Software Requirements Specification

for

Crew Connect

Version 1.0 approved

Prepared by Steffany Jane B. Warain

WASUP Airlines

April 20, 2023

Table of Contents

Revision History

Name	Date	Reason For Changes	Version
Steffany Warain	2/14	Write the Introduction section	Version 1.0
Steffany Warain	2/17	Change WASUP to all Caps lock. 1.1, 1.3 and 1.4 revision. 1.5 Reference Addition	Version 1.0
Steffany Warain	3/10	Write Section 2: Overall Descriptions	Version 1.0
Steffany Warain	3/18	Adjust diagram Section 2.1	Version 1.0
Steffany Warain	3/27	Change diagram, rewrite section 1.4	Version 1.0
Steffany Warain	3/28	Write Section 3 External Interface Requirements	Version 1.0
Steffany Warain	4/10	Insert Page Break Section 2, 3, 4	Version 1.0
Steffany Warain	4/12	Write Section 4 Draft	Version 1.0
Steffany Warain	4/18	Write Section 5 Draft	Version 1.0
Steffany Warain	4/20	Revised Section 4 (Insert Page Break)	Version 1.0
Steffany Warain	4/20	Write Section 6	Version 1.0

1. Introduction

1.1 Purpose

Crew Connect Version 1, set for release on April 30th, 2023, is a mobile application designed to optimize communication between WASUP Airlines' crews and the corporation. With its streamlined communication method and mobile user interface, Crew Connect Version 1 offers improved organization of crew destination, duty hours, and emergency shift changes, all while maximizing operational efficiency. As a result, the corporation can expect to provide superior customer service and more effectively manage its crew members with the implementation of Crew Connect Version 1.

1.2 Document Conventions

This document follows a clear and consistent convention in terms of font type and size. The font type and size used are indicated below. It is important to note that text that is boldfaced or italicized holds special meaning and should be taken into consideration when interpreting the document. It is critical to gain an understanding of the meaning of this text in order to fully comprehend the document and its contents.

In addition, following a consistent font size and type makes it easier to read the text, as well as understand its contents. All of this supports the overall goal of making the document as clear as possible while allowing a reader to comprehend the information presented.

By establishing a consistent font type and size throughout, the author of the document has created a professional and organized look that can be easily read and understood by all. This helps to create a document that is clear, concise, and organized. This is essential for any document that is intended to communicate specific information to a broad audience.

Font	Arial
Heading	18 pt
Subheading	14 pt
Body Text	12 pt
Boldfaced Text	**Heading**, **Subheading**, or **key point** that requires specific action or attention to the reader.
Italized Text	To add an *extra* emphasis to a word or phrase and will be used for *technical* terms.

1.3 Intended Audience and Reading Suggestions

This document provides clear and detailed information about Crew Connect Version 1 currently being developed. Although the whole document is essential but each section can be more important to an intended audience. The table below suggests which section can be more applicable for each individual. Additionally, the document serves as a reference

point for the software development team throughout the software development process, so any changes or updates can be traced through the Revision History section.

Stakeholder	1 & 5
Project Manager	1, 3, 4, & 5
Software Engineer	1, 2, 3, 4, & 5
Marketing Staff	1 & 2
Tester	1 & 2
Scheduling Manager	1 & 5

1.4 Product Scope

The Crew Connect mobile app for WASUP Airlines is a user-friendly and secure platform designed to improve communication between staff and the corporation. Key features of the app include a login page, a home page with an overview of the employee's information, app's features, and various sections such as Schedule, Weather Advisory, Itinerary, Communication, and Emergency Alerts. The Schedule feature allows crew members to view and manage their work schedule, track their vacation days and time-offs, and monitor who is on and off-duty. The Weather Advisory feature provides real-time weather updates to crew members, helping them plan and prepare for their upcoming flights. The Itinerary feature provides essential information on car services, accommodation, and current city attractions. The Communication Tab feature can be easily accessed in every window for easy communication between crew members and the corporation, allowing them to submit requests and collaborate with their managers. The Alerts feature displays important notifications regarding flight schedules, weather alerts, co-worker changes, travel, and other emergency alerts that may affect business operations. Overall, the Crew Connect mobile app for WASUP Airlines is an essential tool for crew members, providing them with essential operational details, improving communication, and enhancing work experience and general performance..

