Software Requirements Specification

For

AIRLINE RESERVATION SYSTEM-

Indian Airlines

Version 1.0 (Initial Review Draft)

Prepared By

MANISH KUMAR SINGH (PL) d0753035

KRISHNA KUMAR d0753032

At

(Formerly National Centre for Software Technology)
Bangalore, Electronic City – 560 100

4th March, 2008

Table of Contents

List of Figures

Revision History

Name	Date	Reason For Changes	Version
Manish Kumar Singh	04/03/2008	Initial Review Draft	1.0(draft 1)

1. INTRODUCTION

1.1 Purpose

This document includes software requirements for Indian airlines *"Airline Reservation System* (ARS)*"* release number 1.0. The proposed system automates "Indian airlines" airline reservation system and assumes that the current reservation system is manual at Indian airlines, by making variants (flight reservation, flight inquiry etc.) of reservation system online. Its purpose is to facilitate user, agency and airport counter personal by making reservation system online along with supports for administrator and operators situated at different parts of the country or world. The system allows to maintain customers list, provides support for flexible ticket pricing, minimize repetitive work done by the system administrator, operator and reservation clerks. It also reduces the efforts and frustration for travelers in scheduling a trip by making flight reservation system online. This document is intended to be used by the members of the of the software development team that will implement and verify the correct functioning of the system. Unless otherwise stated, all requirements specified here are of high priority and committed for release 1.0.

1.2 Document Conventions

- This SRS is written in *"Times New Roman"* font, font size *"12"*, font style *"Regular"* and justify aligned. All chapters start with back background and font size *"14"* written in *"Times New Roman"* font, font style *"Bold"* to clearly separate it from chapter sub headings, which are also written in font size *"14"* written in *"Times New Roman"* font, font style *"Bold"* to clearly separate from contents of SRS. Paragraphs separate each other by one enter space with line spacing 1.5 between lines.

1.3 Intended Audience and Reading Suggestions

Intended Audience

Developers: - Developers who need to have an in-depth knowledge of the system to implement it are the intended audience, in fact the target audience for this document.

Testers: - Testers who test the consistency of the implementation with the design of the system also need to study this document.

Maintenance: -The document is a good aid to identify the errors by tracing the design of the system. Hence the maintenance team also needs to study the document.

Technical writers: - It can be used as a guide line by technical writers to understand the concepts used in this system and how the system reacts to a user's request etc.

The SRS document categories design issues explained in this document as follows:

Chapter 2: An overall description of *"Airline Reservation System"* is given. First product perspective is presented with product features and main functions. Then follows user classes i.e., different type of users who interacts with ARS and their characteristics, operating environments that proposed *"Airline Reservation System"* shall support as well as design and implementation constraints. At last it lists all kinds of documentation which shall be provided to the Indian airlines along with ARS. Documentation will include all the details for user, administrator of ARS along with the data design manual for developers.

Chapter 3: External interface requirements have been explained in more detail. It explains external interface requirement from user, hardware, software, communication point of view.

Chapter 4: This chapter lists all the system features, which is expected to be performed by the system in more detail.

Chapter 5: Elaborates Nonfunctional requirements like performance, safety, security, software quality attributes and business rules.

1.4 Product Scope

The airline reservation system for Indian airlines will facilitate user to book online tickets, search flights for their journey, check status of flights, check fares, PNR status etc. From administrator point of view the system allows to maintain airplanes, airport and flight schedule as well as user's profile. The official of Indian airlines can also book ticket through their employee identification number and check various schemes under which they can fall. The proposed system also manages holiday packages to attract more number of customers to Indian airlines etc.

The system provides unique user identification and a password to users to that the privacy can be maintained. The same applies to official, operators and agencies that are responsible to booking tickets for customers of Indian airlines and all the functionalities mentioned above about the proposed system also applies to agencies that reserve tickets for customers of Indian airlines.

1.5 References

More about Indian airlines rules and regulation relevant to airline reservation system can be found at http://dgca.nic.in/dcs.pdf

- Report of the Committee to Recommend Standards on Interface of Airlines Computer Reservation System (CRS) and Departure Control System (DCS) of the Handling Agents.

2. OVERALL DESCRIPTION

2.1 Product Perspective

ARS for Indian airlines is a new system that replaces the current manual reservation system for reserving tickets at the various counters of Indian airlines done by customer or any unauthorized agency person on behalf of customers.

