Software Design and Architecture

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Project Deliverable 2:

System Sequence Diagrams and Revised Use Case Diagram and Extended Use-Cases

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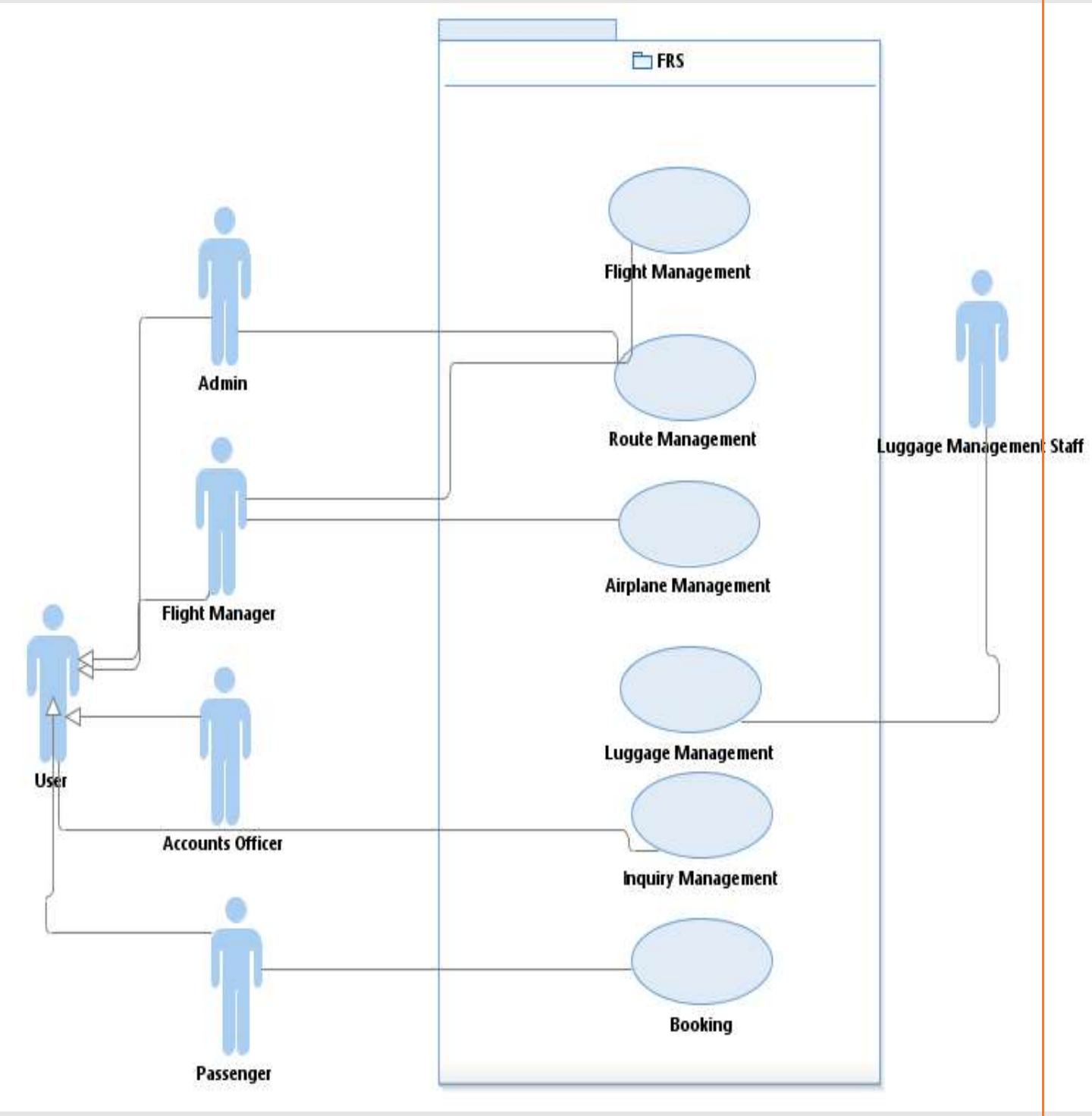
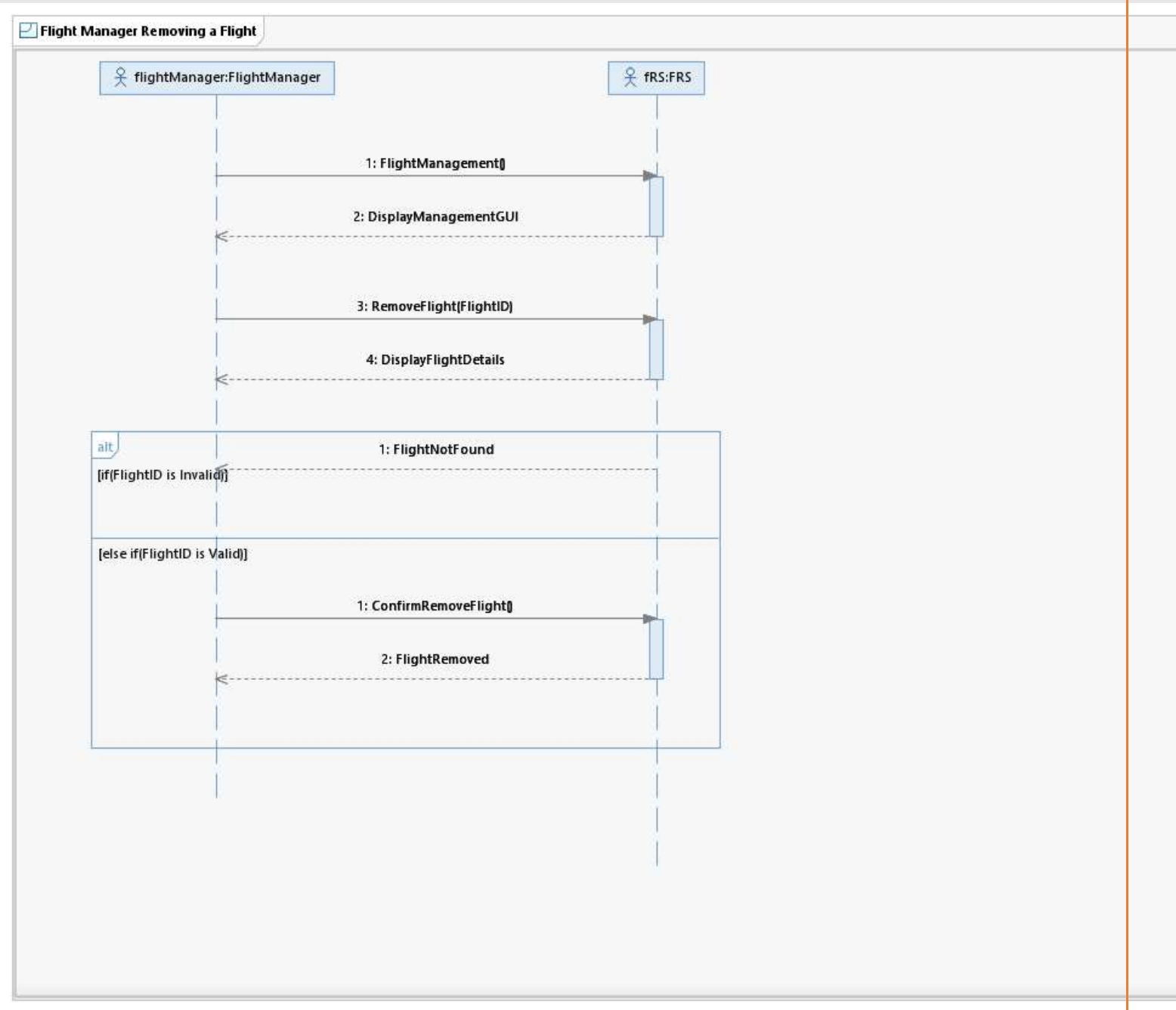
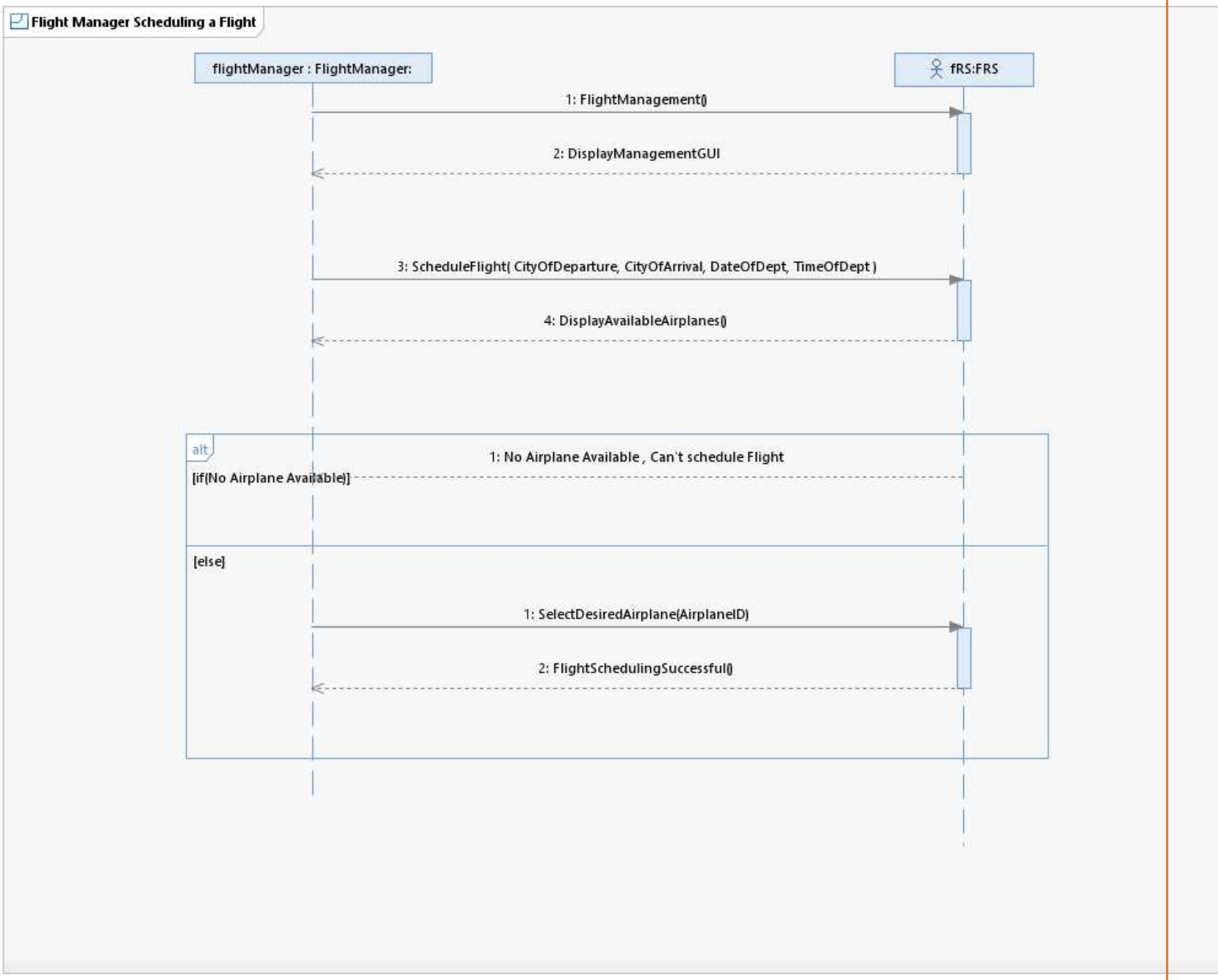
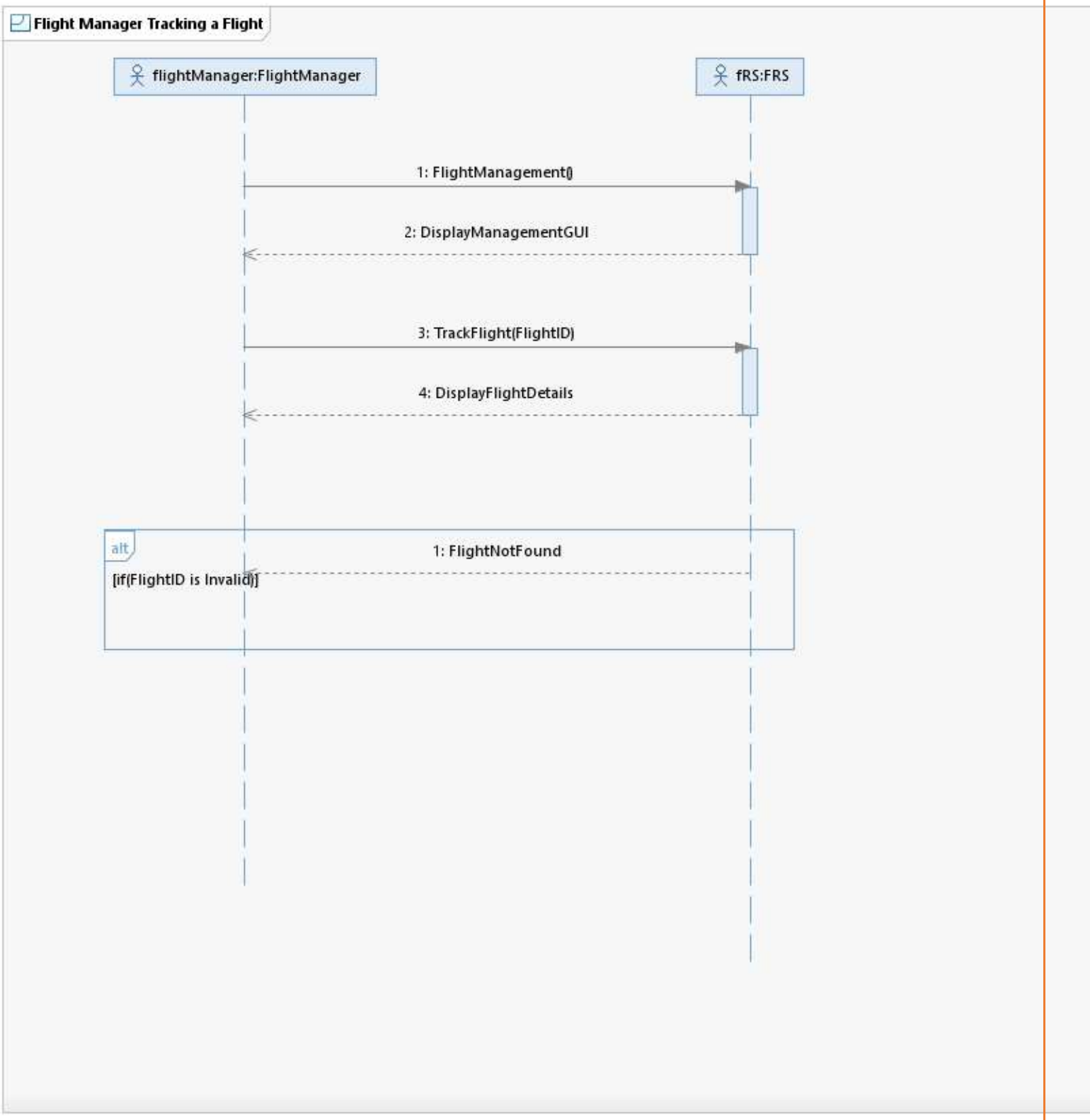
System Diagram:


