

**NANYANG
TECHNOLOGICAL
UNIVERSITY**

**CI6203 Software Engineering
Air Transport ÜBÉR
Academic Year 2017**

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1 INTRODUCTION

This document is a software requirements specification for the Air Transport ÜBÉR project.

1.1 PROBLEM DEFINITION

In the near future, unmanned aerial vehicles (UAVs) or personal aerial vehicles (PAVs) will fly in the low altitude airspace above urban cities. UAVs will be used to transport lightweight goods while PAVs will be used to transport people. Much like Taxis and ÜBÉR cars now, there will be huge demand for their services in dense urban cities that has 10 million population or higher.

ÜBÉR needs a new mobile app AIRBOOKING to allow users to book UAV to transport items or PAV for personal transport. At the same time, it also needs a fleet management software FLEETMS to manage its fleet of UAVs and PAVs.

1.2 PURPOSE

This document aims to cover the brief requirements of the Air Transport ÜBÉR project. The project contains two systems - FLEETMS and Air Booking system whose functional and nonfunctional requirements are established using traditional Use case and class diagrams. This document also highlights the mockup prototypes based on the requirements established for FLEETMS and Air Booking system.

2 FLEETMS

The FLEETMS system is a backend web portal that allows the administrator(s) to manage the fleet of vehicles.

The FLEETMS system is split into 3 main modules:

- Fleet Management
- Fleet Maintenance
- Operations

The Fleet Management module allows the administrator(s) to keep a documentation of the vehicle information via the Vehicle Documents function. The Vehicle Renewal Reminder function allows the administrator to contact the service agents regarding the necessary renewals of the vehicles. This module also allows the administrator(s) to keep track of the accident(s) that the vehicles had been involved in via the Accident Documents function.

The Fleet Maintenance module allows the administrator(s) to keep track of the maintenance state of the vehicles. The Service Reminder function reminds the administrator(s) that it is time to send the vehicle(s) for servicing. The Issue Reporting function lets the administrator(s) to report an issue with the service agents. The Battery Management function allows the administrator(s) to monitor the battery usage of the vehicles.

The Operations module allows the administrator(s) to oversee the operations of the vehicles, like the UAV Scheduled Delivery Management function and the Rate Management function.