ARS is handled by user of different classes, which are customers, administrators, agencies and operator sitting at various airports. All of them need to log in into the system to communicate with the database of the airline to do any kind of transaction through ARS. User logs into the system via the internet webpage and do the interested transaction(s), which in turn interacts with the database owned by the user. The database entries are thrown back to the user based on request sent to the database. In the diagram below there are the main components of the system, subsystem interconnections and external interfaces to help you understand the main idea of ARS for Indian airlines.

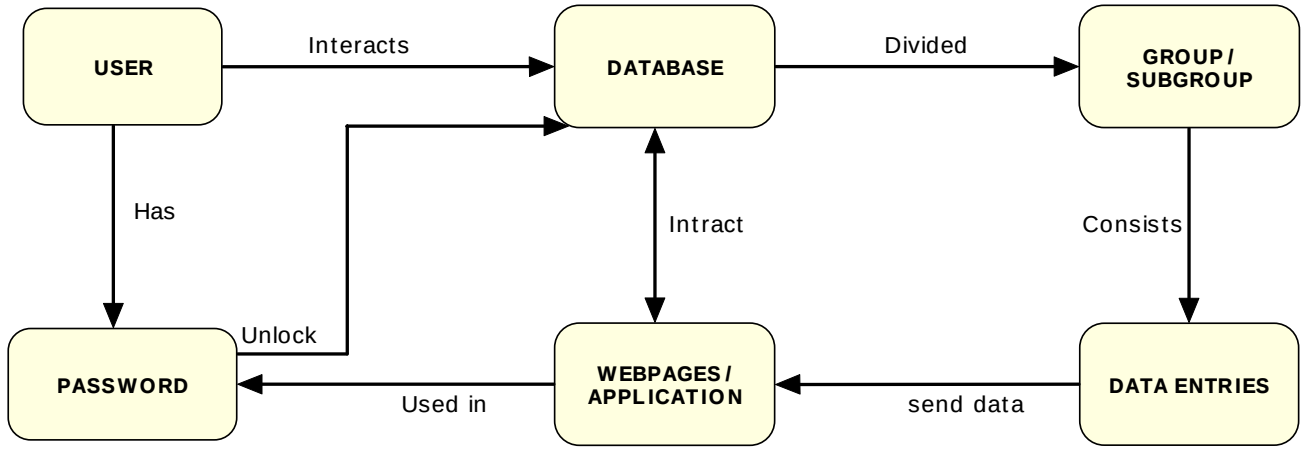


Figure 1: System, Subsystem interconnections and external interfaces

2.2 Product Functions

ARS is an automated system and a substitute for the current manual reservation system, though the proposed automated system shall replace current manual system but the basic functionalities shall be remained same with some more featured embedded on it. Automation never suggests replacing business rules rather it supports business rules to be followed efficiently. The context diagram below shows the functionalities carried by different entities with an automated ARS for Indian airlines. For example

USER: The user can performed functionalities with ARS like search for flight(s), reserve flight(s), make payments through credit card or via cash at counters of Indian airlines at various airports situated at different locations. More can be understood from the diagram below.