FRS
Flight Management
Admin
Route Management
Luggage Management Staff
Flight Manager
Airplane Management
User
Luggage Management
Accounts Officer
Inquiry Management
Booking
Passenger

Flight Management




Flight Manager Scheduling a Flight
flightManager : FlightManager:
fRS:FRS
1: FlightManagement()
2: DisplayManagementGUI
3: ScheduleFlight(CityOfDeparture, CityOfArrival, DateOfDept, TimeOfDept)
4: DisplayAvailableAirplanes()
alt
1: No Airplane Available , Can't schedule Flight
[if(No Airplane Available)]
[else]
1: SelectDesiredAirplane(AirplaneID)
2: FlightSchedulingSuccessful()


Flight Manager Tracking a Flight
flightManager:FlightManager
fRS:FRS
1: FlightManagement()
2: DisplayManagementGUI
3: TrackFlight(FlightID)
4: DisplayFlightDetails
alt
[if(FlightID is Invalid)]
1: FlightNotFound

UC-01: Scheduling a Flight:

Sr. No	Section	Content / Explanation
1	**Designation**	UC-01
2	**Name**	**Schedule a Flight**
3	**Authors**	Daniyal, Ayesha, Mehreen
4	**Priority**	Important for system's success: High Technological Risk: High
5	**Scope**	This use case deals with how the Flight manager schedules a flight.
6	**Criticality**	High
7	**Stakeholders and interests**	• Flight Manager: Responsible for the entire scheduling of a flight. He wants correct retrieval of data to avoid any hazard. • Pilot: Responsible for piloting the flight. I Want to get all the necessary info about the flight to correctly pilot it. • Flight crew: Responsible for managing Passengers. • Technical crew: Responsible for maintaining the airplane of the flight. • Navigation system: Responsible for identifying the route of the Airplane. • Company: Wants to give their Passengers a tension free and satisfactory ride, and wants to record all the data for future use. • Passenger: Wants to travel faster and with minimum headaches.
8	**Description**	From the Flight Scheduling panel, the Flight manager selects the departure date, types the name of departure city, stops and arrival city. The FRS displays the list of available airplanes. The flight manager selects an airplane. The FRS schedules the flight from that airplane.
9	**Trigger Event**	The flight manager wishes to schedule a Flight.
10	**Actors**	Flight Manager, Weather reporting system, Pilot, Flight crew, Technical and maintenance crew, Navigation system.
11	**Pre-Conditions**	1. The airplane must be available for scheduling.

<table>
<tr><th>Sr. No</th><th>Section</th><th>Content / Explanation</th></tr>
<tr><td></td><td></td><td>2. The weather reporting FRS should give a green light (winds less than 30-35 kts (about 34-40 mph))
3. The relative airports should have their landing zones unoccupied at the time of takeoff and landing.</td></tr>
<tr><td>12</td><td>Post-Conditions</td><td>1. Flight is scheduled.
2. Flight records are updated.
3. Pilots have accepted to pilot the aircraft.
4. The fare is generated.
5. Flight is available for booking</td></tr>
<tr><td>13</td><td>Result</td><td>Flight scheduled</td></tr>
<tr><td>14</td><td>Main Scenario</td><td>
<table>
<tr><th>Flight Manager</th><th>Flight Scheduling system</th></tr>
<tr><td>1. The flight Manager logs into the FRS via his Username and PIN.

2. The flight manager enters the desired departure, arrival and stops in between the flight.

3. The flight manager then selects an airplane.

4. The flight manager may request the related authorities(tbd) to update the bill.</td><td>1a. The authentication FRS of the flight scheduling FRS authenticates the Flight Manager’s Username and PIN. If the authentication succeeds, the Flight manager Logs in.

1a. The flight scheduling FRS asks the flight manager for a departure, an arrival place and the stops in between the flight.
The FRS checks for available airplanes at the day of flight and displays it to the flight manager.
The FRS checks take-off availability of departure and stops and landing availability of the desired destination and stops.
The FRS schedules the flight for the particular airplane.
The FRS presents an estimated fare per Passenger to the flight manager.</td></tr>
</table>
</td></tr>
</table>

Sr. No	Section	Content / Explanation
15	**Alternative Scenario**	1. In case of bad weather: 1. The Flight manager requests an override operation 1. The Flight manager now schedules a flight on a bad weather day. In case of FRS failure: To support recovery and correct scheduling, the FRS shall have saved the sensitive information. 1. Flight manager logs in again 2. The FRS resumes from the prior state. In case of unavailability of Airplanes: . The flight manager requests a flight to the desired departure of the newly scheduled flight for the availability of an airplane a. The flight manager requests to delay the maintenance procedure of any airplane for the day of departure of the newly scheduled flight so that it becomes available for flying. In case of unavailability of Pilots: . Repeat 3a. a. The FRS sends a request to the pilot this time for an additional flight. In case of unavailability of Landing: . The FRS displays a list of alternative timings for flight departure, additional time during the stop (if there is any) and extension of flight time or to entirely cancel the scheduling process. a. The flight manager selects one choice.
16	**Exception Scenario**	1. The FRS is unable to fetch flight data. 2. The FRS is unable to fetch weather data. 3. The FRS is unable to fetch Pilot details. 4. The FRS is unable to fetch airport details.

UC-02: Removing a flight:

Sr. No	Section	Content / Explanation
1	**Designation**	UC-02
2	**Name**	**Remove a Flight**

3	**Authors**	Daniyal, Ayesha, Mehreen
4	**Priority**	Important for system's success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how the Flight Manager removes a flight from the schedule.
6	**Criticality**	High
7	**Description**	The Flight Manager removes a flight from the schedule by entering its flight number and departure place.
8	**Trigger Event**	The Flight Manager wants to remove a flight from the schedule.
9	**Actors**	Flight Manager
10	**Pre-Conditions**	· Flight has been scheduled.
11	**Post-Conditions**	· Flight is removed from the schedule. · Airplane is free to be scheduled for another flight. · Flight records are updated
12	**Result**	Flight removed from the schedule.

13	**Main Scenario**	

Flight Manager Action	System Responsibility
The flight Manager logs into the FRS via his Username and PIN.	
	The authentication FRS of the flight scheduling FRS authenticates the Flight Manager's Username and PIN. If the authentication succeeds, the Flight manager Logs in.
The Flight manager enters the flight number and the departure city of the flight he wants to remove.	
	The FRS displays the details (arrival place, stops in between the flight, date, time and estimated fare) of the scheduled flight.
The Flight manager clicks on the Remove Flight link.	
	The FRS shows a dialog box asking "Do you want to remove the flight?"
The Flight Manager clicks on the Remove button.	

		The FRS displays a message that flight (with flight number) has been removed from the schedule.

14	**Alternative Scenario**	In case of system failure: To support recovery and correct scheduling, the system shall have saved the sensitive information. 1. Flight manager logs in again 2. The system resumes from the prior state.
15	**Exception Scenario**	The FRS is unable to save the updates i.e., the flight removal.