1.5 References

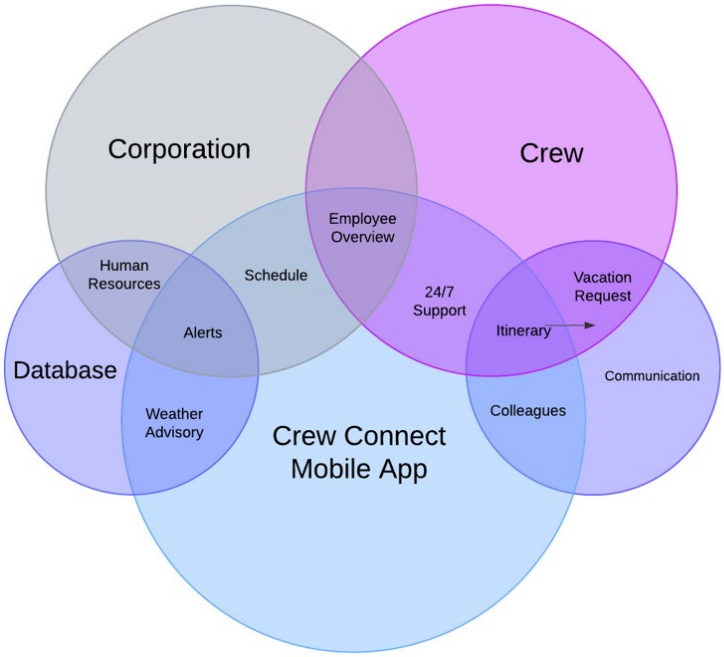
For Document Convention reference TDSMAN. (2021). Document Convention. Retrieved February 14, 2023, from https://www.tdsman.com/user-manual/20.21/en/topic/document-convention.

Sommerville, Ian. “Chapter 4 Requirements Engineering.” *Software Engineering*, 9th ed., Pearson, Boston, 2011, pp. 91–105.

2. Overall Description

2.1 Product Perspective

The Crew Connect Version 1 mobile application is a new, self-contained product developed for WASUP Airlines, which is intended to optimize communication between the airline's crew and the corporation and improve the organization of crew destination, duty hours and emergency shift changes.



2.2 Product Functions

Summary:
The Crew Connect Version 1 application is a mobile app designed to enable communication and collaboration among airline crew members and the corporation. The app allows crew members to access flight schedules and history, Check their Accommodation and car Services Status check the weather, Itinerary, Emergency alerts, as well as approved time offs and other messages. The goal of the application is to improve communication and coordination with the business, increase efficiency and productivity, and enhance the overall flight experience of the crews.

User Story:
An airline crew member use the Crew Connect Version 1 application to access her flight schedule, view her flight history, and check the weather.

Flow Chart:

[Start] → [Login Screen] → [Home Screen] → [View Schedule] → [View Flight History] → [Back] → [Home Screen] → [View Weather] → [End]

The crew starts by logging into the application on their mobile device. They are then directed to the Home Screen, where they can access different functions of the app, including viewing their Flight Schedule, Flight History, and check the Weather. They can also view their available vacation allocations, Itinerary for attractions on their destinations, check who they are going to be working with, and request for a vacation. Once they have completed their desired tasks, they can exit the application.

2.3 User Classes and Characteristics

The application is designed to be used by the Crew Members and the Corporation. These are the primary users of the application and include the pilot, Human Resources, and the Flight Scheduling manager. They will use the Crew Connect frequently to communicate and inform each other, especially the crews about their flight details as well business operations.

2.4 Operating Environment

Crew Connect Version 1 is designed to run on a smartphone running iOS and Android operating systems. The application is compatible with iOS 16 and Android 12 and will rely heavily on network connectivity to communicate with the corporation and refresh the data. It will operate in a variety of networking environments, including Wi-Fi, cellular, and satellite networks. The application is also designed to optimize network performance and minimize data usage, while still ensuring that crews have access to the information they need to perform their duties effectively.

2.5 Design and Implementation Constraints

There are several items or issues that may limit the options available to the developers of Crew Connect Version 1. These include:

Corporate or regulatory policies: The developers adhere to the corporation's policies related to data privacy, security, and access control. Developers will only need the name of the crew and their employee identification number to be added to the database to be granted access to the mobile application.

Hardware limitations: The application must operate within the hardware limitations of the target platform, such as memory requirements, processing power, and connectivity.