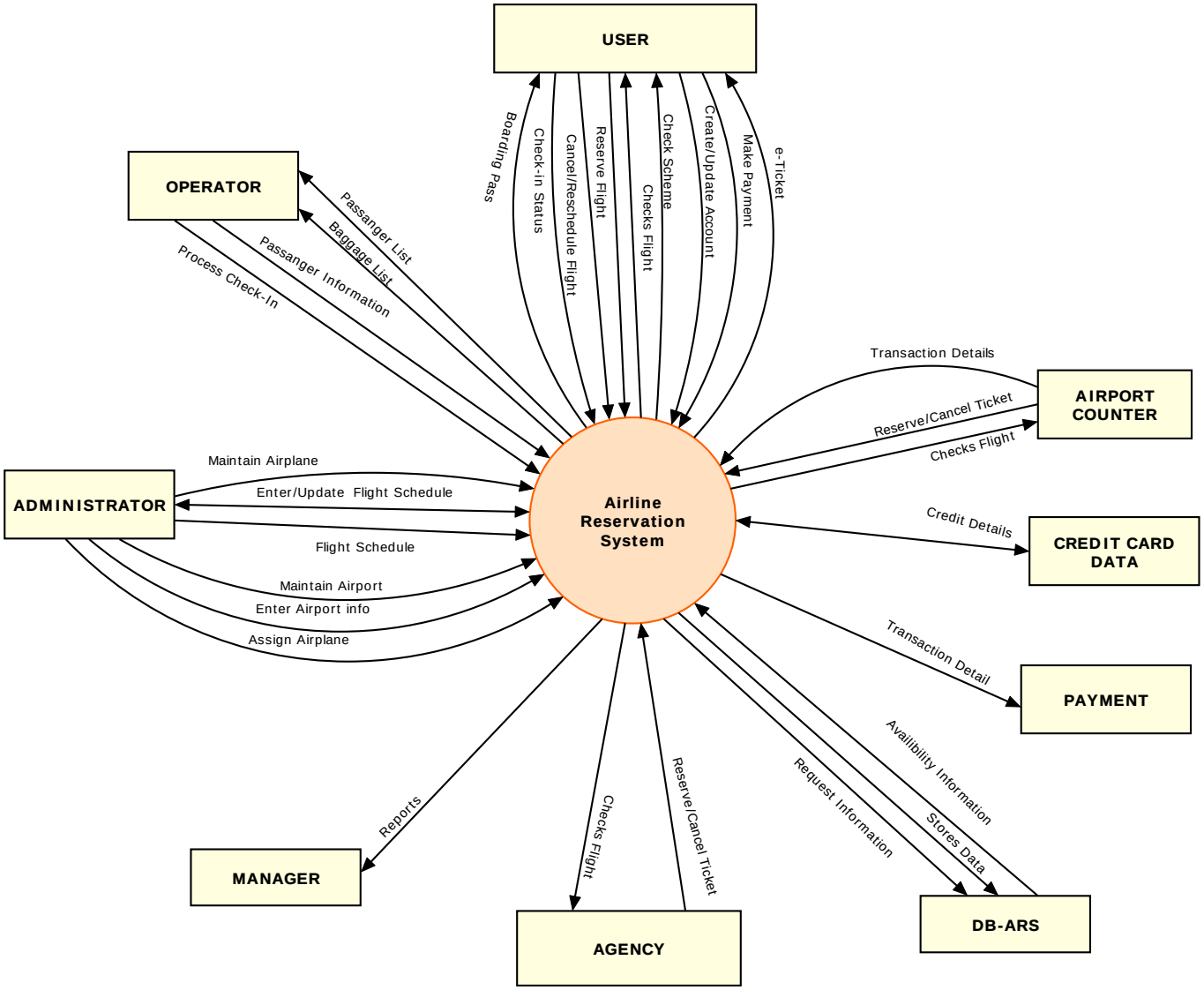


Figure 2: Context Diagram of ARS for Indian airlines

2.3 User Classes and Characteristics

- **User:** A user can be a visitor who checks for availability of flight(s) and then register himself/ herself to proceed with the ticket reservation or a registered user can log-in into the system through his/her account and checks available flight and then do the reservation by making payments through credit card. A user can also be the official(s) of Indian airlines who can log-in into the system through their employee ID and can avail all the services provided by the ARS like a normal user.

- **Administrator:** An administrator is a person who is responsible for maintaining (edit/update) flight schedule, an administrator also has privileges like maintain (edit/update) airplane, maintain (edit/update) airport information through his/her account.

- **Agency:** An agency is an authorized person who checks for available flight(s), does reservation/cancel for the customers of Indian airlines through a separate his account given by Indian airlines.

- **Airport Counter:** Almost every airport has a counter of Indian airlines, who is responsible for searching flight(s), reserve/cancel ticket(s), check flight status, check PNR status, refund of money in case of cancellation through an account given to airport counter personal by Indian airlines ARS.

- **Operator:** An operator is a person who process Check-In for passengers, operator update passenger status, update security check status, measure baggage weigh, charge additional amount in case of overweight, count numbers of baggage for each passenger, generates boarding pass, generate passengers list for every departure flight.

- **Manager:** Managers of Indian airlines have privilege of generating different kind of reports through ARS. With the help of report(s) managers can efficiently manage Indian airlines and can make strategic decisions to enhance the business done by Indian airlines from revenue, customer's satisfaction, airplane management etc. point of view.