UC-03: Track Current Flight's Status:

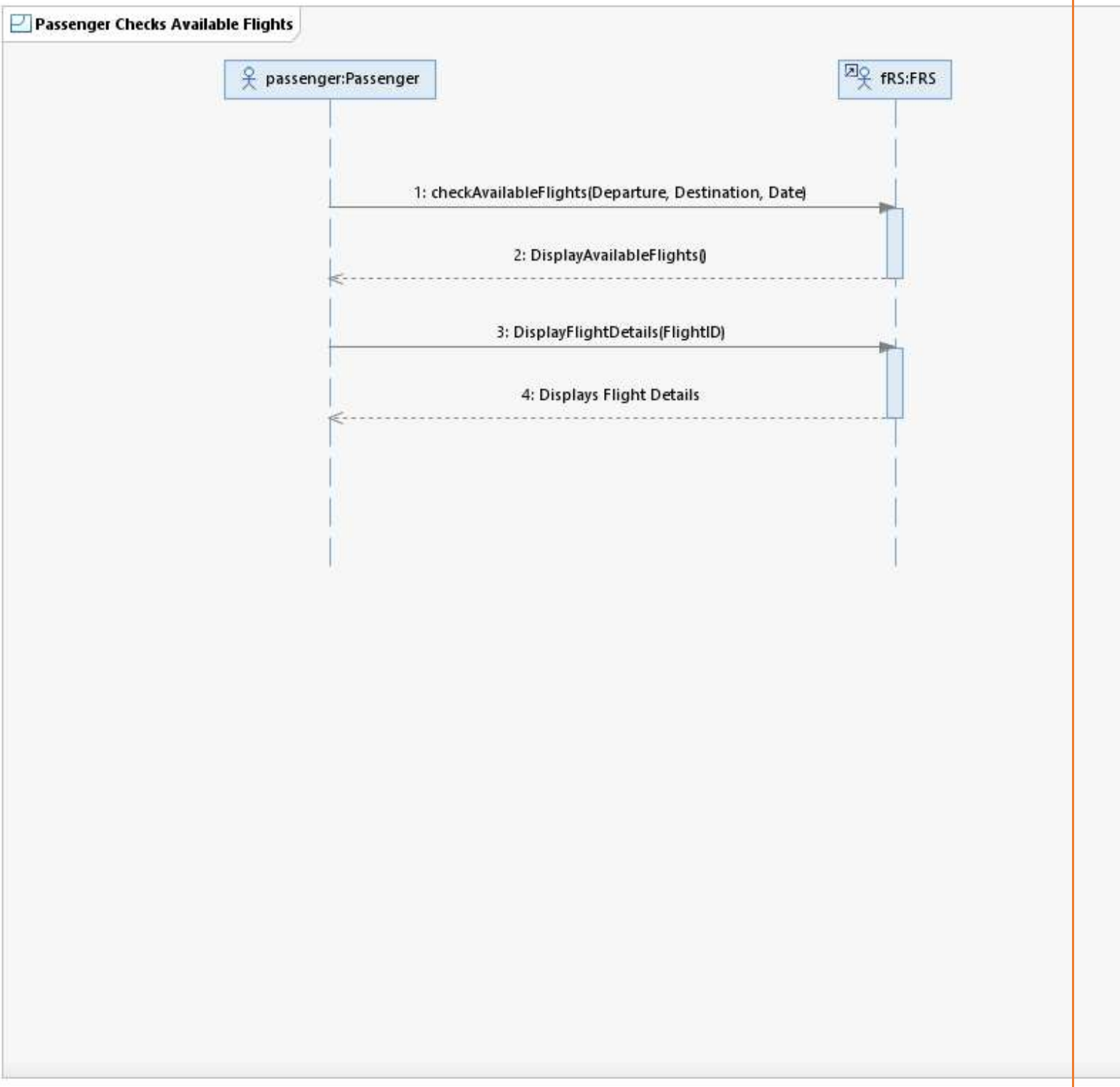
Sr. No	**Section**	Content / Explanation
1	**Designation**	UC-03
2	**Name**	**Track Flight Status**
3	**Authors**	Daniyal, Ayesha, Mehreen

4	**Priority**	Important for system's success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how the Flight Manager tracks the Status of a flight.
6	**Criticality**	High
7	**Description**	In the Flight's Tracking panel, the Flight Manager enters the Flight ID. The FRS displays the flight details i.e., Flight ID, Current Flight Status (In-Air / On-ground), Number of Passengers, Departure Time, Arrival time,
8	**Trigger Event**	The Flight Manager wants to track the status of a flight.
9	**Actors**	Flight Manager, GPS Satellite System
10	**Pre-Conditions**	Flight to be tracked has been scheduled.
11	**Post-Conditions**	Flight Manager can see the status (the current location of airplane), route of the flight
12	**Result**	Flight Status is displayed.

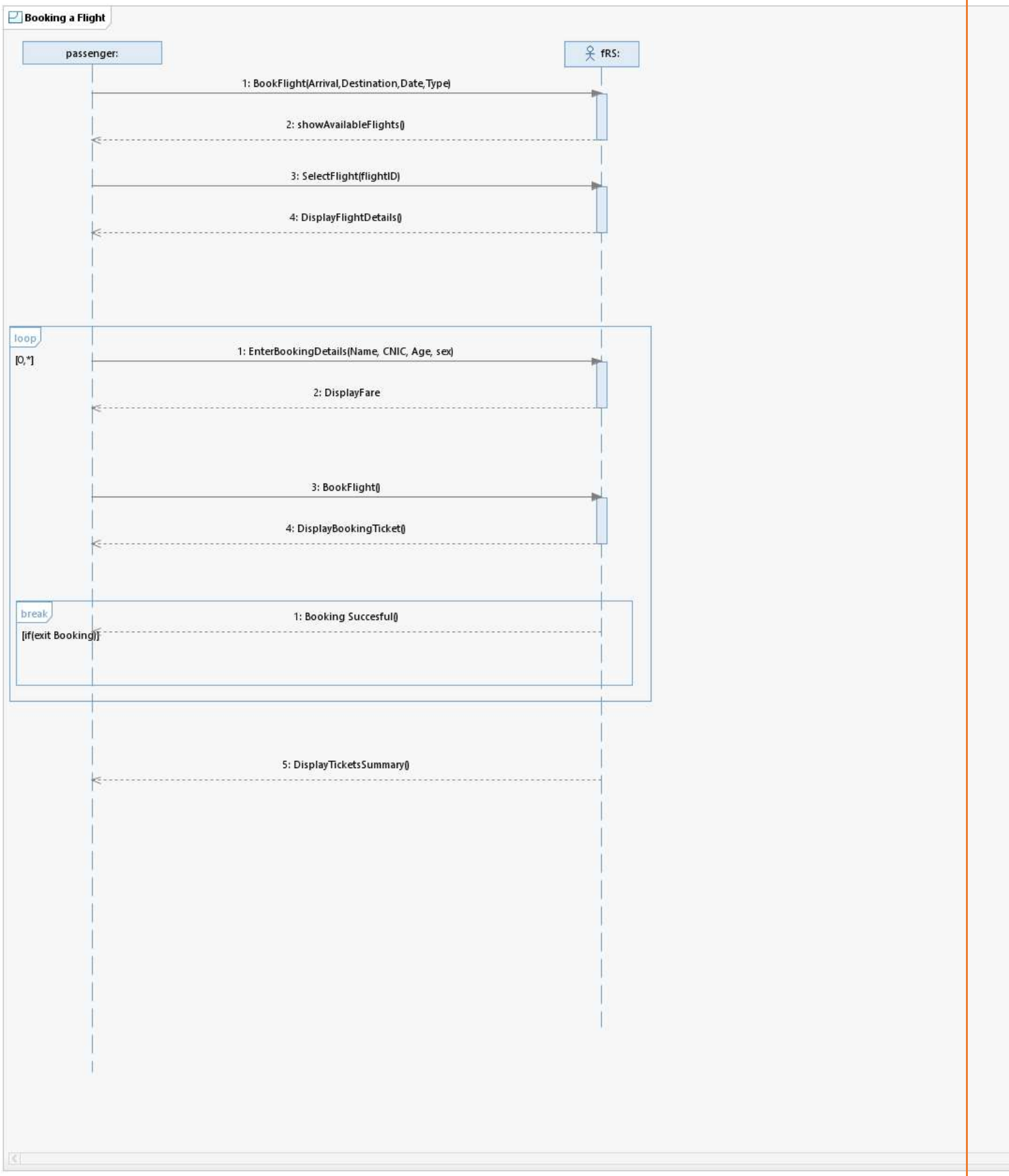
<table>
<tr>
<td>13</td>
<td>Main Scenario</td>
<td>
<table>
<tr><th>Flight Manager Action</th><th>System Responsibility</th></tr>
<tr><td>The flight Manager logs into the FRS via his Username and PIN.</td><td></td></tr>
<tr><td></td><td>The authentication FRS of the flight scheduling FRS authenticates the Flight Manager’s Username and PIN. If the authentication succeeds, the Flight manager Logs in.</td></tr>
<tr><td>The Flight manager opens up the manage flights page.</td><td></td></tr>
<tr><td></td><td>The FRS prompts the flight manager to add the flight number and departure place of the flight he wants to track.</td></tr>
<tr><td>The Flight manager enters the flight number and the departure place of the flight that he wants to track.</td><td></td></tr>
<tr><td></td><td>The FRS displays the details of the flight such as current location, route, and the time remaining to land the flight.</td></tr>
</table>
</td>
</tr>
<tr>
<td>15</td>
<td>Exception Scenario</td>
<td>The FRS is unable to fetch data from the GPS Satellite System.

The FRS is unable to save the updates as the airplane changes its location.</td>
</tr>
</table>

Booking Management



Passenger Cancels a Booking
passenger:
fRS:
1: CancelBooking()
2: showCurrentBookings()
3: CancelBooking(BookingID)
4: DisplayBookingDetails()
5: CancelBooking((BookingID)
6: DisplayBookingDetails()
7: ConfirmCancel()
8: BookingCancelled


Booking a Flight
passenger:
fRS:
1: BookFlight(Arrival,Destination,Date,Type)
2: showAvailableFlights()
3: SelectFlight(flightID)
4: DisplayFlightDetails()
loop
[0,*]
1: EnterBookingDetails(Name, CNIC, Age, sex)
2: DisplayFare
3: BookFlight()
4: DisplayBookingTicket()
break
[if(exit Booking)]
1: Booking Succesful()
5: DisplayTicketsSummary()

UC-04: Book a flight:

Sr. No	Section	Content / Explanation
1	**Designation**	UC-04
2	**Name**	**Book a Flight**
3	**Authors**	Daniyal, Ayesha, Mehreen
4	**Priority**	Important for system's success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how a Passenger books a flight.
6	**Criticality**	High
7	**Description**	The Passenger has two choices for booking a flight (Round trip, one way). In q city, arrival city, and departure date only, but in case of round trip he also selects a return date. The FRS shows a number of flights which fulfill the selected criteria by the Passenger. Passenger therefore selects a flight according to his budget and convenience.
8	**Trigger Event**	The Passenger wants to book a flight.
9	**Actors**	Passenger
10	**Pre-Conditions**	• Passenger has logged in to the FRS. • Flights have been scheduled by the Flight Manager for the next whole month.

11	**Post-Conditions**	• Seat is reserved. • Passenger is notified about the reservation through SMS/Email.
12	**Result**	Seat(s) reserved.

13	**Main Scenario**	

Passenger Action	FRS Responsibility
The Passenger opens up the booking page.	
	The FRS prompts the Passenger to opt for the type of trip (either round trip or one way trip).
The Passenger selects the type of trip.	
	In case of round trip, the FRS shows drop-down menus to select departure city, arrival city, departure date, and return date for the flight. And in case of one-way trip, the FRS shows drop-down menus to select departure city, arrival city, and departure date only.
The Passenger then fills all the shown fields.	
	The FRS asks to enter the number of Passengers i.e., number of adults, number of children, and number of infants separately.
The Passenger enters the number of guests for whom he wants to book the flight and clicks the search button.	
	The FRS searches flights scheduled from the selected arrival city to the selected departure city on the selected departure date, and displays the results.
The Passenger chooses a flight according to his budget and convenience and enters the next button.	
	The FRS asks the Passenger to add the personal details (First name, Last name, CNIC, email/phone number) of each guest for whom he wants to book a flight.

		The Passenger enters the personal details of each guest and enters the complete button.	
			The FRS displays all the booking details including the confirmation number.
			The FRS also notifies the Passengers through SMS/email that the seats have been reserved on the flight requested, he must complete the purchase before the reservation expires.