Interfaces to other applications: We rely on other web services such as: AccuWeather, Aviation Digital Data Service (ADDS) and The World Meteorological Organization (WMO) to provide us worldwide weather information for the Weather information tab. TripAdvisor, Lonely Planet and Eventbrite to provide information on different local attractions, travel guides, and current activities on your destination for the Itinerary tab.

Specific technologies, tools, and databases: Code Editor used VS Code. Programming Language used by the developers is Python. Database used MySQL, SQLite, and Microsoft SQL Server.

Language requirements: English.

2.6 User Documentation

The application will come with a comprehensive user manual that provides detailed, step-by-step instructions for utilizing all of its features. The manual will be accessible in both electronic and paper format.

Users will have access to 24/7 Web Chat and Customer Service Agents to help them with any questions or problems they may encounter while using the application.

Interactive tutorials will be available within the application to assist new users with getting started and to provide guidance on more advanced features.

All user documentation will be presented in clear and concise language, designed to be easily understood by users with varying technical expertise. The documentation will be delivered in industry-standard formats such as PDF and HTML to ensure compatibility with a wide range of devices and platforms.

2.7 Assumptions and Dependencies

Assumptions:

- Users have mobile devices compatible with Crew Connect Version 1.
- Operating environment meets minimum hardware and software requirements.
- Third-party software components are available and compatible.

Dependencies:

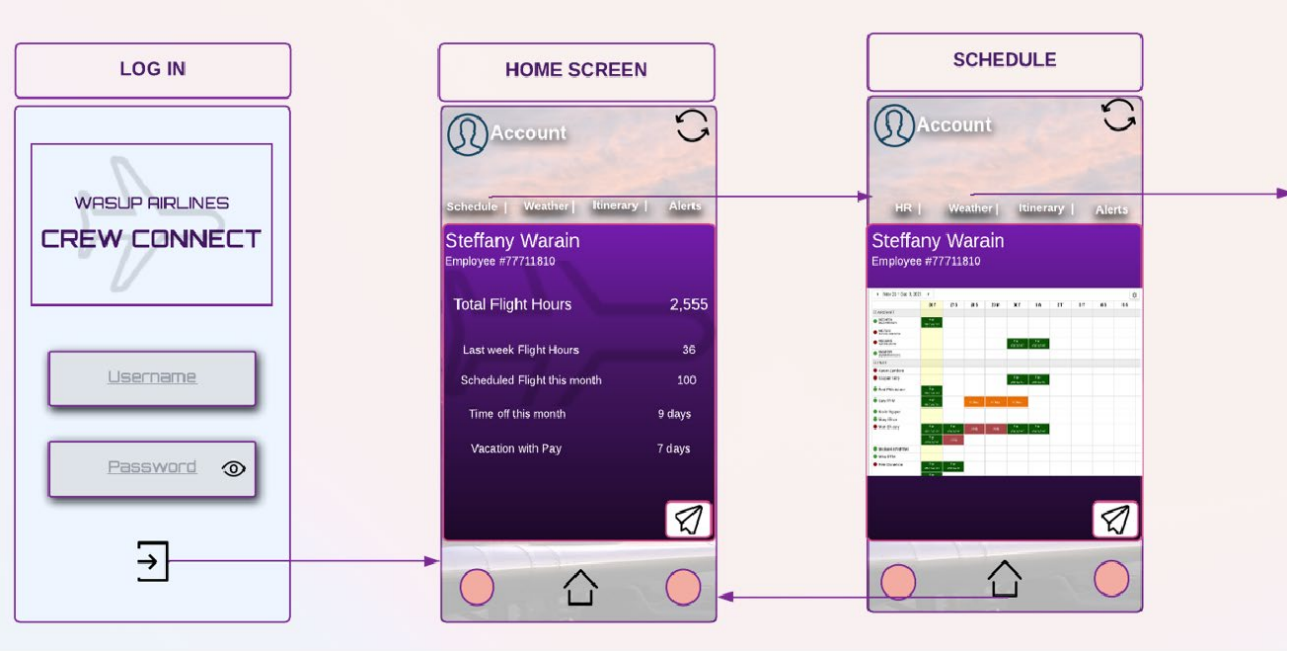
- Cellular or Wi-Fi network availability and functionality.
- Availability and reliability of corporation's databases and servers.
- Mobile device operating systems supported by the application.