2.4 Operating Environment

- The ARS shall operate with the following web browsers: - Microsoft Internet Explorer 5.0 and above, Netscape Communicator version 4.7 and above, Netscape versions 6 and 7 and Mozilla Firefox versions 2.0 and above.
- The ARS shall operate on a server running licensed Windows (9x/2000/XP)/Red Hat Linux operating system and Apache WebServer/IIS server.
- The ARS shall permit users to access services running on the server from any part of the world. It shall also support intranet browsing for the administrators of ARS.

2.5 Design and Implementation Constraints

Design Constraints

- Since the proposed ARS automates the current manual system, so the system's design, code, and maintenance documentation shall facilitate the business rules of Indian airlines from reservation point of view rather changing business rules while designing and making ARS for Indian airlines.

Implementation Constraints

- All HTML code should conform to the current HTML standard.
- All scripts shall be written in Java™ (Sun Microsystems).
- Server side programming shall be done in JSP along with the JDBC as a connectivity protocol between client and server.

2.6 User Documentation

- Database design manual shall be provided to developers of ARS for better understanding of the database designed for the ARS.
- User manual for the administrator, user, agency, airport counter personal shall be provided, which contains screen shots of the ARS along with the brief description about each screens.
- ARS shall also contain an on-line help and tutorials, which elaborates every screen along with the description about all the fields in a particular screen.

2.7 Assumptions and Dependencies

Assumptions

- The ARS is open for reservation by clients, agencies, at airport counters and official throughout the year.
- A user can book ticket(s) up to three months in advance.
- A user can reserve up to 11 tickets mainly divided like 5 adults, 4 Children, 2 infants.
- No schemes shall be given other than the family members of an employee, if available.
- The ARS does not take care of the security issues of the credit card transaction though it stores credit card information given by the user to resolve discrepancies in case arises.
- The real-time credit card transaction is done by the respective banks through their secured system. ARS simply directs to the respective credit card bank.
- All the transactions and payments will be done in Indian rupee (INR).

Dependencies

- The operation of the ARS depends on changes being made in the payment system of the proposed ARS, which does transaction into two modes i.e., through cash at various counters and through credit card via the respective bank transaction pages.
- The operation of the ARS depends on changes being made to the airplane and airport information stored into the system.
- The operation of the ARS depends on the changes being made to the flight schedule system which stores the information about flight arrival, departure, flight#, etc.

3. EXTERNAL INTERFACE REQUIREMENTS

3.1 User Interfaces

User interface includes HTML/JSP web pages which interact with ARS and which in turn interact with ARS database. Interfaces have been categorized into three types. First, administrator interfaces through which administrator enters information like flight-schedule, airport details and airplane details. There would be a single interface for searching/reserving/cancellation/rescheduling flight(s) through different passwords given to different kind of users like user, official, airport counter personal and agency. Below are the examples of interfaces for the administrator.

Note: Below examples are the field's examples not the web layout for the administrator interface.

For Administrator

ARS flight-schedule interface for the administrator through which admin enters information like airline (international, domestic), source and destination name, flight number, departure time, arrival time, how many days in a week a particular flight is available and the basic fare between a pair of source and destination. Similarly for others as well, as show below in figure 4 and figure 5.

