**Requirements Analysis Document**

# Space Flight Reservation System

**Version 2**

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# Contents

# 1 Introduction

This document describes the space tourism reservation system and the project's requirements. The goal is to provide a general overview of the project.

## 1.1 Purpose of the System

Users will utilize the system for space flight reservations. They should be able to see which flights are available at each Space Company with their respective locations featured in the application and book the desired space flight on a specific day and time. Users should also be able to view their list of reservations, modify them, and cancel any reservation if needed.

The target audience for the product includes anyone who wants to browse available flights to view different parts of the Earth using a certain space company or who wishes to reserve flights at one of the participating locations of the space tourism company.

## 1.2 Scope of the System

The system can provide actual space tourism companies with locations and a wide array of flights for users to explore. Since searching for a space tourism company is impossible, users must manually scroll through a list. For this reason, the application would be suitable for hosting the space tourism program (space flights) with a view of an entire continent from space, ensuring that the user experience remains positive, as the list of space companies would be easy to navigate by hand.

## 1.3 Objectives and Success Criteria of the Project

The goal of the contractors is to deliver an application that serves the purpose laid out above. All requirements described below should be met, and the product owner should accept the product.

The project will be accepted if:

The user can make an online space flight reservation for a Space tourism company for a specific view type,  day, and time (space flight schedule). This way, the user makes sure they will have a seat to experience their desired space journey and has no need to be afraid that they will contact the company and be unable to book any seats.

1. The user can manage the previously made reservations and either modify the reservation, i.e., select a different number of seats, or completely delete specific reservations.
2. The user can only perform the previously described action if logged in. This means the user has to create an account to utilize the services. At first, this might seem like a drawback; however, this is the only way to make it possible for the user to safely modify or delete a reservation that was previously made.
3. The user can also view and edit their current profile information. This way, it is easy for the customer to check if all information is correct and possibly update it.

## 1.4 Definitions, Acronyms, and Abbreviations

Here are the definitions of the terms, acronyms, and abbreviations necessary to understand and read this document.

| Term / Acronym / Abbreviation | Definition |
|---|---|
| Space Tourism Company | Space Tourism Company is considered a branch of some space corporation (e.g., SpaceX, Blue Origin, etc.) situated at a certain location. Depending on the view type and space flight schedule, companies offer different flight programs. |
| Space Flight | Space Flight is a journey conducted at a company in one of the locations. The same flight can be offered multiple times. A flight has a name, duration, and view type (views of continents: Africa, Antarctica, Asia, Australia, Europe, North America, and South America). |
| Reservation | One user makes a reservation for one flight operating at one company at a certain time. A reservation must keep track of the number of seats the user has reserved since there can be multiple seats for one reservation. |

## 1.5 References

There is no previous system; it's a greenfield engineering project.

## 1.6 Overview

The following chapters will describe how the tasks supported by the space flight reservation system are done and define the requirements the system should fulfill.

# 2 Current System

The system is an independent project and does not serve as a replacement for any existing systems. Below is an overview of the current approach that space tourism companies use for reserving space flight seats.

Currently, customers book seats for space flights through traditional channels, which often involve direct contact with the company's sales office or website.

Customers manually search for availability, select flight dates, and make reservations. Sometimes, they just need to leave their email or phone number for further reservations with the salesperson.

However, these processes are not streamlined, fast, or user-friendly and do not fully leverage modern mobile or digital technologies.

| **Pros** | **Cons** |
|---|---|
| 1. Customers have a direct interaction point with the company.<br><br>2. Customers can compare all available options since space flights are less common than airplane flights. | 1. Customers are responsible for the arrival to the Launch Stations, which are available only in a few countries.<br><br>2. The ticket queue might be long, resulting in extended waiting times.<br><br>3. Customers might wait in line only to discover that all tickets are sold out. |

From the overview above, users who can conduct online space-flight reservations could benefit from it.

The space tourism reservation system will make online seat reservations possible and enable a digital way to look for a seat for a desired flight.