2.1 FUNCTIONAL REQUIREMENTS

2.1.1 Module - Fleet Management

2.1.1.1 Vehicle Documents

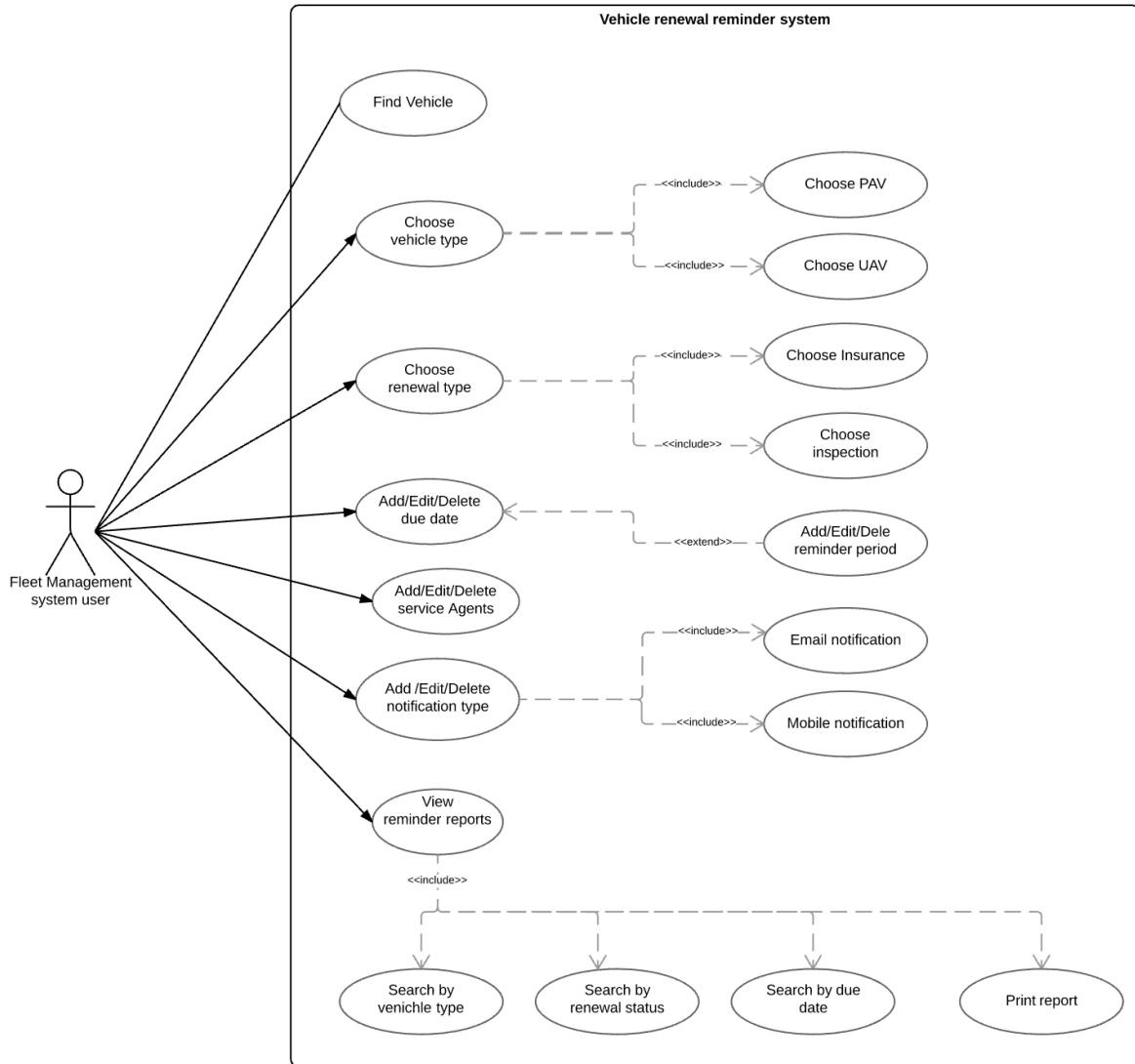
The Vehicle documentation module allows FLEETMS system user to store the comprehensive vehicle profiles such as vehicle information and vehicle documentations. The vehicle information involves vehicle model, vehicle engine type, vehicle battery type, vehicle mileage and photos. The vehicle documentations involve vehicle warranty, purchase information and supplier detail information. The system user can search the vehicle information to view the existing vehicles. The system user can choose the vehicle type such as PAV and UAV vehicle type to add, edit and delete the vehicle information and documentations.