3. External Interface Requirements

3.1 User Interfaces

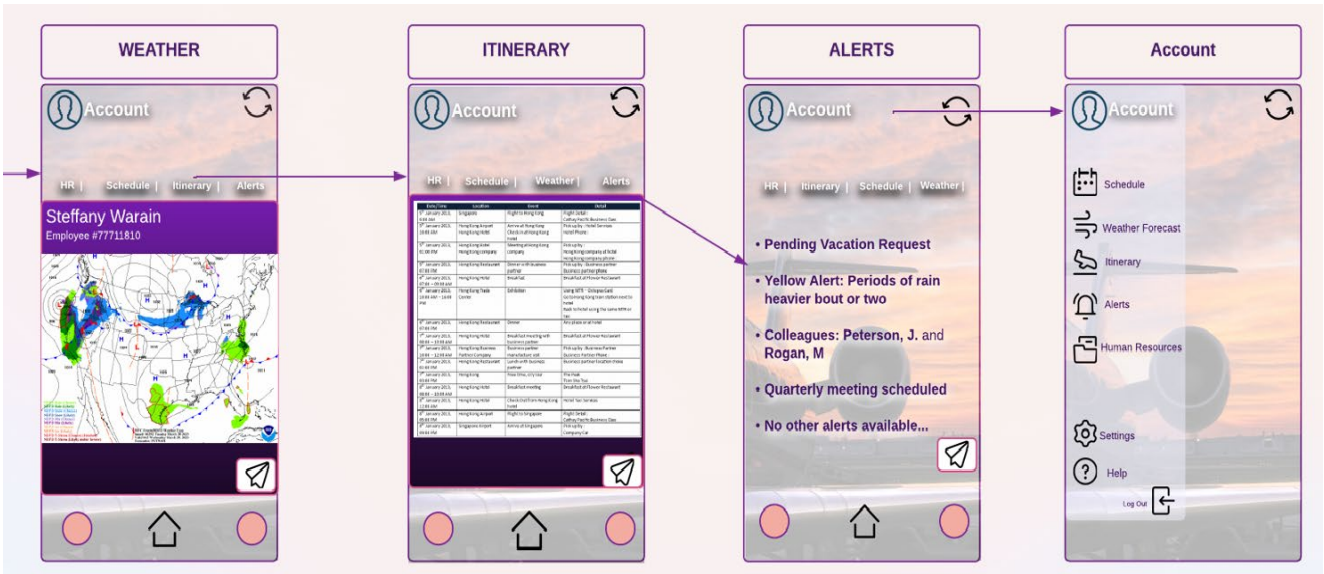
Crew Connect Mobile App by WASUP Airlines includes the following key features:

- Log-In Page: The app will feature a secure and easy login interface allowing crew members to access their account. After logging in the crew will be directed to Home Page.
- Home Page: This page will show an overview of the crew's total hours of flying and weekly and monthly goals. Remaining annual paid vacation and allotted time off. Every page can lead to other app's key features which include: Schedule, Weather, Itinerary, Emergency Alerts, and Communication. At the right corner of the page is a refresh button, it is available on every page to refresh data and make it up-to-date. At the right lower corner is the messaged button and at the bottom of each page are three buttons, (from left to right): Back Key, Home Key, and Previous page opened.
- Schedule: This section enables crew members to review their current and past schedule details, Flight Logs, vacation requests, car services, hotel reservations, time-offs, and the list of crews that they will be working with on each flight, all in a calendar view. All operational flight information necessary for a specific day will be in each day element in a summary view, and to view the details just tap on a specific day for full view.
- Weather Advisory: This feature will provide real-time weather updates to crew members to help them plan and prepare for their upcoming flights, informing them of any dangerous or unexpected weather conditions and advisories. This feature will provide tailored, localized information to each crew member, allowing them to make informed decisions on what to bring and what not to bring on their flights, ensuring a safe and pleasant experience.
- Itinerary: This feature will provide information about flight schedules, routes, car services, accommodation, and current city attractions that they can explore whenever they want, allowing them to plan and prepare for their upcoming flights.
- Account page is where all available features are including the Human Resource section, Account Settings, Help button, and the Log Out button, all in a list view. This feature will allow crew members to navigate the app and view their personal information, including those that are related to Human Resources.



- Communication button: This feature has the crew's inbox and is the feature that will allow crew members to submit requests to the corporation, including vacation requests, changes to accommodation, or any other requests they may wish to communicate to their manager and the company as well as communicate with other crew members. This feature fosters collaboration and easy communication within the organization, enabling crew members to feel more connected to their managers and other crews.
- Alerts: This feature will show crew members important alerts and notifications regarding their flight schedule, co-worker changes, weather alerts, travel, and other emergency alerts that will affect the business operation.