# 3 Proposed System

## 3.1 Overview

The general procedure for a user is to browse the available space tourism companies and the corresponding flights they offer. After deciding on a specific flight in one company, the user must select a suitable location, date, and time. The user can then make a reservation if he/she is logged in to his/her account. If the user is logged in, he/she can always view the reservations he/she has made and modify or delete them as desired.

## 3.2 Non-functional Requirements

In this section, each non-functional requirement will be listed, i.e., all the additional requirements not contained in the functional requirement but still relevant, and further constraints will be described.

### 3.2.1 Usability

The complete application should be intuitive, and the user interface should be easy to understand and operate for people of any age. This specifically means that no complex and nested graphical components should be used.

### 3.2.2 Reliability

The list of available flights for a company should be displayed within 3 seconds after the user clicks on the company. The same time limit is applied to other actions, such as performing a reservation, changing a reservation, or changing the profile data.

### 3.2.3 Performance

The system should provide the desired output almost instantly. This means that any action that the user performs should have an immediate effect. The user should, for example, get a list of flights for the desired company almost immediately after choosing a company.

The application should not crash when the user inputs incorrect data. All the data the user inputs should be quickly validated and the user should be notified if they have entered invalid data. Inputs must also be sanitized to ensure RCE and other injection-based attacks are impossible.

### 3.2.4 Supportability

The implemented software should be well structured and have a good code style throughout the project. Existing features are easy to modify, and the system can easily be extended with additional requests and features.

### 3.2.5 Implementation

The implemented system needs a stand-alone Java application that can run on a normal PC or laptop running Windows.

### 3.2.6 Interface

The users are all those interested in space tourism who want to see what's available or reserve a seat. This also includes elderly people; thus, the application interface should be relatively simple to operate and should not contain too complex and hard-to-understand layouts. Accessibility is crucial.

### 3.2.7 Packaging

The system should be delivered to the user as a Java application/executable binary.

### 3.2.8 Legal

No customer data should be available without logging in. No customer should be able to view or alter the data of other customers. Here, the data includes both personal information and the reservation list.

## 3.3 System Models

### 3.3.1 Scenarios

#### *3.3.1.1 Scenario 1: View Space Flights*

John wants to do something extraordinary for his birthday, so he is exploring the Space Tourism reservation system to see what's available. He sees a list of all the companies and picks the SpaceX company located in the USA because it's the most established, according to the description in the company information. He looks at the list of flights for that company and picks “Antarctica Experience.” He looks at the available dates and times, but there is no flight for his birthday month, so he returns to the list of flights offered at Virgin Galactic and clicks on “Europe Journey.”

#### *3.3.1.2 Scenario 2: Login and Registration*

John wants to reserve a seat but doesn't have that option since he didn't log in. He also didn't use the system before, so he doesn't have an account and needs to register. He clicks the "Sign Up" button and gets a form to fill in. He types his first and last name, e-mail, and password that he just invented (1234). After that, he clicks the "Sign Up" button in the form to confirm his entry; he gets a message saying that he should create a longer password. He thinks of a better password and clicks "Sign Up" again. A success message is shown this time. The system then asks him to choose a security question to protect his account. A list of questions is shown, and he chooses “What is the name of your first pet?” and enters his answer. Then, he is successfully logged in.

#### *3.3.1.3 Scenario 3: Simple Login*

John likes the Space Tourism reservation system, so he plans to use it for all his space travel needs. He already has an account that he always uses. Now, he wants to reserve some seats for next month's launch, so he clicks the "Log In" button in the reservation system interface and logs into the system by typing his e-mail with the corresponding password in a form. After he clicks the "Log In" button in the form, a success message is shown, and John continues to browse the system, ready to reserve some seats when he finds an interesting flight.

#### *3.3.1.4 Scenario 4: Filter by Date*

John wants to see all the available space flight schedules for his preferred travel date. On the page, he notices a "Filter by Date" button. John clicks the button and is asked to choose a date. A calendar pops up, and all the available flights are highlighted, which makes it easier for John to see on which date a flight is available. He selects his desired date, March 22. The system instantly filters and displays a list of all flights available on that date, including their launch times, durations, flight types, and the company location. John finds the "Europe Journey" flight launching at 1 pm from Virgin Galactic, clicks on it, and decides to proceed with reserving his seat.