14	**Alternative Scenario**	8. Incase of unavailability of flights 1. The FRS displays the message “No flight matches your selection” 2. The Passenger goes back to the booking page and makes changes in any of his inputs. 3. The FRS shows different flights than before.
15	**Exception Scenario**	1. The drop-down menu does not have an option for any particular city. 2. The system takes too long to find the flights for Passenger’s search.

UC-05: Cancel a booking:

Sr. No	**Section**	Content / Explanation
1	**Designation**	UC-05
2	**Name**	**Cancel a booking**
3	**Authors**	Daniyal, Ayesha, Mehreen
4	**Priority**	Important for system’s success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how a Passenger cancels a booking of the flight.
6	**Criticality**	High

<table>
<tr><td>7</td><td>Description</td><td>The Passenger cancels the booking by entering first name, last name and confirmation number of the flight. The amount is refunded and cancellation fee is deducted from his account.</td></tr>
<tr><td>8</td><td>Trigger Event</td><td>The Passenger wants to cancel a booking.</td></tr>
<tr><td>9</td><td>Actors</td><td>Passenger</td></tr>
<tr><td>10</td><td>Pre-Conditions</td><td>Passenger has booked a flight.</td></tr>
<tr><td>11</td><td>Post-Conditions</td><td><ul><li>Booking is canceled.</li><li>Passenger is notified about the cancellation fee deductions through SMS/Email.</li></ul></td></tr>
<tr><td>12</td><td>Result</td><td>Booking of flight has been canceled.</td></tr>
<tr><td>13</td><td>Main Scenario</td><td>
<table>
<tr><td>Passenger Actions</td><td>FRS Responsibility</td></tr>
<tr><td>The Passenger opens up the Manage Booking page and clicks on Cancel Reservation.</td><td></td></tr>
<tr><td></td><td>The FRS pops up 3 boxes on the screen, asking for first name, last name and confirmation number.</td></tr>
<tr><td>The Passenger enters the first name, last name and flight confirmation number.</td><td></td></tr>
<tr><td></td><td>The FRS shows the flight details.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>
<table>
<tr><td>The Passenger clicks cancel reservation option.</td><td></td></tr>
<tr><td></td><td>The FRS shows a dialog box asking “Cancel the reservation?”</td></tr>
<tr><td>The Passenger clicks on the Cancel button.</td><td></td></tr>
<tr><td></td><td>The FRS displays a message that your booking has been canceled, and also notifies the Passenger about cancellation fee deductions through SMS/email.</td></tr>
</table>
</td></tr>
<tr><td>14</td><td>Alternative Scenario</td><td>3) Passenger doesn’t know the flight confirmation number.
i) The Passenger checks booked flight history to find the confirmation number.
ii) The Passenger can also see confirmation number on SMS/email.
4) To cancel a round trip, the return flight must be canceled explicitly.</td></tr>
<tr><td>15</td><td>Exception Scenario</td><td>The System is unable to find a booked flight.</td></tr>
</table>

UC-06: Check available flights (Fare, Capacity, Route (departure, destination, stops)

Sr. No	**Section**	Content / Explanation
1	**Designation**	UC-06
2	**Name**	**Check available Flights**
3	**Authors**	Mehreen
4	**Priority**	Important for system's success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how a passenger checks available Flight.
6	**Criticality**	High
7	**Description**	The passenger enters departure and arrival city and selects any flight to see its status, date, time, fare, capacity, and route.
8	**Trigger Event**	The Passenger wants to check the status of an available flight.
9	**Actors**	Passenger
10	**Pre-Conditions**	· Passenger has logged in to the FRS.
11	**Post-Conditions**	· The passenger can see the status of the flight and other relevant booking details on the screen.
12	**Result**	The Flight status is displayed on the screen.

13	**Main Scenario**	1. The passenger clicks the flight status option from the homepage. 2. The FRS asks the passenger to add departure city and arrival city. 3. The passenger enters the departure city and arrival city. 4. The FRS shows all the flights of next 2 to 3 days from the selected departure city to the selected arrival city with flight status (On Time, Canceled, or Delayed etc.), date and time. 5. The passenger clicks on any of the flights to see more details related to booking. 6. On clicking a flight number, the FRS shows the fare, capacity and route of the flight.
14	**Alternative Scenario**	4. If the flight is not displayed by entering departure place and arrival, pass
15	**Exception Scenario**	· The system is unable to update the capacity of the airplane/ the number of seats reserved. · The system is unable to fetch route details from Google Maps.

UC-07: View Booking:

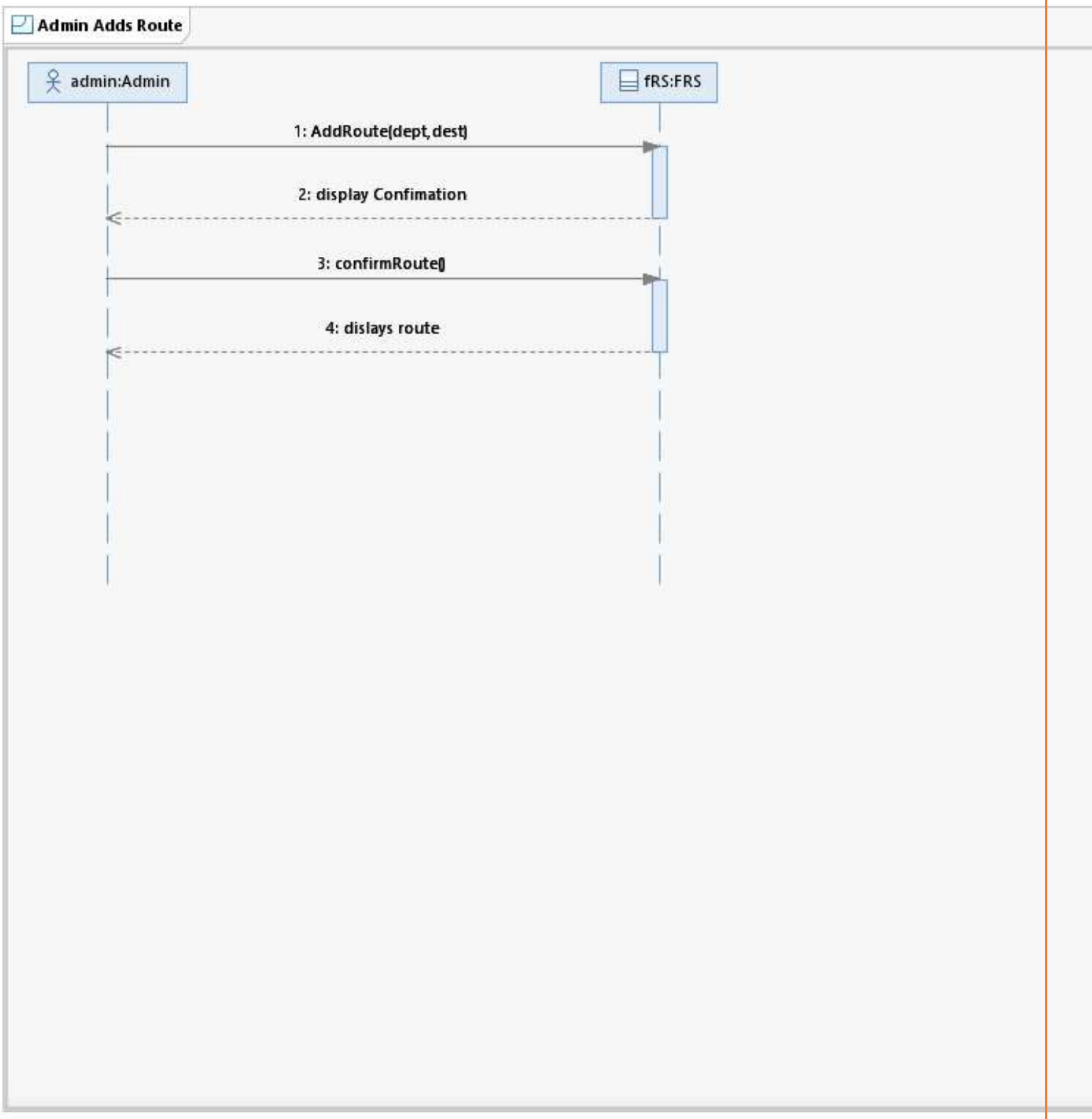
Sr.No	**Section**	Content / Explanation
1	**Designation**	UC-07
2	**Name**	**View Booking**
3	**Authors**	Daniyal, Ayesha, Mehreen
4	**Priority**	Important for system's success: **High** Technological Risk: **High**
5	**Scope**	This use case deals with how a passenger checks the booking status of his flight.
6	**Criticality**	High
7	**Description**	The passenger checks the status of his/her booking via FRS.
8	**Trigger Event**	The Passenger wants to check the booking status of a flight.
9	**Actors**	Passenger
10	**Pre-Conditions**	Passenger has logged in to the FRS
11	**Post-Conditions**	Passenger has successfully viewed his/her ticket.
12	**Result**	The Booking status of a flight is displayed on the screen.

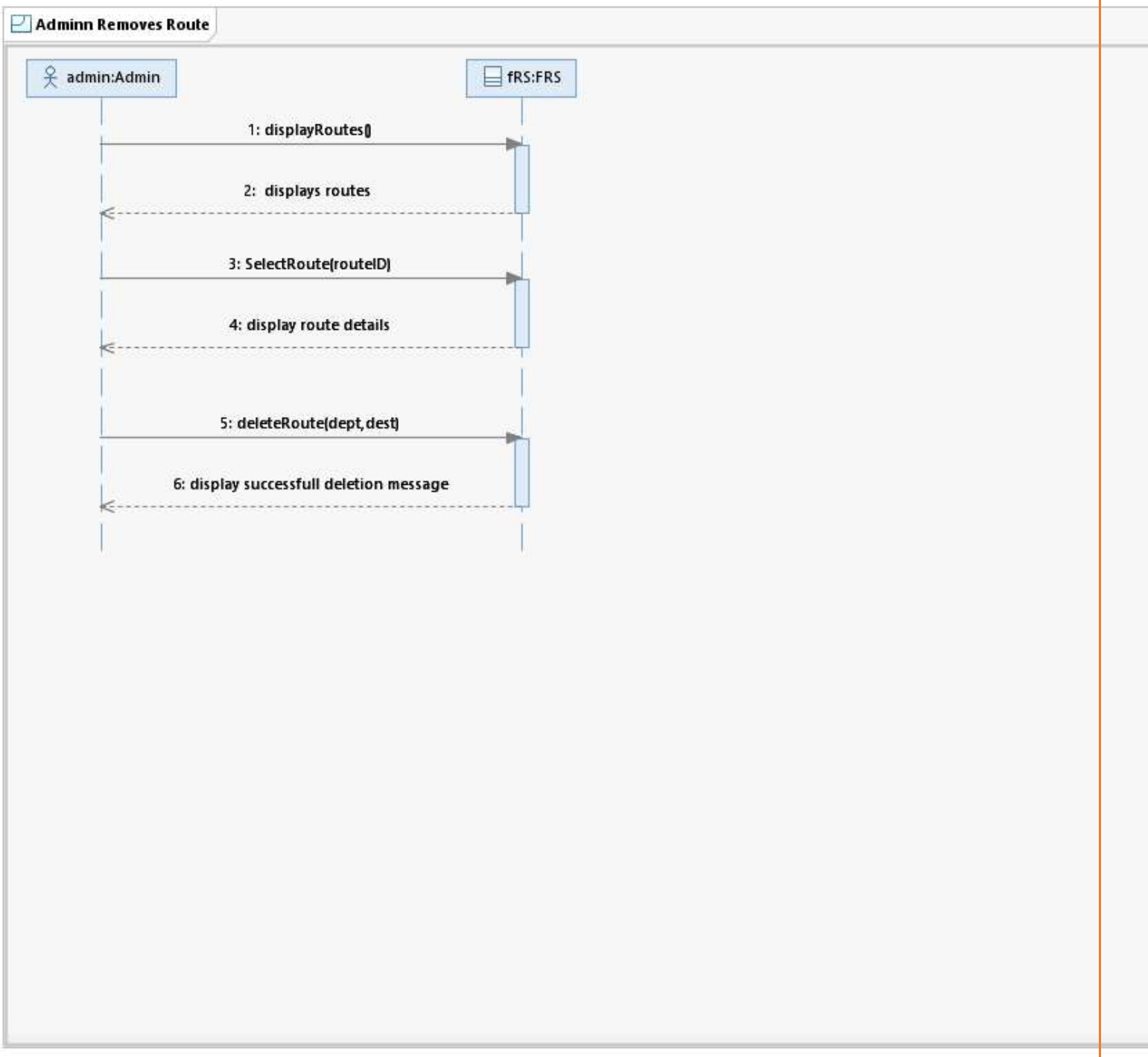
13	**Main Scenario**	1. The Passenger logs into the FRS. 2. The FRS displays the UI. 3. Through the UI, the passenger navigates to “View current bookings”. 4. The FRS responds by fetching the passenger’s Booking data from its database and displays the Passenger’s ticket(s) on the terminal that is displayed.