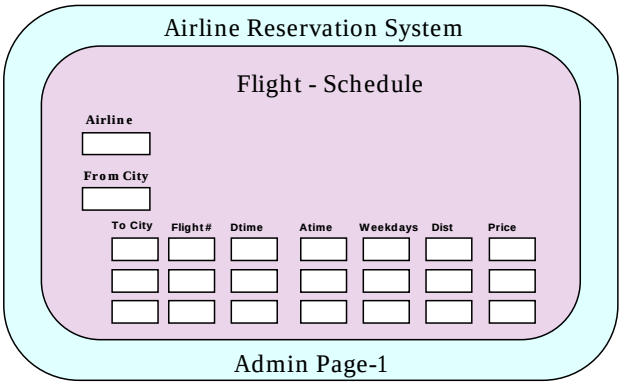


Figure 3: Flight-Schedule Interface (UI -1) for Administrator at Indian airlines

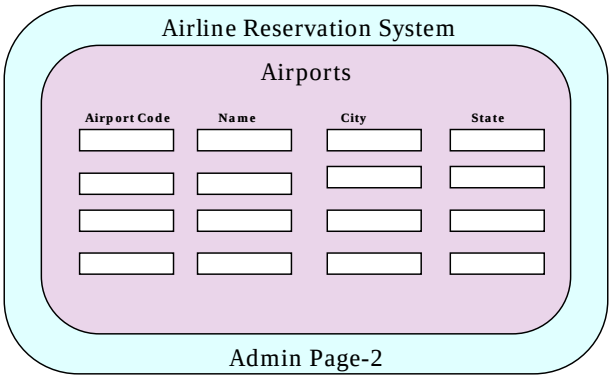


Figure 4: Airport Interface (UI -2) for Administrator at Indian airlines

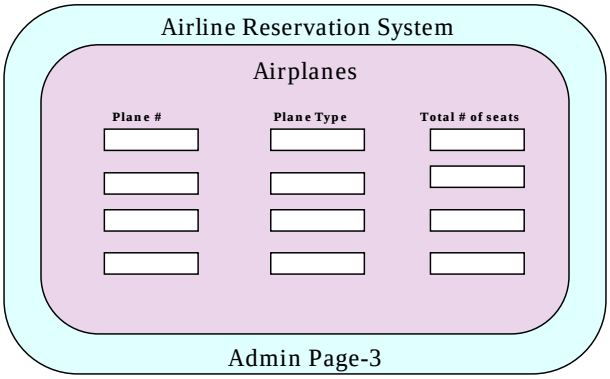


Figure 5: Airplane Interface (UI -3) for Administrator at Indian airlines

Above are the external interfaces (field's information) for the administrator at Indian airline of ARS. Through this admin can enter all the information into the database so that user, official, airport counter personal and operator can search flight(s) details. In this document, only three external views of the administrator pages (field's information) have been shown to have a better understanding of the system. Showing all the interfaces is out of scope of this document.

3.2 Hardware Interfaces

No hardware interfaces has been identified as such but the ARS assumes the minimum requirements are present such as router, switches, support for high speed broadband connection, servers etc. to support world wide web application.

3.3 Software Interfaces

ARS Database:

- The ARS shall transmit information to and fro from ARS database through HTML/JSP pages written in Java™ (Sun Microsystems).
- The ARS shall communicate with the database using JDBC connectivity protocol interface.
- The ARS shall connect credit card transaction page correctly to the respective bank credit card transaction interface.

3.4 Communications Interfaces

- Since the proposed ARS is a web based application, so it requires web browsers, which is been developed matching all the standards to HTML.
- The ARS shall send an e-mail message to the primary user for whom the ticket is being booked as a confirmation along with details like total fare, from source, to destination, arrival time, departure time etc.
- The ARS shall send an e-mail incase any problem occurred during reservation of ticket(s).

4. SYSTEM FEATURES

The proposed ARS is having features like online search/query flight details, reserve tickets, cancel reserve tickets and reschedule reserved ticket(s). An administrator of ARS can maintain flight schedule, maintain airport information as well as airplane information. ARS has support for airport counter personal and agencies, which can also reserve tickets on behalf of customers by taking payments via modes i.e. through cash or credit card. System features are organized by use cases and functional hierarchy so that the main functions of the system will be understandable. This SRS lists main features of the ARS as mentioned below:

4.1 Search/Query flight Detail(s)

4.1.1 Description and Priorities

The system shall allow any user (registered or non registered), official, airport counter and agencies to access the details about the arrival and departure times of a flight by requesting the user to input the flight number and date. The system accesses ARS flight schedule database and presents the time of arrival and departure along with the availability of flight(s) for mentioned date.

Priority = High.

4.1.2 Stimulus/Response Sequences

Stimulus: User query for a particular flight(s) by giving flight from source, to destination, departure time, arrival time, no of passenger(s),airlines(national or international)

Response: System queries user for details of flight(s). System matches airline, if query is for national or international flight then it look for the information given by the user into the database and displays the relevant data if found in the database else displays your query doesn't match any data. System doesn't display flight if seats are not available.

4.1.3 Functional Requirement

Q-REQ1: System makes sure that the arrival date is equal or greater than the departure date and departure dare is equal or greater than the current date.

Q-REQ2: System makes sure that the user mentions the no of passengers for their search.