#### *3.3.1.5 Scenario 5: Reserve Flight and Select Specific Seats*

John is already logged in, so he can start the reservation process by clicking the "Reserve." Now, he gets to choose the amount of seats to reserve. John chooses four seats for himself and his family members. Then, he also gets to choose which seat number to reserve. He wanted the full experience for his family, and so he chose the first four seats. Finally, he clicks the "Reserve" button to confirm his choice. He sees a success message and is directed to his profile page, where he also sees that his new reservation, alongside the seat number, was successful.

#### *3.3.1.6 Scenario 6: Show Profile*

John wants to check if he reserved enough seats for his family space adventure, so he logs in to the Space Flight reservation system and looks at his profile page. He sees his personal information (first and last name and e-mail address) and all his past and future reservations on a table. John also notices the “Available Tokens” panel in his profile, and the token bar has increased by four ever since his reservation for the Europe Journey earlier.

#### *3.3.1.7 Scenario 7: Modify Reserved Flight*

John noticed on his profile page that he forgot to count himself for the Europe Journey seats when he was reserving them; he reserved four instead of five seats. He selects the reservation for Europe Journey on the profile page and clicks the "Modify" button. He can now modify the number of seats reserved for this reservation. He changes the number of seats from four to five and clicks the "Change Reservation" button. Then, he sees the success message and is led back to the profile page, where the reservation modification is visible.

#### *3.3.1.8 Scenario 8: Delete Reserved Flight*

John has an urgent business commitment, so he must cancel his plans and delete his Space Flight reservation for the Europe Journey. He logs in to the Space Tourism reservation system, and on his profile page, he selects the reservation for the flight "Europe Journey." Then, he can delete the reservation by clicking the "Delete" button. John clicks, and the reservation for Europe Journey is no longer shown in the reservations table on John's profile.

#### *3.3.1.9 Scenario 9: Redeem Tokens*

John felt bad about canceling his plans with his family, and he wanted to make another reservation for the summer holiday. But he only has enough money to buy two tickets. He then remembered his loyalty tokens from his first reservation, and he wanted to redeem them for free tickets. John then goes into his profile to see his loyalty tokens. Before clicking on the “Redeem” button, he has the option to choose the amount of token he wants to redeem. John

wants to redeem three tokens for three free tickets, so he chooses 3 tokens and finally clicks on the “Redeem” button. The token bar then decreased by the number of tokens that had been redeemed.

*3.3.1.10 Scenario 20: Log out*

John wants to be sure his daughter doesn't use his Space Flight reservation account while using his laptop, so he logs out by clicking the "Log Out" button.