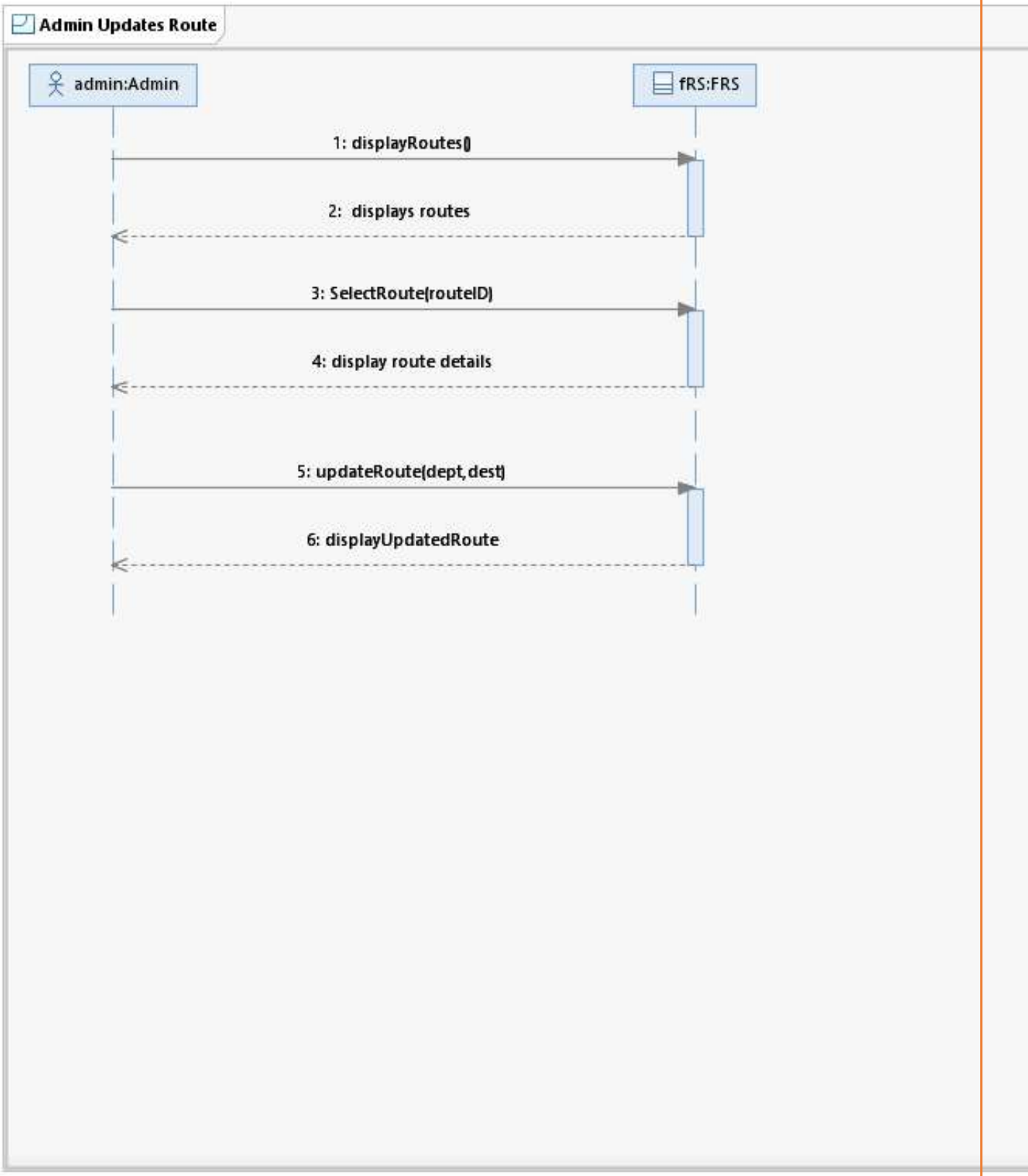
14	**Alternative Scenario**	1. If the passenger is unable to log in, then
		    1. The admin can also check the flight status of any person through the FRS using the steps in the Main scenario if he is logged in to the FRS.
		    2. The Accounts Manager can also do 1a.

15	**Exception Scenario**	

Route Management




Adminn Removes Route
admin:Admin
fRS:FRS
1: displayRoutes()
2: displays routes
3: SelectRoute(routeID)
4: display route details
5: deleteRoute(dept, dest)
6: display successfull deletion message


Admin Updates Route
admin:Admin
fRS:FRS
1: displayRoutes()
2: displays routes
3: SelectRoute(routeID)
4: display route details
5: updateRoute(dept, dest)
6: displayUpdatedRoute

UC-08: Adding a route:

Section	Content / Explanation
Designation	UC-08
Name	Adding a route
Priority	Important for system's success: **High** Technical Risk: **High**
Scope	This use case deals with how the Admin adds a route in the FRS .
Criticality	High
Level	User-goal
Description	The Admin selects flight type, enters destination, stops, departure and makes a route. Route is added in the database.
Trigger event	The admin wishes to add a new route.
Primary actor	Admin
Stakeholders and interests	Passenger: He wants to look at the routes of flight. Admin: he wants to keep check of every route. He wants to manage the route.
Pre-Conditions	The Amin must be logged in. The admin must be in the route management portal.

Post-Conditions	Route is added. Route records are updated.
Result	Route added
Main Scenario	1. The Admin selects a route option. 2. The FRS displays an add route screen and gives options for direct or indirect flight. 3. Admin selects direct flight. 4. FRS then asks the Passenger for departure and destination city. 5. The Admin enters departure and destination. 6. FRS gives admin the option to 6.1 Confirm the route. 6.2 Cancel the route. 6.3 Change the route. 7. The admin confirms the route. 8. The FRS checks the database if the route is already present in the database and stores the route if it is not found in the database.
Alternative Scenario	3a. The admin selects indirect flight. 3a.1 The FRS asks the admin number of stops he wants to enter. 3a.2 The admin enter the number of the stops he want to add. 3a.3 The FRS asks the admin to enter the name of stop (city). 5a. The admin enters departure, stops and destination. 6a. The admin select cancel the route option. 6a.1 The FRS brings the admin back to the route management portal. 6b. The admin selects a change route option. 6b.1 Go to step 4. 8a. The route is already present. 8a.1 The FRS will display message that route is already stored and give admin the option: 1. Add another route 2. Cancel the route. 8a.2 the admin select add another route. 8a.3 got to step 4. 8a.2.1 The admin cancels the route. 8a.2.1.1 The FRS takes admin to route management portal.
Exception Scenario	The FRS server is down. (2) Refresh and add the route again.

UC-09: Updating a route

Section	Content / Explanation
Designation	UC-09
Name	Updating a route
Priority	Important for system's success: Medium Technical Risk: Medium
Scope	This use case deals with how the Admin updates a route in the FRS .
Criticality	Medium
Level	User-goal
Description	The admin select the route to change and enter the entries (departure, destinations, stop) he want to change in the route
Trigger Event	The admin wishes to update route information.
Primary actor	Admin
Stakeholders and interests	Passenger: He wants to check the routes of flight. Admin: he wants to keep checking every route. He wants to manage the route.
Pre-Conditions	The Amin must be logged in. The admin must be in the route management portal.
Post-Conditions	Route is updated. Route records are updated.
Result	Route updated.

Main Scenario	1. The Admin selects and updates a route option. 2. The FRS will fetch the routes from the database and display routes to the admin. 3. The admin selects the route he wants to update. 4. The FRS displays details of route and asks the admin if he wants to change the departure or not. 5. The admin selects the change the departure option and enters the new departure. 6. This gives the admin option if he wants to change the destination or not. 7. The admin selects to change destination and enters new destination. 8. The systems check if routes contain the stops and ask if the admin wants to change the stops or not. 9. The admin changes the stops. 10. FRS display the update route gives admin the option to 10.1Confirm the route. 10.2 Cancel the route. 10.3Change the route. 11. The admin confirms the route. 12. The FRS checks the database if the route is already present in the database and updates the route if it is not found in the database.
Alternative Scenario	5a. The admin selects to not change the departure option. 5a.1 Go to step 6. 7a. The admin selects to not change the destination. 7a.1 Go to step 8. 8a. The route does not contain any stops. cancel the route option. 8a.1 Go to 10 8b. The admin does not want to change the stop. 8b.1 Go to step 10. 10a. The admin select cancel the route option. 6a.1 The FRS brings the admin back to the route management portal. 10b. The admin selects a change route option. 10b.1 Go to step 4. 12a. The route is already present. 10a.1 The FRS will display message that route is already stored and give admin the option: 1. Add another route 2. Cancel the route. 10a.2 the admin select add another route. 10a.3 got to step 4. 10a.2.1 The admin cancels the route. 10a.2.1.1 The FRS takes admin to route management portal.