Overall, the Crew Connect mobile app for WASUP Airlines aims to improve communication between staff and the corporation through their company smartphones and provide its crew members with daily operational details to enhance work experience and general performance



3.2 Hardware Interfaces

This section specifies the hardware requirements and interface specifications for the Crew Connect mobile app, which is designed for crew members of an air cargo company.

Hardware Requirements. The following hardware components are required to run the Crew Connect mobile app:

- Smartphones running Android OS 12 or higher, or iOS 16 or higher
- Minimum 2GB of RAM,
- Minimum 16GB of storage space
- Wi-Fi or network connectivity
- GPS and Bluetooth connectivity

Interface Specifications. The Crew Connect mobile app must interface with the following hardware components:

- GPS: To track the user's location for scheduling and navigation purposes.
- Bluetooth: To communicate with external Bluetooth devices such as headsets and speakers for hands-free communication.
- Camera: To take photos and videos as well as Biometrics for access control.
- Touchscreen: The mobile app must be able to receive input from the smartphone touchscreen for user interaction.
- Storage: The mobile app must be able to read and write data to the smartphone's storage.

Performance Requirements. The Crew Connect mobile app must be able to perform the following functions efficiently:

- Receive and process GPS data to track the user's location for scheduling and navigation purposes.
- Connect and communicate with external Bluetooth devices for hands-free communication.
- Detect and respond to movement and orientation changes using the smartphone accelerometer for navigation purposes.
- Respond to user inputs on the smartphone touchscreen for a seamless user experience.
- Read and write data to the smartphone's storage quickly and reliably for data synchronization and backup purposes.

Environmental considerations. The hardware shall be designed to operate under the following environmental conditions:

- Temperature: 0°C to 40°C.
- Humidity: 10% to 90% non-condensing.
- Electromagnetic interference: The system shall be designed to minimize electromagnetic interference.

The mobile app must be designed and tested to work seamlessly with the hardware components listed above to ensure optimal performance and user experience for crew members.

3.3 Software Interfaces

In this section we identify the software components that the system will interact with, including any third-party libraries and APIs that the software will need to use to access and transmit data. We specify here the software requirements that the system will need to run properly as well as security considerations that may affect the performance of the software.

Software requirements:

- Operating system: iOS 16 or higher or Android 12 or higher.
- Programming language: Swift for iOS or Python for Android.

- Development tools: Xcode for iOS or Android Studio for Android.

Software Interface:

- Weather API: The mobile app shall interface with Weatherbug.com, AccuWeather, Aviation Digital Data Service (ADDS), and The World Meteorological Organization (WMO) to retrieve weather information.
- Schedule API: The mobile app shall interface with AIMS server to retrieve flight schedules.
- Employee Database: The mobile app shall interface with company database such as PeopleSoft Server, and Travel server to retrieve employee details, vacation request history, flying hours, accommodation, and other operational information.

Data exchange formats:

- JSON: The mobile app shall transmit data in the form of JSON objects.
- XML: The mobile app shall transmit data in the form of XML documents.

Security considerations:

- Data encryption: All sensitive data transmitted between the mobile app and other software components shall be encrypted.
- Authentication: The mobile app is exclusive for crews of WASUP Airlines therefore only with the registered username and password can use the app.
- Access control: The mobile app shall use access control to ensure that users can only access data that they are authorized to access.

3.4 Communications Interfaces

This section specifies the communication protocols that will be used to exchange data between the software and other software components. The system shall use the following communication protocols to exchange data with the hardware components:

- HTTP: The system shall use the HTTP protocol to communicate with the web server.
- SQL: The system shall use the SQL protocol to communicate with the database.
- GPS: The system shall use the NMEA 0183 protocol to communicate with the GPS sensor.
- Accelerometer: The system shall use the I2C protocol to communicate with the accelerometer.
- Microphone: The system shall use the PCM audio protocol to record audio input from the microphone.
- Speaker: The system shall use the audio amplifier to provide audio output to the speaker.

4. System Features

This section describes the primary features, outlining the functionality that will be available to users of Crew Connect software system being developed for WASUP Airlines. It provides a comprehensive overview of the features that the software must implement to meet the requirements and expectations of its users and serves as a detailed reference for the development team, ensuring that all the required features are implemented and tested during the development process.