### 3.3.2 Use Case Model

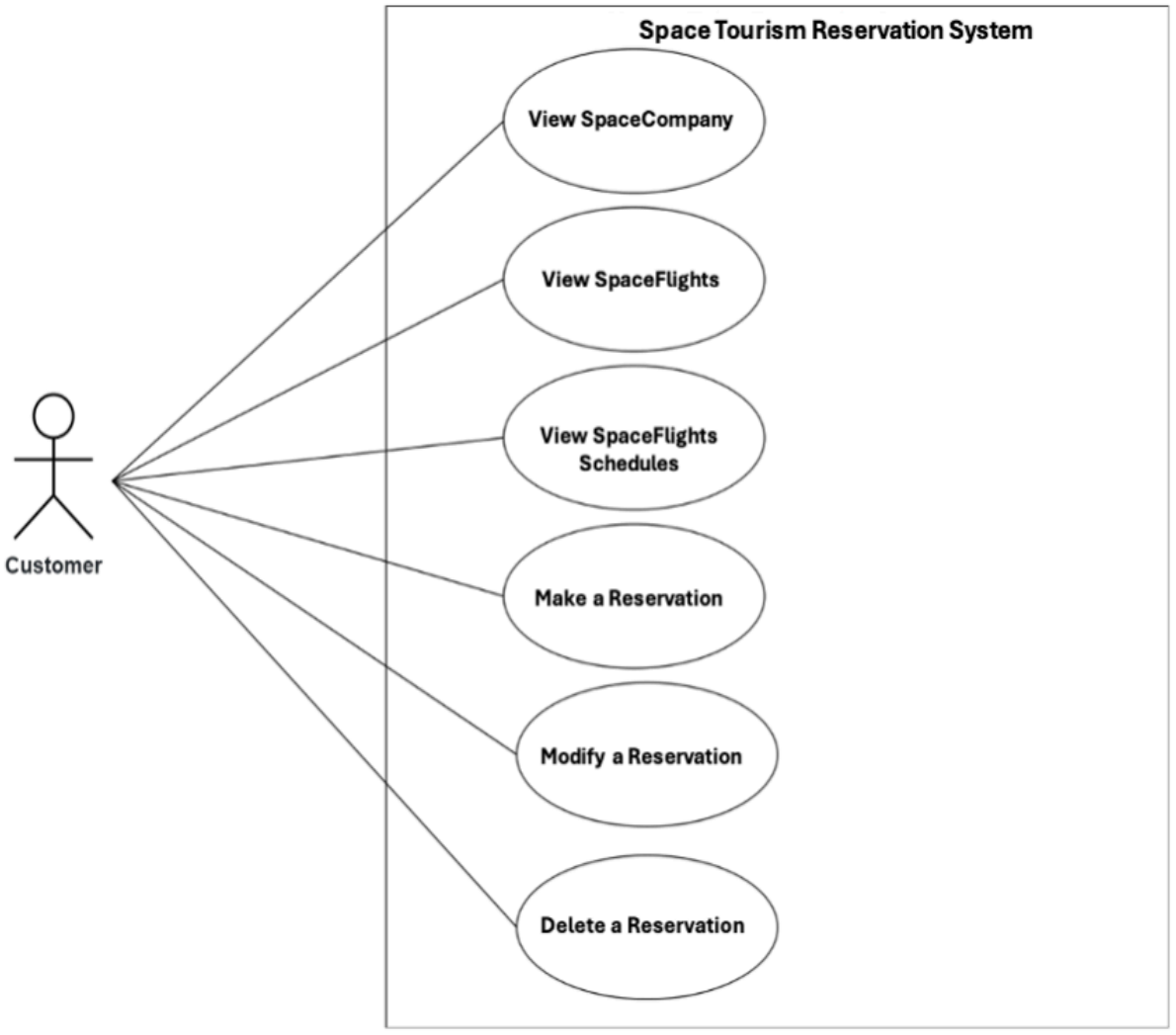


*Figure 1: Use case diagram*

### 3.3.3 Object Model

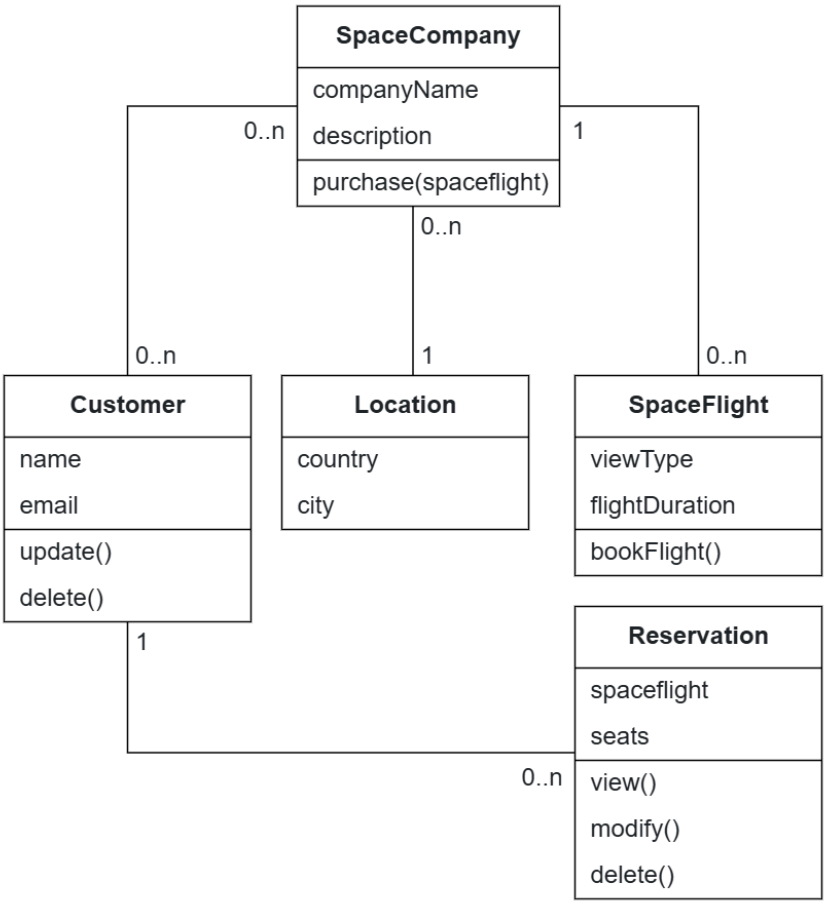


*Figure 2: Class diagram from the application domain.*

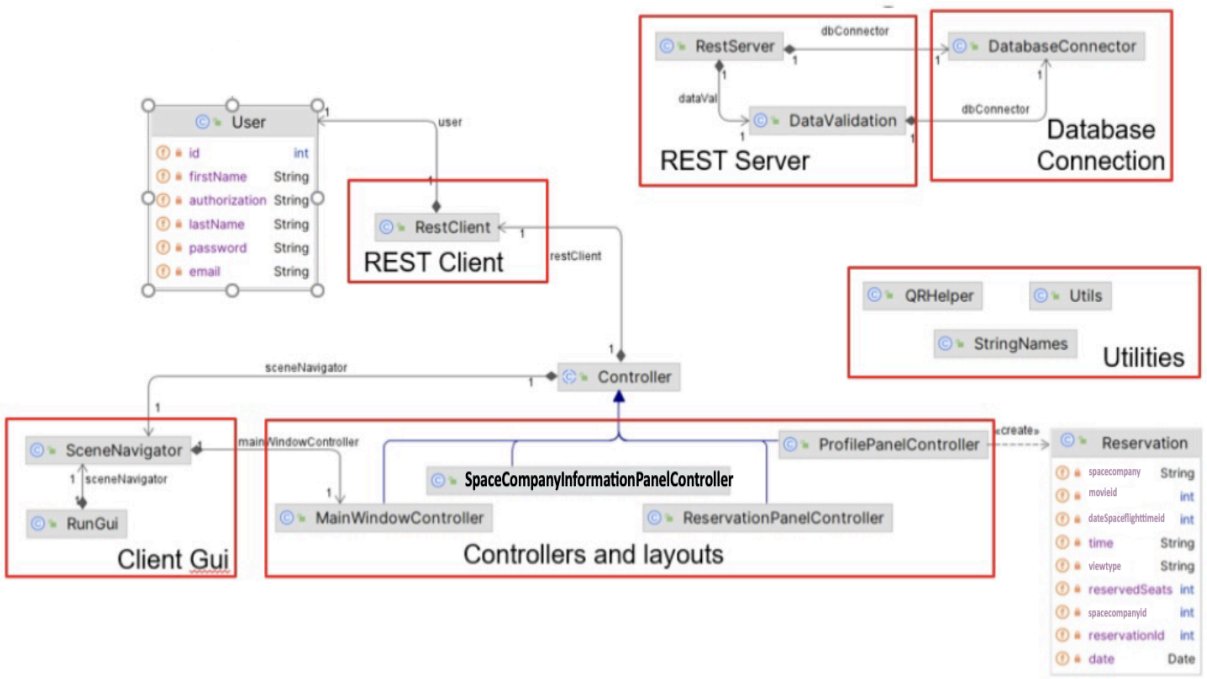