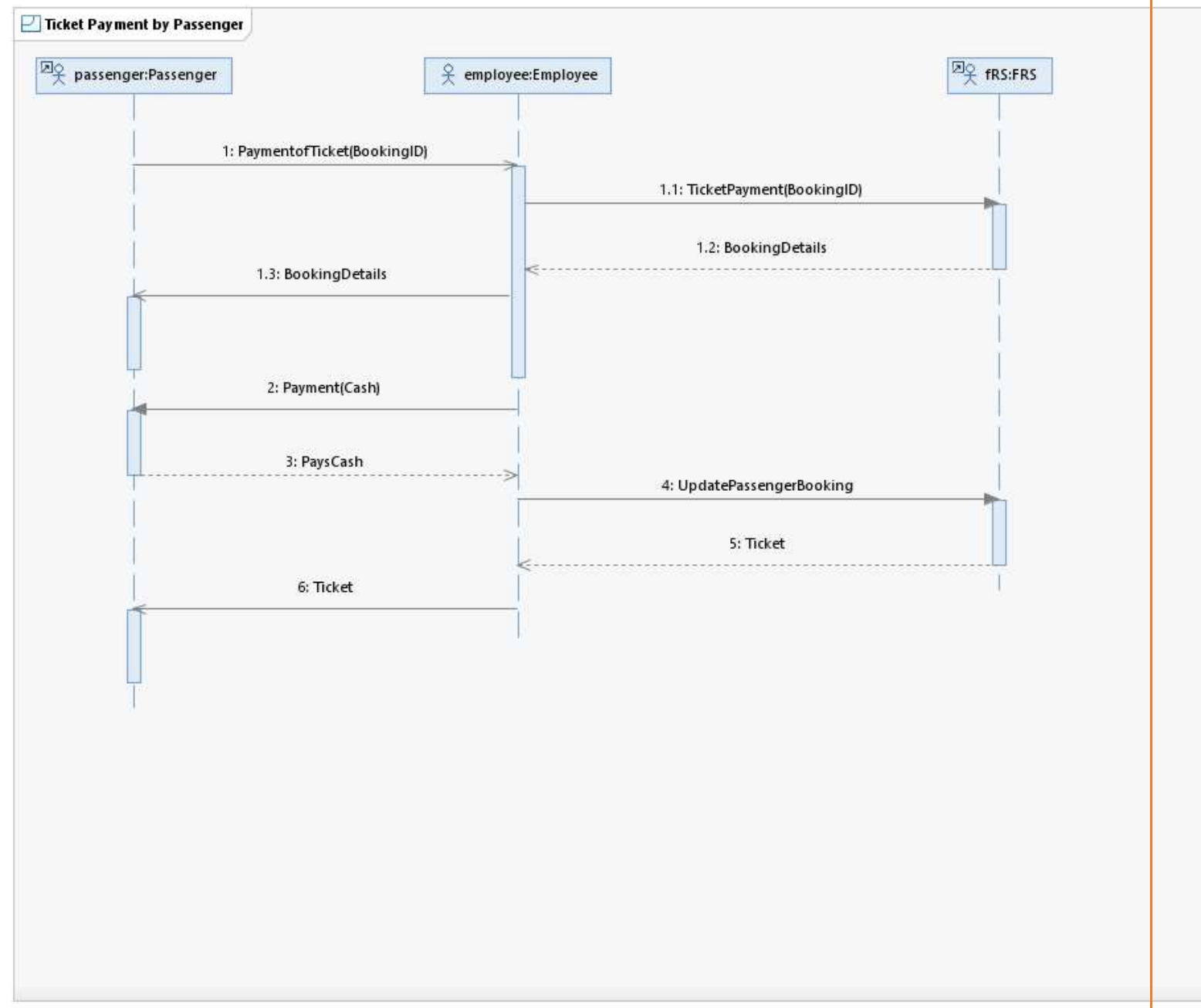
Exception Scenario	The FRS server is down. (1) Refresh and update the route again.

UC-10: Removing a route

Section	Content / Explanation
Designation	UC-10
Name	Remove a route
Priority	Important for system's success: Medium Technical Risk: Medium
Scope	This use case deals with how the Admin removes a route in the FRS .
Criticality	medium
Level	User-goal
Description	The admin selects the route to remove and the route is removed from the database and information is updated.
Trigger Event	The admin wishes to remove the route.
Primary actor	Admin
Stakeholders and interests	Passenger: He wants to check the routes of flight. Admin: he wants to keep checking every route. He wants to manage the route.
Pre-Conditions	The Admin must be logged in. The admin must be in the route management portal.

Post-Conditions	Route is removed. Route records are updated.
Result	Route removed.
Main Scenario	1. The Admin selects a route option. 2. The FRS will fetch the routes from the database and display routes to the admin. 3. The admin selects the route he wants to remove. 4. The FRS displays details of the route and asks the admin for the confirmation. 5. The admin confirms the deletion. 6. The FRS deletes the route from the database.
Alternative Scenario	2a. The FRS database is empty. 2a.1 The FRS gives the admin the message that the database is empty and navigates the Passenger to the route management portal. 5a. The admin select cancel the route option. 5a.1 The FRS brings the admin back to the route management portal.
Exception Scenario	The FRS server is down. (1) Refresh and remove the route again.

Payment



UC-11: Payment with cash (TBD)

Section	Content / Explanation
Designation	UC-11

Name	Payment with cash
Priority	Important for system's success: High Technical Risk: High
Scope	This use case deals with how the Passenger processes payment.
Criticality	High
Level	User-goal
Description	The Passenger selects to pay through cash and the FRS tells the Passenger to pay 3 hours before the flight departure and if the Passenger pays before the time, then the seat is reserved else it is set free to be booked.
Trigger Event	The Passenger wishes to pay through cash.
Primary actor	Admin
Stakeholders and interests	Passenger: He wants to pay for the booked flight. Admin: he wants to keep a check of every Passenger who has reserved and paid for the flight. He wants to manage flight reservations.
Pre-Conditions	The Passenger must have booked a flight.
Post-Conditions	Payment is done. Flight Records are updated. Seating records are updated.
Result	Payment received.

Main Scenario	1. The Passenger clicks on the payment option after booking a flight. 2. The FRS will display calculated fare, Passenger information and flight details with two options pay through cash/ or pay through easy paisa. 3. The Passenger selects pay with cash. 4. The FRS then reserved the flight seat and Passengers were required to pay 3 hours before the flight departure. 5. The Passenger pays 3 hours before the flight. 6. The FRS updates the payment information in the database.
Alternative Scenario	3a. The Passenger chooses to pay through easy paisa. 3a.1 Go to UC-03 5a. The Passenger does not pay before 3 hours of flight. 5a.1 The FRS cancels the Passenger flight reservation and the seat is set free for booking. 5a.2 The FRS sends the Passenger flight reservation canceled message.
Exception Scenario	The FRS server is down. (1) Refresh and remove the route again.

UC-11.1: Payment with cash

Section	**Content / Explanation**
Designation	UC-11
Name	Payment with cash
Priority	Important for system's success: High Technical Risk: High
Scope	This use case deals with how the Passenger processes payment.

Criticality	High
Level	User-goal
Description	The Passenger selects to pay through cash and the FRS tells the Passenger to pay 3 hours before the flight departure and if the Passenger pays before the time, then the seat is reserved else it is set free to be booked.
Trigger Event	The Passenger wishes to pay through cash.
Primary actor	Admin
Stakeholders and interests	Passenger: He wants to pay for the booked flight. Admin: he wants to keep a check of every Passenger who has reserved and paid for the flight. He wants to manage flight reservations.
Pre-Conditions	The Passenger must have booked a flight. The Passenger must be in the Airline Office The Employee dealing the Passenger must be logged in to the FRS
Post-Conditions	Payment is done. Flight Records are updated. Seating records are updated.
Result	Payment received.
Main Scenario	1. The Passenger goes to the Airline Office. 2. The passenger tells the Employee for Ticket Payment 3. The Employee Selects Ticket Payment from the FRS. 4. The Employee asks for Booking ID of the Passenger. 5. The Employee enters the Booking ID into the FRS. 6. FRS displays the calculated fare, Passenger CNIC and flight time. 7. The Employee collects the Payment from the passenger. 8. The Employee updates the payment of the Passenger.

Alternative Scenario	Main Scenario of UC-11, UC-12.
Exception Scenario	The FRS server is down. The Employee can't log in.

UC-12: Payment with external Microfinance FRS (T.B.D)

Section	Content / Explanation
Designation	UC-12
Name	Payment through Easy Paisa
Priority	Important for system's success: High Technical Risk: High
Scope	This use case deals with how the Passenger processes payment through easy paisa.
Criticality	High
Level	User-goal
Description	The Passenger enters account number. The token is sent on the Passenger easy paisa account, Passenger confirms and the transition takes place.
Trigger Event	The Passenger wishes to pay through easy paisa.

Primary actor	Passenger
Stakeholders and interests	Passenger: He wants to pay for the booked flight. Admin: he wants to keep a check of every Passenger who has reserved and paid for the flight. He wants to manage flight reservations.
Pre-Conditions	The Passenger must be logged in. The Passenger must have booked a flight.
Post-Conditions	Payment is done. Flight Records are updated. Seating records are updated.
Result	Payment received.
Main Scenario	1. The Passenger clicks on the payment option after booking a flight. 2. The FRS will display ticket details with two options: pay through cash/ or pay through easy paisa. 3. The Passenger selects to pay through easy paisa. 4. The FRS asks for an easy paisa account of the Passenger. 5. The Passenger enters the easy paisa account number. 6. The FRS verifies and then sends a token on the easy paisa account of the Passenger. 7. The Passenger gets the message and approves the transaction. 8. The amount is deducted from the easy paisa account and sent to the FRS bank. 9. As soon as the payment is received the confirmation message is shown to the Passenger. 10. The FRS updates the flight information in the database.
Alternative Scenario	3a The Passenger select to pay through cash 3a.1 go to UC-02. 5a. The Passenger enters the wrong account number. 5a.1 The FRS then asks the Passenger to re-enter the account number. 7a. The Passenger does not get a token message. 7a.1 The FRS resends the message. 8a. The amount is deducted but the payment is not done. 8a.1 The FRS again asked Passengers to pay. 8a.2 the Passenger pays again. 8a.3 the FRS bank then reverse the transaction (send money back of double payment). .

Exception Scenario	The FRS server is down. (1) Refresh and pay again. The easy paisa server was down.