4.1 Crew Connect Log In

4.1.1 Description and Priority

Allows the Crew to securely log in to the system, gaining access to their personalized account and settings.
Priority Scale - 9.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew opens the application	Log In page displayed
2.	The Crew enters Username and Password	Username and Password validation
3.	The Crew taps on Log In Button	The Home Page will be displayed
4.	The Crew taps Forgot Password	The application will send a secure link for resetting Password

4.1.3 Functional Requirements

REQ - 1: The Crew must provide a valid username and password to log in.

REQ - 2: The system must verify the Crew's credentials and grant access if they are correct.

REQ – 3: If the Crew forgot their password, they should be able to reset it through the reset password link.

REQ – 4: If Crew enters incorrect login information multiple times, the system should lock the account to prevent unauthorized access.

4.2 Crew Connect Home

4.1.1 Description and Priority

The Home Screen displays a customized home screen for the Crew, providing quick access to Human Resources' important information and other system features. Priority Scale – 9.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew on Home Page	Crew Total Flying Hours on display, Flying Hours remaining for the month, Time off left for the month, Vacation with pay.
2.	Option to other features	Display other features: Account, Schedule, Itinerary, Weather, Alerts, and Communication tab.

4.1.3 Functional Requirements

REQ-1: The home screen should display a summary of the Crew's total flying hours, flying hours remaining for the month, Time off left, and vacation with pay left.

REQ-2: The home screen should have tabs that links to other system features, such as the Accounts, Alerts, Communications, Schedule, Weather, and Itinerary features.

4.3 Crew Connect Schedule

4.1.1 Description and Priority

Allows Crew to view and manage their schedule.
Priority scale – 9.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew on the Schedule Page views the schedule for the month.	The page displays the time and date of the crew.
2.	The Crew wants to go view the schedule for next month.	The page can retrieve the schedule for the whole calendar year.

4.1.3 Functional Requirements

REQ-1: The user should be able to view their schedule in a calendar format, with options to view by day, week, or month.

REQ-2: The user should be able to create, edit, and delete tasks and appointments.

REQ-3: The system should notify the user of upcoming events and provide reminders if desired.
REQ-4: The system should be able to retrieve data for the past and upcoming schedule of the crew.

4.4 Crew Connect Weather Alert

4.1.1 Description and Priority

Provides the Crew with current and forecasted weather information by location. Priority Scale – 8.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew wants to check the weather of their destination.	Displays the weather forecast by the hour and for the whole week.
2.	The Crew wants to check the weather of another city.	Displays the weather of that city for the whole day and for the whole week

4.1.3 Functional Requirements

REQ-1: The system uses an external weather API to retrieve the current weather conditions and forecast such as Weatherbug.com, AccuWeather, Aviation Digital Data Service (ADDS), and The World Meteorological Organization (WMO) to retrieve weather information.

REQ-2: The weather information should be displayed by the hour throughout the day and for the whole week.

4.5 Crew Connect Travel

4.1.1 Description and Priority

Provides the crew with information about their accommodation, Hotel & Car Services, as well as city sites or possible attractions at their destination. This information will be available in the **Itinerary** tab.
Priority scale – 8.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew checks where they are going to stay after the long flight.	Displays the accommodation information: Hotel's name Displays the car service: Driver's Name, Car Model, Color, and Plate Number.
2.	The Crew checks any interesting activity on the area.	Displays suggestions by category: Restaurant, Museum, Leisure & Spa, Beach Resorts, Sporting Event, Festivals.

4.1.3 Functional Requirements

REQ-1: The system should be able to display the Crew's accommodation and car service with detailed information.

REQ-2: The system should provide information and recommendations for local attractions and sites based on user preferences and location.

REQ-3: The Crew should be able to view detailed information about each attraction or site, such as hours of operation and admission prices.

4.6 Crew Connect Communication

4.1.1 Description and Priority

This feature is available in every tab. It is located at the bottom right corner of the display screen, so the crew can send a message to Human Resources every time they view their information and have any request, clarification, or correction. The communication system feature allows the user to communicate with other users within the system.
Priority scale – 8.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew on the Schedule tab sent a request to their manager that his family is going to meet him at the airport and plans to spend time with them for the rest of the day.	The system will deliver his message. Upon approval, his accommodation will be cancelled and the Crew will be informed of his pick-up time details at the **Itinerary Tab** and at the **Alerts tab** for his next work schedule.
2.	The Crew requests time off and sent a message to his supervisor.	The system will deliver his message. Upon approval, his **Schedule** will change as well as the information displayed on the Home Page.