Q-REQ3: System takes all the fields given by the user and matches into the flight schedule database and display the desired result into the user screen along with basic fare as well as total fate (inclusive of taxes) of the ticket based on number of passenger(s) mentioned by the user for the flight else display *"no data found for your query"*.

4.2 Making reservation

4.1.1 Description and Priorities

Once the search/query of flight(s) has been done then user may want to reserve a ticket for the searched flight. The system shall provide facility for reserving one ticket at a time through *"world wide web"* to user, official, airport counter personal and agency by charging the ticket price to his credit, except at airport counter which has also the cash down payment option. *Refer appendix c: State transition diagram clear understanding.*

Priority = High

4.1.2 Stimulus/Response Sequences

Stimulus: From the searched list, user request to reserve ticket for a particular flight or cancels/re-schedule it.

Response: System takes user to the detailed flight information page, which shows the total price as well.

Stimulus: User continues with the reservation or cancel/re-schedule it.

Response: If status is logged in then system takes user to the personal information page and asks the user to fill passenger(s) details with an option that user is same as passenger or choose passenger(s) from the master list else it asks user to log into the system in case not logged-in.

Stimulus: User continues with payment or cancel/re-schedule it or user logs-in into the system and in case not registered then user register him/her self with the system or cancel/re-schedule it.

Response: System asks credit card bank name from the user and in case of logged in users or newly registered user system asks user to continue with the payment.

Stimulus: User gives bank information to the system or cancel/re-schedule it. In case of logged-in and newly created account user choose to continue with the payment

Response: System asks credit card information from the user and directs it to the respective bank and waits for response. System asks to choose respective credit card bank.

Stimulus: User waits for the confirmation from the system. System asks credit card information from the user.

Response: System receives confirmation from the bank interface and displays ticket reserved to the user along with the confirmation number and generates airline PNR No, ticket number and decrements the no of seats of that particular flight by one. System sends an e-mail with all the details to the user e-mail id. And in the second case system does the same process as done above.

4.2.3 Functional Requirements

R-REQ1: System checks the format of all the information given by the users like maximum length, minimum length of the fields, e-mail address format in case missing something, system requests user to re-enter values entered wrongly.

R-REQ2: System checks the credit card data by matching it with the standards of credit card, i.e. length of the credit card number, length of CVC number etc. If it doesn't match the standard format then system requests to re-enter all the credit card information.

R-REQ3: System makes sure that there is a continuous connection between the user and server unless or until logged out or cancelled by the user.

R-REQ4: System makes sure that all the booked ticket information has been updated into the user account for further tracking or cancellation.

R-REQ5: System makes sure that the number of available seats has been decremented.

4.3 Cancellation

4.3.1 Description and priorities

The system allows user(s) to do cancellation of the confirmed tickets through his/her Indian airlines account.

Priority = High

4.3.2 Stimulus/Response

Stimulus: To proceed with the cancellation user logs-in into the system.

Response: System opens the user page which has all details like booked ticket, cancelled ticket etc.

Stimulus: User proceeds with the cancellation by opening the cancellation panel.

Response: System opens a page which lists all the ticket(s) reserved by the user till now through airline reservation system with an option for cancellation.

Stimulus: User proceeds with the cancellation by choosing the ticket and cancellation option.

Response: System shows all the details of the ticket with an option to cancel the ticket.

Stimulus: User proceeds with the cancellation.

Response: System request for the PNR number from the user and it shows the amount, which will be deducted from the ticket as mentioned in the cancellation rules and regulation link.

Stimulus: User confirms cancellation.

Response: System requests for the credit card information from the user to charge/credit the amount from/back into the card.

Stimulus: User gives credit card information and waits for the response.

Response: System directs the page to the respective bank and waits for the confirmation number. Once received confirmation of transaction from the bank interface then system displays cancellation done to the user. Once cancellation is confirmed then system generates the cancellation number and increments the number of seats for that particular flight.

4.3.3 Functional Requirements

C-REQ1: System checks that cancellation request has not been made for the ticket whose departure date has passed the current date.

C-REQ2: System matches the PNR number with the cancellation ticket PNR number.

C-REQ3: System checks the credit card data by matching it with the standards of credit card, i.e. length of the credit card number, length of CVC number etc. If it doesn't match the standard format then system requests to re-enter all the credit card information.