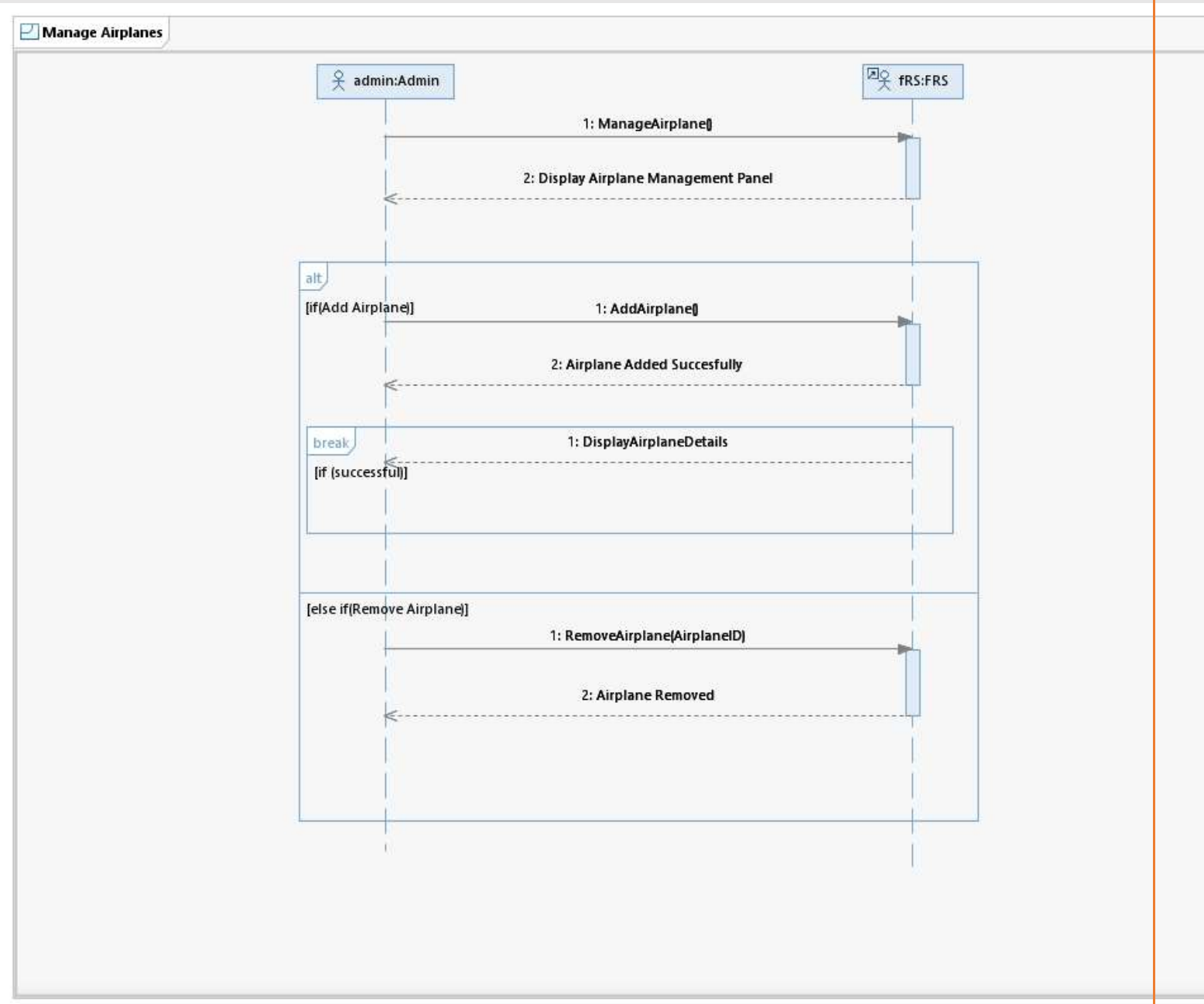
Luggage Management

UC-13: Calculate fare of extra Luggage

Sr. No	Section	Content / Explanation
1	**Designation**	UC-13
2	**Name**	luggage Management
3	**Authors**	Daniyal
4	**Priority**	Important for system's success: **Medium** Technological Risk: **Low**
5	**Scope**	This use case deals with the Management of Luggage/luggage.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Passenger: Wants to store and retrieve his luggage safely. • Company: Wants to make sure the luggage of a Passenger is not damaged.
8	**Description**	The Passenger who has booked a flight will deliver his luggage to the Airport staff on the airport before his departure. The Airport staff will give an identification number of his luggage. The Airport staff will collect any charges if the luggage exceeds the quantity mentioned in the flight instructions. The Passenger will collect the luggage after the flight using his luggage identification tag.
9	**Trigger Event**	The luggage is collected by the Airport staff from the passenger who is about to depart.
10	**Actors**	Passenger, Airport Staff.

Sr. No	Section	Content / Explanation
11	**Pre-Conditions**	1. The passenger must enter the departure area with luggage.
12	**Post-Conditions**	1. Luggage is successfully collected from the passenger and loaded on the Airplane with a luggage identification tag. 2. Passenger is successfully given his luggage identification tag by the luggage management team. 3. As the flight arrives on destination, the luggage is successfully collected by the passenger with the help of his luggage identification tag.
13	**Result**	Luggage is successfully collected
14	**Main Scenario**	1. The Passenger comes in the area of departure 2. The Luggage management team collect his luggage (if any) 3. The Luggage management team gives the passenger his luggage identification tag. 4. The luggage management team then charge the passenger if the luggage exceeds the amount defined in the flight Instructions 5. The luggage is successfully loaded onto the Airplane 6. After the flight is completed, the luggage is safely returned to the passenger using his luggage identification tag.
15	**Alternative Scenario**	1. If the passenger loses his luggage identification tag, then the passenger has to wait for everyone to collect their luggage. 2. Then the luggage management team tries to identify the passenger's luggage using the passenger flight's data.
16	**Exception Scenario**	5. The luggage is left at the departing Airport. 6. The luggage identification tag is lost from both luggage and the passenger.

Airplane Management



UC-14: Update Airplane's Flight Status

Sr.No	Section	Content / Explanation
1	**Designation**	UC-14
2	**Name**	Update Airplane's Flight Status
3	**Authors**	Daniyal

Sr.No	Section	Content / Explanation
4	**Priority**	Important for system's success: High Technological Risk: High
5	**Scope**	This use case deals with how the FRS updates Airplane Status when a flight lands.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Flight Manager: Responsible for the entire scheduling of a flight. He wants correct retrieval of data to avoid any hazard.
8	**Description**	When the flight lands on any Airport 'X', the FRS automatically updates the status of the flight from "In Air" to "Flight to X completed".
9	**Trigger Event**	The Airplane completes its flight from destination A to Destination B and lands on Airport X successfully.
10	**Actors**	Flight Manager, Pilot, Flight crew, Navigation system, FRS.
11	**Pre-Conditions**	2. The airplane must successfully land the flight on Airport X.
12	**Post-Conditions**	6. Flight is successfully Landed on Airport X. 7. Flight records are updated. 8. The status of the Flight is successfully changed from "In Air" To "Flight to X completed".
13	**Result**	Airplane's Status successfully updated.
14	**Main Scenario**	1. The Airplane Y lands on Airport X. 2. The FRS updates the Flight status from "In Air" to "completed". 3. The FRS updates the Airplane status from "In Air" to "Flight completed and landed successfully on Airport X".
15	**Alternative Scenario**	3. If the Flight that is about to land on Airport X is rerouted to any at other Airport Y, then the Flight manager manually overrides
16	**Exception Scenario**	7. The FRS is unable to fetch flight data. 8. The FRS is unable to fetch airport details.

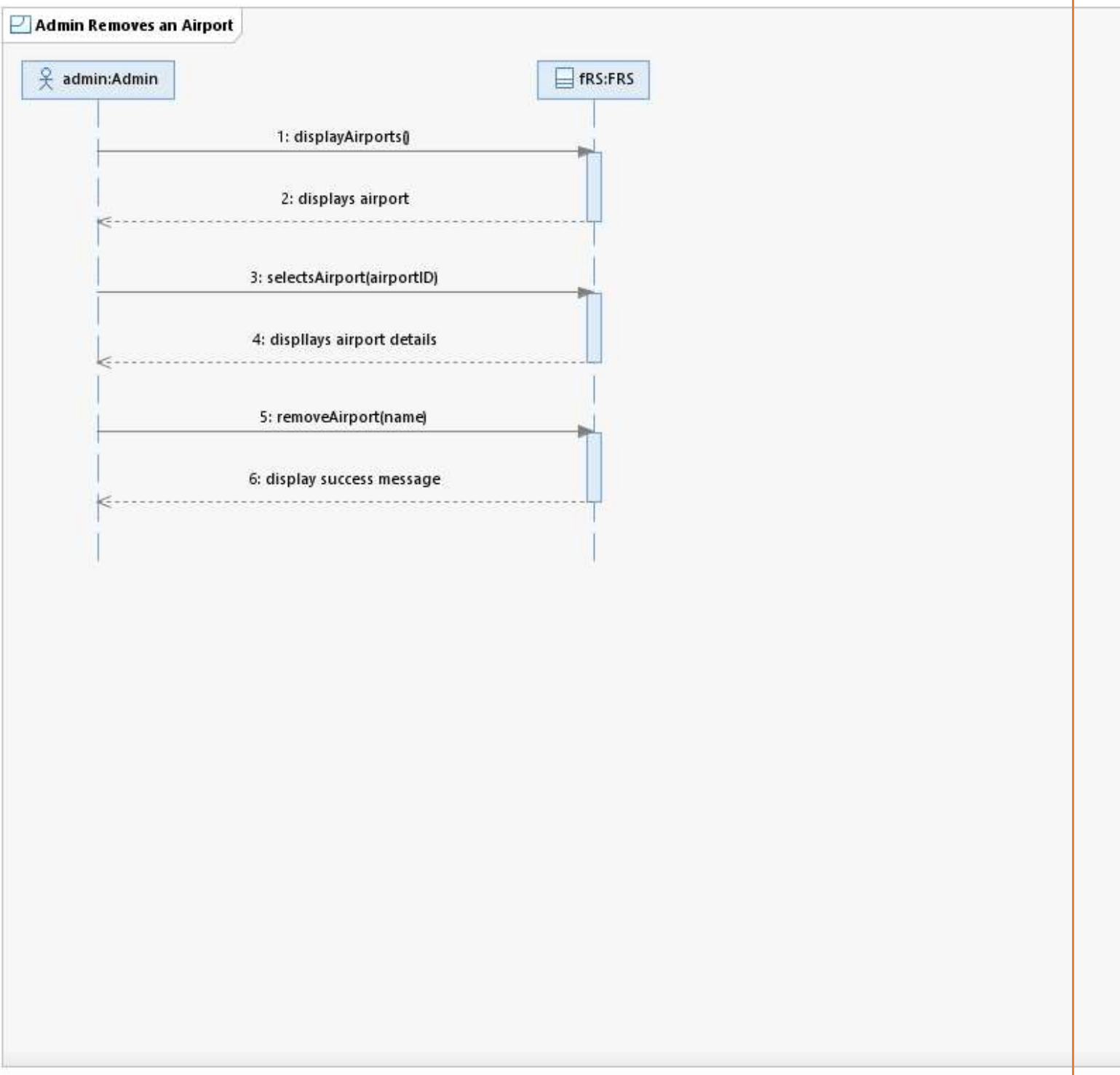
UC-15: Manage Airplanes in FRS

Sr. No	Section	Content / Explanation
1	**Designation**	UC-15
2	**Name**	Manage Airplane in FRS
3	**Authors**	Daniyal
4	**Priority**	Important for system's success: **Medium** Technological Risk: **Medium**
5	**Scope**	This use case deals with how the Admin adds/removes an Airplane to FRS.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Admin: Responsible for entire administration and management of the FRS.
8	**Description**	Admin adds an airplane to the FRS.
9	**Trigger Event**	Admin wants to add a new Airport
10	**Actors**	Admin, FRS..
11	**Pre-Conditions**	1. The Admin must be logged in.
12	**Post-Conditions**	1. The Airplane is successfully added/removed from the FRS.
13	**Result**	Airplane is successfully added to the FRS and is now available for flight scheduling, Airplane is successfully removed from the FRS and won't be available for scheduling. All the flights of that Airplane shall be cancelled.

14	**Main Scenario**	1. The admin opens up the Airplane Management Panel.
		2. The system displays Airplane Management UI.
		3. The Admin opens either of the Following:
		  1. The admin adds an Airplane in the FRS
		  2. The admin removes and Airplane from the FRS

Sr. No	Section	Content / Explanation
15	**Alternative Scenario**	1. If the Airplane is not found in the FRS, then the Admin won't be able to delete the Airplane from the FRS.
16	**Exception Scenario**	1. The FRS is unable to fetch Airplane Details. 2. The FRS is unable to delete Airplane.

Airport Management


Admin Removes an Airport
admin:Admin
fRS:FRS
1: displayAirports()
2: displays airport
3: selectsAirport(airportID)
4: displlays airport details
5: removeAirport(name)
6: display success message

UC-16: Add Airport

Sr.No	Section	Content / Explanation
1	Designation	UC-16
2	Name	Add Airport
4	Priority	Important for system's success: High Technological Risk: High
5	Scope	This use case deals with how the Admin adds an airport.
6	Criticality	High
7	Stakeholders and interests	Company: The company wants to provide as many airports as possible for Passengers to book a flight. . • Passenger: Wants to travel faster and with minimum headaches. Passengers want to book a flight at the airport suitable for them.
8	Description	The admin enters the airport name, the no. of planes on the airport, the flight manager responsible for the flight management, the system asks for confirmation and then stores the airport in the database.
9	Trigger Event	The admin wishes to add a new airport.
10	Actors	Admin, FRS (Flight reservation system).
11	Pre-Conditions	Admin must be logged in.
12	Post-Conditions	Airport is added to the FRS database.
13	Result	Airport added

<table>
<tr><th>Sr.No</th><th>Section</th><th>Content / Explanation</th></tr>
<tr><td>14</td><td>Main Scenario</td><td>
<table>
<tr><th>Admin</th><th>Flight Scheduling system</th></tr>
<tr><td>1. The admin clicks on adding the airport option.

3. The Admin enters the name of the airport and numbers of the airplanes in the airport.

5. The admin assigns a flight manager to the airport and clicks on the save button.
7. The admin select confirm</td><td>2. The FRS asks the Passenger to enter the name of the airport, number of the plane in the airport.