4.1.3 Functional Requirements

REQ-1: The Crew should be able to send and receive messages to and from other users of this application.

4.7 Crew Connect Emergency Alerts

4.1.1 Description and Priority

Sends emergency alerts to the Crew about important business operation information as well as critical situations or emergency.
Priority scale – 9.

4.1.2 Stimulus/Response Sequences

No.	Stimulus	Response
1.	The Crew checks the Alerts Tab	Displays the following Alerts: Crew's request of accommodation changes was approved. Displays a reminder to check his Itinerary and Schedule.

4.1.3 Functional Requirements

REQ-1: The system should be connected to the Schedule, Weather, Itinerary, and Communication APIs to monitor alerts.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

1. Must support a minimum of 1,000 concurrent users without any decrease in performance.
2. Response time of at most 3 seconds for 90% of user actions.
3. Load pages and display content within 3 seconds on a standard 4G mobile connection.
4. Able to handle peak traffic periods without any significant impact on overall performance.
5. Provide real-time updates for all relevant crew member data without any delays.

5.2 Safety Requirements

1. Includes a built-in emergency notification feature to alert crew members in case of any safety-critical events.
2. Ensure that all safety procedures and guidelines are always accessible to crews.
3. Incorporate an automated checklist feature to monitor the completion of required safety tasks.
4. Provide clear visual warnings for any potential hazards or safety concerns.
5. Allow crews to report any safety-related incidents or concerns through a designated channel within the application.

5.3 Security Requirements

1. Must implement strong password policies and require two-factor authentication for all users.
2. Utilize encryption for data storage and transmission to protect sensitive crew member information.
3. Regular testing for vulnerabilities by a third-party security firm and maintaining a secure codebase.
4. Include logging and auditing capabilities to monitor and track unauthorized access attempts.
5. Clear incident response plan in case of security breaches.

5.4 Software Quality Attributes

1. Usability: Crew Connect must provide clear, concise, and contextually relevant tooltips and help documentation for all features.
2. Scalability: Must be designed to accommodate future growth in user numbers and data volume without significant performance degradation.
3. Maintainability: Have a modular architecture, allowing for easy updates and maintenance.
4. Portability: Accessible through the company’s smartphones.
5. Flexibility: Ability to integrate with other software systems or third-party applications to support crew management processes.

5.5 Business Rules

1. Complies with international maritime regulations and jurisdiction-specific laws.
2. Ensure that crew members' work hours and rest periods adhere to relevant labor laws and industry standards.
3. Includes a feature for tracking and managing compliance with mandatory training and certifications.
4. Provide accurate and up-to-date information on crew member assignments, ensuring compliance with contract terms and conditions.
5. Support customizable workflows and processes to align with each organization's unique business requirements.

6. Other Requirements

1. Database Requirements
- Supports relational database management systems (RDBMS) such as MySQL, PostgreSQL, or MS SQL Server.
- Supports ACID (Atomicity, Consistency, Isolation, and Durability) properties for reliable transactions.
- Have proper indexing, data validation, and constraints to ensure data integrity.
- Support at least 10,000 concurrent users in the initial release, scalable to 100,000 concurrent users for future releases.
- Have a backup and restore functionality to protect against data loss.

2. Internationalization Requirements
- Support multiple languages, with English being the default. Additional languages will include Mandarin, French, German, Arabic, Hebrew, and Spanish in the first release, with more languages added in future releases.
- Support right-to-left (RTL) languages such as Arabic and Hebrew for future releases.
- Display dates, times, and currency in the appropriate format for the user's locale.
- Provide a mechanism for adding new translations and updating existing ones.

3. Legal Requirements
- Complies with the General Data Protection Regulation (GDPR) and other relevant data protection and privacy laws.
- Store and handle user data securely and only for the intended purposes.

4. Reuse Objectives
- Designed to use a modular architecture, enabling easy updates to individual components without affecting the entire system.
- Uses open standards and widely adopted technologies to ensure compatibility and interoperability with other systems.
- Provide API documentation, allowing third-party developers to build upon and extend its functionality.
- Reusable user interface components across different parts of the application and easily adaptable to new requirements.