C-REQ4: System makes sure that the number of available seats has been incremented.

C-REQ5: System makes sure that the cancellation information has been added into the user account for further tracking.

4.4 Reschedule Ticket

4.4.1 Description and priorities

The system shall allow user to reschedule the reserved ticket and reserve a new ticket.

Priority: High

4.4.2 Stimulus/Response

Stimulus: User logs-in into the system to proceed with the rescheduling of the confirmed ticket.

Response: System opens the user page and which has all reserved ticket(s) information.

Stimulus: User selects the ticket which needs to be rescheduled.

Response: System asks for the PNR number and displays all the details of the ticket with fields like from source, to destination, departure date, and arrival date opened.

Stimulus: User searches for a new flight

Response: search flight schedule (4.1) followed and displays the result. If flights not found then system gives cancellation option and cancellation (4.3) feature is followed else system proceeds with the new flight reservation.

Stimulus: user proceeds with the reservation with the same number of passenger(s) or might add/delete number of passengers.

Response: System proceeds with the new reservation by calculating total amount of the flight ticket and comparing it with the old one if its more then system charges the additional amount to the credit card else credit to the card.(credit card transaction is done in the same manner as mentioned in *"making reservation (4.2)"*.

4.4.3 Functional Requirements

RS-REQ1: System matches the PNR number with the reserved ticket PNR number.

RS-REQ2: All the relevant functionalities shall be performed as mentioned in 4.1, 4.2 and 4.3.

4.5 Create account/Register

System allows user to open an account by crating a user profile with the system so that user can reserve/cancel/re-schedule ticket(s) through their personal account and they can track any information any time.

4.6 Update Profile

The system shall enable the user to update his/her profile at any time. Changes can be made in fields including but not limited to address, phone number.

5. NONFUNCTIONAL REQUIREMENTS

5.1 Performance Requirements

- The system shall accommodate 500 users easily, with estimated average session duration of 10 minutes.
- All the web pages generated by the system shall be downloadable in no more than 10 seconds over a minimum of 56 kbps modem speed, the same shall be faster in case of broadband connections.
- Query response shall not be more than 10 seconds to load a screen after the user submits the query.
- The system shall respond to information submitted by the user within 4 seconds.

5.2 Safety Requirements

No safety requirement has been identified.

5.3 Security Requirements

Authentication:

- Users shall be required to log into the ARS for all operations except searching flight details.
- Cancellation, reschedule, reserving services shall be given to the registered user.

Confidentiality

- The system shall allow view only to their own accounts through their own passwords.
- Entries into the ARS database shall be done through the interfaces given to the administrators using their own passwords.

Data Integrity

- The integrity of ARS data will be critical to the success of ARS as a system. Therefore extensive data validation must be performed before entering data into the ARS database.

Availability

- The fourth consideration for security requirements is availability. The ARS system must be available to the intended audience 24 hours per day, 7 days a week. For this system, availability will be concerned with the reliability of the software and network components.

5.4 Software Quality Attributes

Portability

- This ARS and ARS database is particular to Indian airlines and may not be portable but results to queries will be portable between many environments.

Adaptability

- Implementation of the application software/code and design of database structure should be flexible enough for the necessary change in the later phase.

