compiling, and debugging the C# .NET code.*
* *SQL Server: 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.

## 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.

# System Features

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

## 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 $1.00 USD for domestic flight and $2.00 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

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

## Overflight, Landing, 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 $950.00 USD per the entry of each airline 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 poor visibility of daytime. Services of lighting which is being provided to airlines in both international and domestic airports, and the fee for domestic airlines is $20.00 USD and for international flights is $60.00 USD. The parking fee is payable by any aircraft parking on surfaces intended for this use. It is calculated per hour of parking based on the weight of the aircraft. The parking fee is imposed on all international and domestic aircrafts after 4 hours of landing in Afghanistan’s 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.
* 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.
* Response: System save the actual departure or arrival time for flights and estimated the delay time.
* Stimulus: ACAA Statistics department requests to display the list of confirmed and cancelled flights.
* Response: System displays the list of confirmed and cancelled flights.
* Stimulus: ACAA Statistics department request to generate invoices for confirmed (overflight, landing) flights and for parking duration.
* Response: System generate invoices for the request.
* Stimulus: ACAA ATC request to charge the airline based on captain request for lighting.
* Response: System generates the invoice for lighting charges.
* Stimulus: Airline requests for invoices to do the payments.
* Response: System displays the generated invoice to airline for payment.

### 4.1.3 Functional Requirements

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

## Pilot and Crew License

### 4.1.1 Description and Priority

Certificates and licenses are issued by ACAA to aircrafts of airline and their technical staff. The airline company is required to get Air Operator Certificate and then request for aircraft certificates such as Certificate of Airworthiness, Certificate of Registration. In addition, the airline technical staff or individual needs to get licenses such as Airlines Transport Pilot License, Commercial Pilot License, Private Pilot License, Flight Officer, Aircraft Maintenance Engineer, Air Traffic Officer License and Flight Dispatcher. The training certificate for airline technical and non-technical staff and maintenance certificate for aircrafts will be issued to companies who are referred by the airline after ACAA verification. The following table shows the list of 13 certificates and licenses that the ACAA is issuing and charging fee.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Certificate and License | Abbreviation | Cost | Validity Duration |
| 1 | Air Operator Certificate | AOC | $65000. 00 and extension $32,500.00 | 12 months |
| 2 | Certificate of Airworthiness | CofA | $1000.00 | 12 months |
| 3 | Certificate of Registration | CofR | $3,246.00 | Lifetime |
| 4 | Approved Maintenance Organization | AMO | $5000.00 | Lifetime |
| 5 | Approved Training Organization | ATO | Nil | Lifetime |
| 6 | Airlines Transport Pilot License | ATPL | $500.00 | 12 months |
| 7 | Commercial Pilot License | CPL | $400.00 | 12 months |
| 8 | Private Pilot License | PPL | $500.00 | 12 months |
| 9 | Student Pilot License CC Cabin Crew Certificate | SPL | $400 | 12 months |
| 10 | Flight Officer | FO | $150.00 | 12 months |
| 11 | Aircraft Maintenance Engineer | AME | $200.00 | 24 months |
| 12 | Air Traffic Officer License | ATOL | $6.00 | 12 months |

### 4.1.2 Stimulus/Response Sequences

* Stimulus: ACAA request to assign the inspectors or technical board (Herein after referred as user) for verification.
* Response: System assign the user for the verification of airline, aircraft or individual.
* Stimulus: User select the required checklist for verification.
* Response: System provides the required checklist for the user to verify the airline company, aircraft or individual for certificate and license.
* Stimulus: User approve the request from airline or individual.
* Response: System generate the invoice for the certificate or license.
* Stimulus: User request for certificate and license registration form.
* Response: System displays the registration form to enter certificate or license details.
* Stimulus: User request for certificate or license.
* Response: System generate and issue the certificate or license.
* Stimulus: ACAA request to display the list of issued certificates and licenses.
* Response: System displays the list of issued certificates and licenses.

### 4.1.3 Functional Requirements

1. Airline should be able to request for change in aircraft type and registration number for a particular route.
2. ACAA should be able to modify certificate and license details.
3. ACAA should be able to generate invoice for certificates and licenses.
4. ACAA should be able to add penalty to non-paid invoices.
5. ACAA should be able to view the lists of valid or non-valid issued certificates and licenses.
6. ACAA should be able to cancel generated invoice of a particular certificate or license.
7. ACAA should be able to approve or reject a certificate or license.
8. ACAA should be able to archive the documents related to certificates and licenses.
9. System should send automatic emails to airlines or individuals one month and one week prior to expiration date of certificate or license.
10. System should generate reports of issued licenses and certificates.

## Invoice and Billing

### 4.1.1 Description and Priority

The ACAA is using handwritten paper invoices 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 Statistics 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

1. System should automatically add penalty to the non-paid expired invoices.
2. The penalty percentage rate should be dynamic and the ACAA should be able to change it according to the ACAA polices and regulations.
3. ACAA Revenue department should be able to archive the paid invoices and slips documents.
4. User should be able to upload the paid invoice slip to the system.
5. ACAA Revenue department should be to view the collected amount from penalties added to the non-paid invoices.
6. System should send automatic email to the user once the invoice is generated and approved by ACAA.
7. System should send automatic reminder email to the user when the due date for invoice is expiring.
8. System should send automatic email to the user when the penalty is added to the unpaid invoice.
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.
10. System should generate reports for paid and unpaid invoices.

# Other Nonfunctional Requirements

## 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.

## 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.

## 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.

## Software Quality Attributes

### 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.

### 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.

## 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.

# Other Requirements

## 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.

## 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.

## Usability

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

## 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.

## 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.

Appendix A: Glossary

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 |
| 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 |

Appendix B: Analysis Models

1. **Data Flow Diagrams for RMS**

**Diagram

Description automatically generated**

*Figure 3: Level 0 Diagram*

**Diagram

Description automatically generated**

*Figure 4: Level 1 Diagram*

**Diagram

Description automatically generated**

*Figure 5: Level 2 Diagram*

1. **Entity Relation Diagram for RMS**

Graphical user interface, application

Description automatically generated

*Figure 6: Entity Relation Diagram for all sub-systems of RMS*

Graphical user interface, application

Description automatically generated

*Figure 7: Entity Relationship Diagram for invoice and billing of RMS*

1. **Class Diagram for RMS**

Not Applicable

1. **State Transition Diagram for RMS**

Not Applicable

Appendix C: To Be Determined List

Not Applicable