*Figure 3: Class diagram from the solution domain.*

### 3.3.4 Dynamic Model

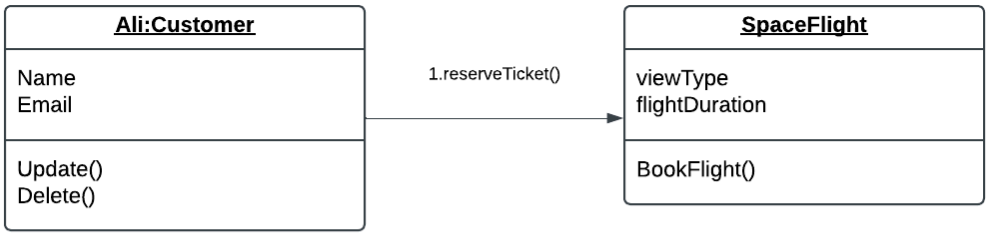


*figure 4: communication diagram showing ticket reservation*

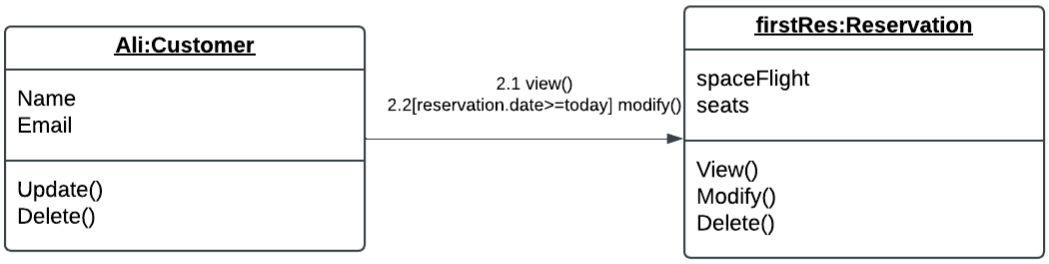


*figure 5: communication diagram showing reservation modification*