APPENDIX A: ACRONYMS

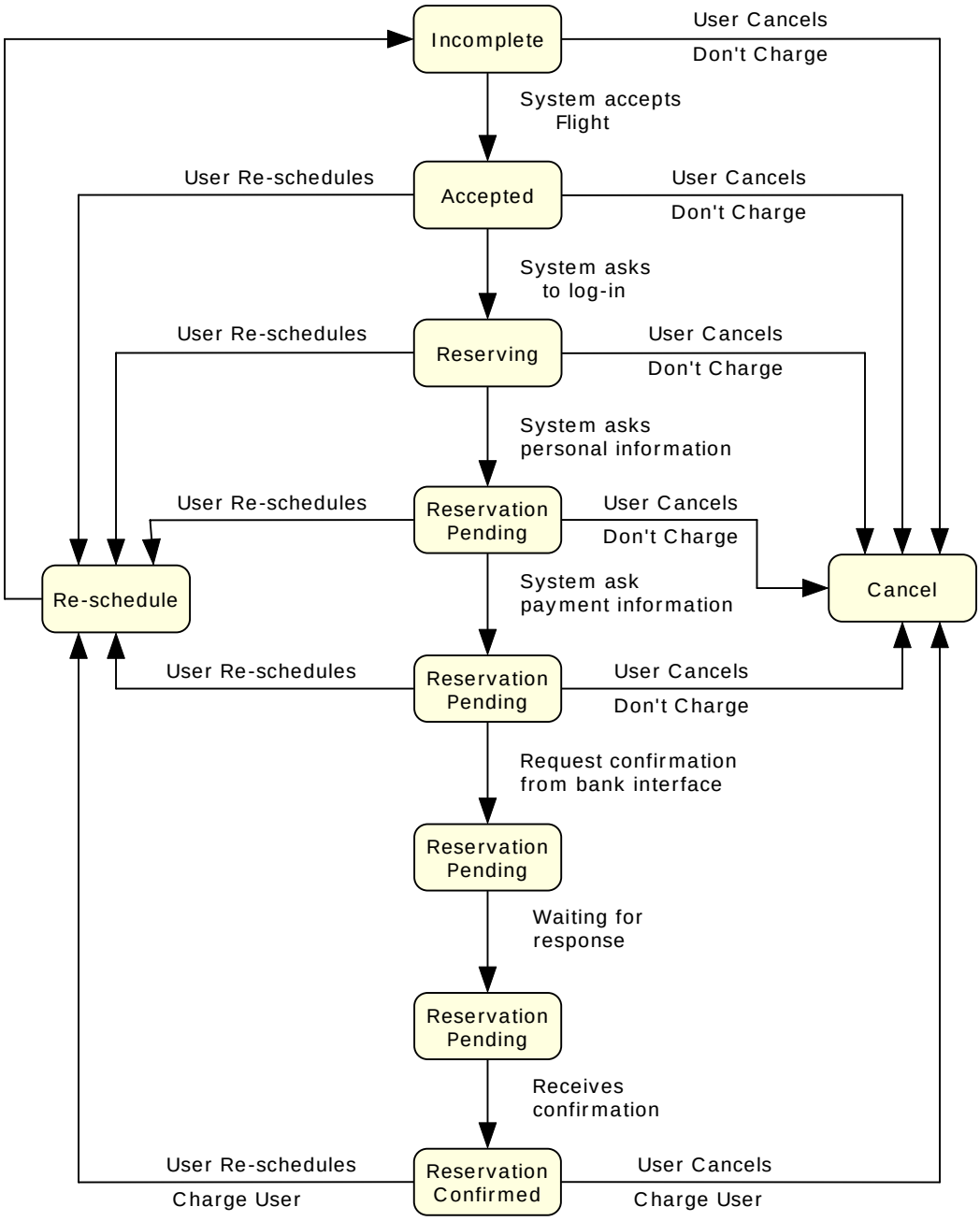
Acronyms:

ARS	**:**	Airline Reservation System
HTML	**:**	Hyper Text Markup Language
HTTP	**:**	HyperText Transfer Protocol
IIS	**:**	Internet Information service
CRS	**:**	Computer Reservation System
DCS	**:**	Departure Control System
JSP	**:**	Java Server Pages
Q-REQ	**:**	Query Functional Requirement
R-RQE	**:**	Reservation Functional Requirements
C-REQ	**:**	Cancellation Functional Requirements
RS-REQ	**:**	Rescheduling Functional Requirements

APPENDIX B: DELIVERABLES & WORK PLAN

Deliverables	Delivery Date	Member Responsible
SRS(Software Requirement Specification)	5th March, 2008	Manish Kumar Singh, Krishna Kumar
Use Case Diagrams and Description	10th March, 2008	Manish Kumar Singh, Krishna Kumar
Class Diagram	25th March, 2008	Manish Kumar Singh, Krishna Kumar
Collaboration Diagram	25th March, 2008	Manish Kumar Singh, Krishna Kumar
Sequence Diagram	25th March, 2008	Manish Kumar Singh, Krishna Kumar
System Architecture Diagram	25th March, 2008	Manish Kumar Singh, Krishna Kumar
Test-Cases & Project Demo	4th April, 2008	Manish Kumar Singh, Krishna Kumar

APPENDIX C: STATE TRANSITION DIAGRAM



State Transition Diagram for "Making Reservation"