4. The FRS asks the admin to assign a flight manager for this airport.

6. The FRS system displays the airport details and give admin option:
6.1 Confirm
6.2 Change the details
6.3 cancel.

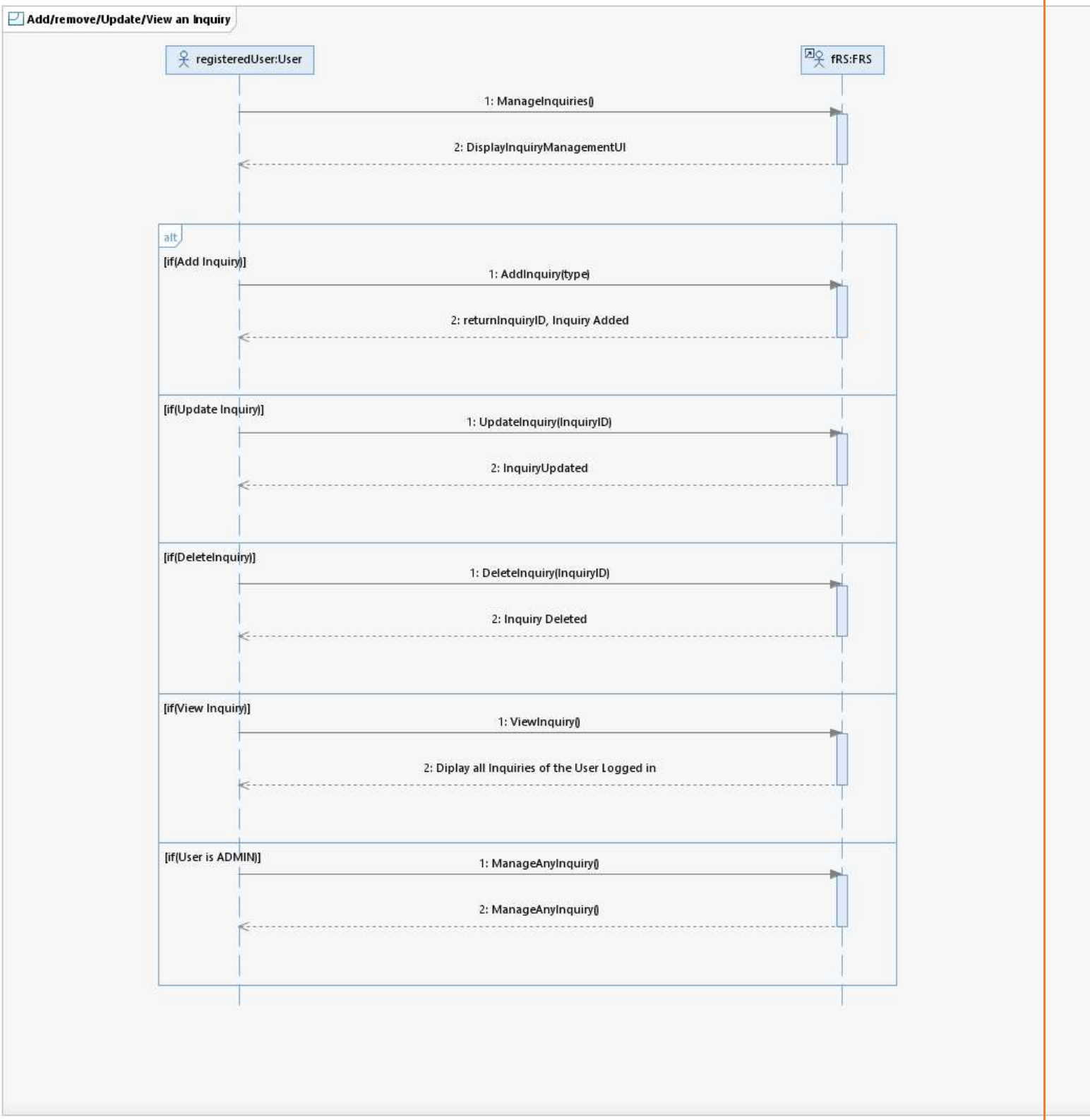
8. The FRS system checks if the airport is already present in the database or not. And saves the airport in the database of FRS if it is not present.</td></tr>
</table>
</td></tr>
<tr><td>15</td><td>Alternative Scenario</td><td>7a. The admin chose to change the details.
7a.1 Go to the 2 step.
7b. The admin chose to cancel the airport.
7b.1 The system navigates the Passenger toward the main screen.
8a. The airport is already present in the database.
8a.1 The system shows the message to the Passenger that the airport is already present and redirects the admin to enter the airport information again.</td></tr>
<tr><td>16</td><td>Exception Scenario</td><td>The FRS server is down.
The FRS will ask Passengers to refresh and enter the airport again.</td></tr>
</table>

UC-17: Remove an Airport

Sr. No	Section	Content / Explanation
1	**Designation**	UC-17
2	**Name**	**Remove a route**
3	**Priority**	Important for system's success: **Medium** Technical Risk: **Medium**
4	**Scope**	This use case deals with how the admin removes an airport in the FRS.
5	**Criticality**	medium
6	**Level**	User-goal
7	**Description**	The admin selects the airport to remove and the airport is removed from the database and information is updated.
8	**Trigger Event**	The admin wishes to remove the airport.
9	**Primary actor**	Admin
10	**Stakeholders and interests**	Admin: he wants to keep checking every detail. He wants to manage airports in the FRS.
11	**Pre-Conditions**	The admin must be logged in.
12	**Post-Conditions**	Airport is removed. Database is updated.

		The FRS will add an inquiry to shift the airplane to another airport in FRS.
13	**Result**	Airport removed.
14	**Main Scenario**	1. The Admin selects to remove an airport. 2. The system will fetch the airports from the database and display airports to the admin. 3. The admin selects the airport he wants to remove. 4. The system displays details of the airport and asks the admin for the confirmation. 5. The admin confirms the deletion. 6. The system deletes the airport from the database.
15	**Alternative Scenario**	2a. The system database is empty. 2a.1 The system gives the admin the message that the database is empty and navigates the Passenger to the management portal. 5a. The admin select cancel the airport deletion option. 5a.1 The system brings the admin back to the management portal.
16	**Exception Scenario**	The FRS server is down. (1) Refresh and remove the airport again.

Inquiry Management



UC-18: Redirecting an Inquiry:

Sr. No	Section	Content / Explanation
1	**Designation**	UC-18
2	**Name**	Redirect an Inquiry
3	**Authors**	Daniyal
4	**Priority**	Important for system's success: **Medium** Technological Risk: **Medium**
5	**Scope**	This use case deals with how the user's (Admin, Flight manager, accounts manager, passenger) Inquiry is redirected to the Inquiry manager. Then that inquiry manager solves the user's inquiry.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Admin: Wants to get his inquiries solved about any administration related issues (TBD) • Flight manager: Wants to get his inquiries solved about any flight scheduling related issues (TBD) • Accounts manager: Wants to get his inquiries solved about any accounts and finance scheduling related issues (TBD) • Passenger: Wants to get his inquiries solved about any flight booking and luggage related issues (TBD) • Inquiry Manager: Wants to solve the inquiry of the user (Admin, Flight manager, accounts manager, passenger)
8	**Description**	The FRS redirects the user's (Admin, Flight manager, accounts manager, passenger) inquiries to a case manager to get the user's inquiry resolved.
9	**Trigger Event**	The user (Admin, Flight manager, accounts manager, passenger) adds an inquiry.
10	**Actors**	Admin, Flight manager, accounts manager, passenger, Inquiry Manager
11	**Pre-Conditions**	The user must be registered in the FRS.
12	**Post-Conditions**	An Inquiry Manager is assigned to the User.
13	**Result**	Inquiry redirected.

Sr. No	Section	Content / Explanation
14	**Main Scenario**	The FRS redirects the inquiry to an Inquiry manager after the User (Admin, Flight manager, accounts manager, passenger) adds an Inquiry. The FRS then assign that inquiry manager to solve the User's Inquiry.
15	**Alternative Scenario**	If there is No Inquiry Manager available, then the user should navigate to the FAQ page shown by the FRS UI.
16	**Exception Scenario**	The user is not registered. The FRS is unable to fetch Inquiry data.

UC-19: View/Update/Delete an Inquiry

Sr. No	Section	Content / Explanation
1	**Designation**	UC-19
2	**Name**	View/Update/Delete an Inquiry
3	**Authors**	Daniyal
4	**Priority**	Important for system's success: **low** Technological Risk: **Medium**
5	**Scope**	This use case deals with how the user (Admin, Flight manager, accounts manager, passenger) views/update/Delete an Inquiry.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Admin: Wants to manage inquiries about any administration related issues (TBD) • Flight manager: Wants to manage inquiries about any flight scheduling related issues (TBD) • Accounts manager: Wants to manage inquiries about any accounts and finance scheduling related issues (TBD) • Passenger: Wants to manage inquiries about any flight booking and luggage related issues (TBD)

Sr. No	Section	Content / Explanation
8	**Description**	The FRS allows the user (Admin, Flight manager, accounts manager, passenger) to manage inquiries about what issue they want to inquire about.
9	**Trigger Event**	The user (Admin, Flight manager, accounts manager, passenger) wants to manage inquiries.
10	**Actors**	Admin, Flight manager, accounts manager, passenger
11	**Pre-Conditions**	The user must be registered in the FRS
12	**Post-Conditions**	The inquiry is added managed
13	**Result**	Inquiry managed.
14	**Main Scenario**	The user (Admin, Flight manager, accounts manager, passenger) logs in to the FRS. The FRS displays a UI. The user navigates through FRS Interface to Inquiry Management. Here, all the users (Admin, Flight manager, accounts manager, passenger) can view/delete/update their own inquiries. Admin and Flight Manager can also view inquiries of other user.
15	**Alternative Scenario**	If the inquiry is already added but not shown by the FRS, then the user should refresh the FRS.
16	**Exception Scenario**	The user is not registered. The FRS is unable to fetch Inquiry data.

UC-20: Add an Inquiry

Sr. No	Section	Content / Explanation
1	**Designation**	UC-20
2	**Name**	Add an Inquiry
3	**Authors**	Daniyal

Sr. No	Section	Content / Explanation
4	**Priority**	Important for system's success: **low** Technological Risk: **Medium**
5	**Scope**	This use case deals with how the user (Admin, Flight manager, accounts manager, passenger) adds an Inquiry.
6	**Criticality**	**Medium**
7	**Stakeholders and interests**	• Admin: Wants to inquire about any administration related issues (TBD) • Flight manager: Wants to inquire about any flight scheduling related issues (TBD) • Accounts manager: Wants to inquire about any accounts and finance scheduling related issues (TBD) • Passenger: Wants to inquire about any flight booking and luggage related issues (TBD)
8	**Description**	The FRS allows the user (Admin, Flight manager, accounts manager, passenger) to add an Inquiry about what issue they want to inquire about.
9	**Trigger Event**	The user (Admin, Flight manager, accounts manager, passenger) wants to add an Inquiry.
10	**Actors**	Admin, Flight manager, accounts manager, passenger
11	**Pre-Conditions**	The user must be registered in the FRS
12	**Post-Conditions**	The inquiry is added successfully.
13	**Result**	Inquiry added.
14	**Main Scenario**	The user (Admin, Flight manager, accounts manager, passenger) logs in to the FRS. The FRS displays a UI. The user navigates through FRS Interface to Inquiry management and then adds an inquiry.
15	**Alternative Scenario**	If the inquiry is already listed, then FRS does not add a duplicate inquiry.
16	**Exception Scenario**	The user is not registered.

Sr. No	Section	Content / Explanation
		The inquiry does not have a category.