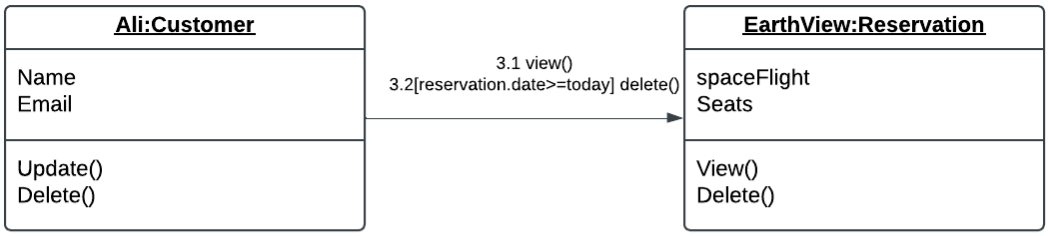


*figure 6: communication diagram showing reservation deletion*

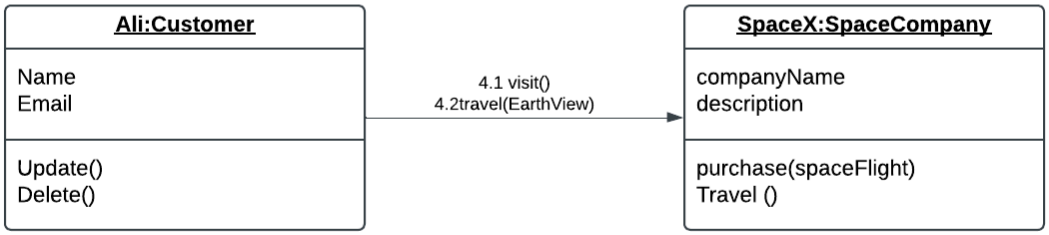


*figure 7: communication diagram showing a visit to  space company to travel the Earth view*

# 4 Glossary