2.1.1.2 Vehicle Renewal Reminder

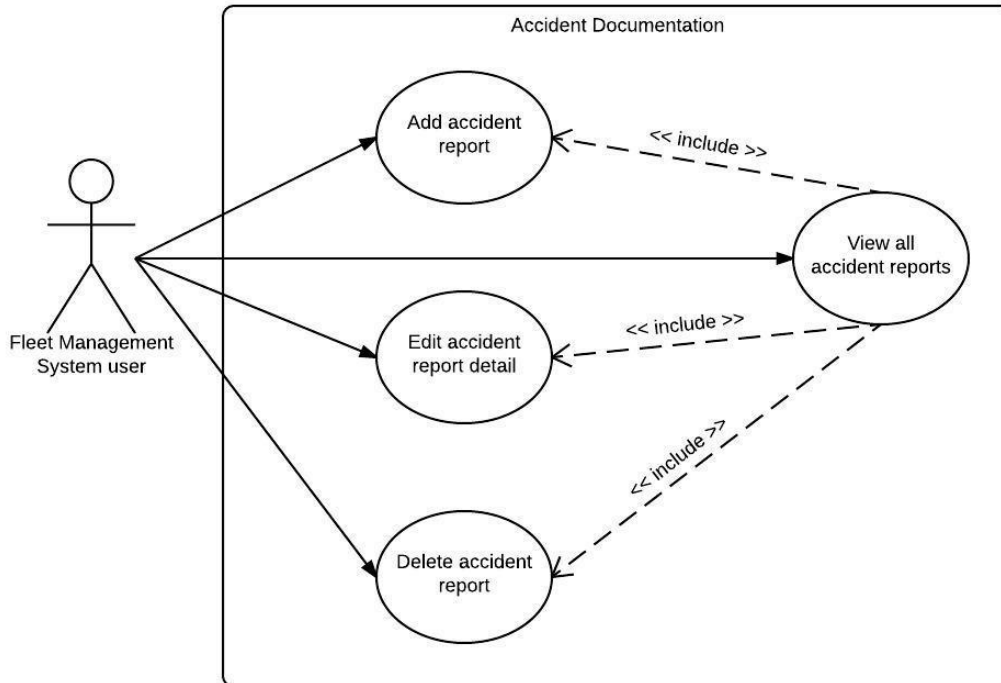
The Vehicle renewal reminder module allows FLEETMS user to inform the vehicle renewal information to the responsible service agent. The system user can store the vehicle renewal type such as insurance renewal, vehicle inspection renewal and the service agent's information who is responsible for the renewal system. The service agents will receive the reminder

notifications for licences, insurances and inspection via email or mobile phone call/messaging. The system user can search the vehicle information to view the existing vehicle reminder reports. The system user can choose the vehicle type such as PAV and UAV vehicle type to add, edit and delete the vehicle renewal information.



2.1.1.3 Accident Documents

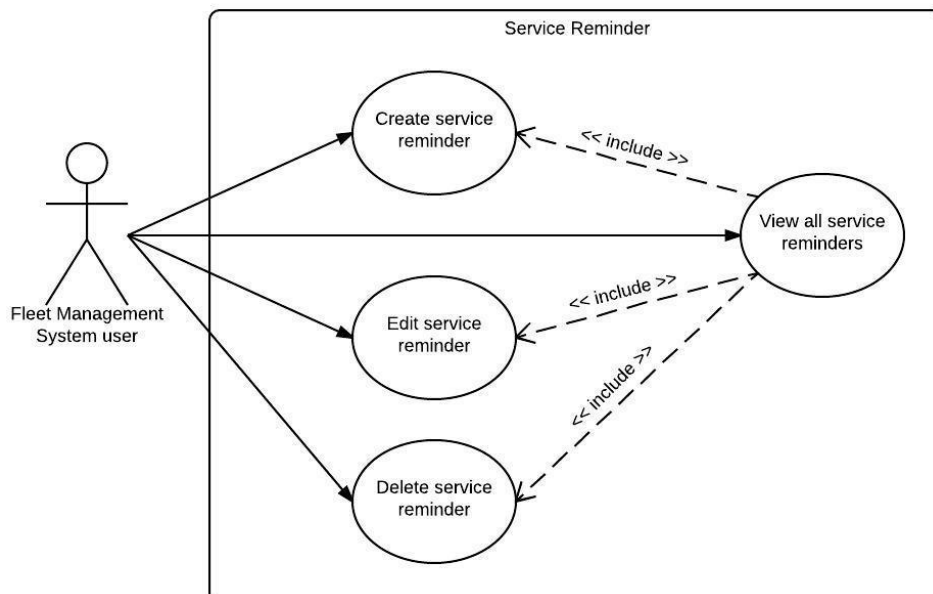
The Accident Documents module allows the FLEETMS user to keep a record of all accidents that have occurred. Details to be documented includes the date/time of accident, and accident detail. This will help the administrators in scheduling maintenance (or services) of the vehicle.



2.1.2 Module – Fleet Maintenance

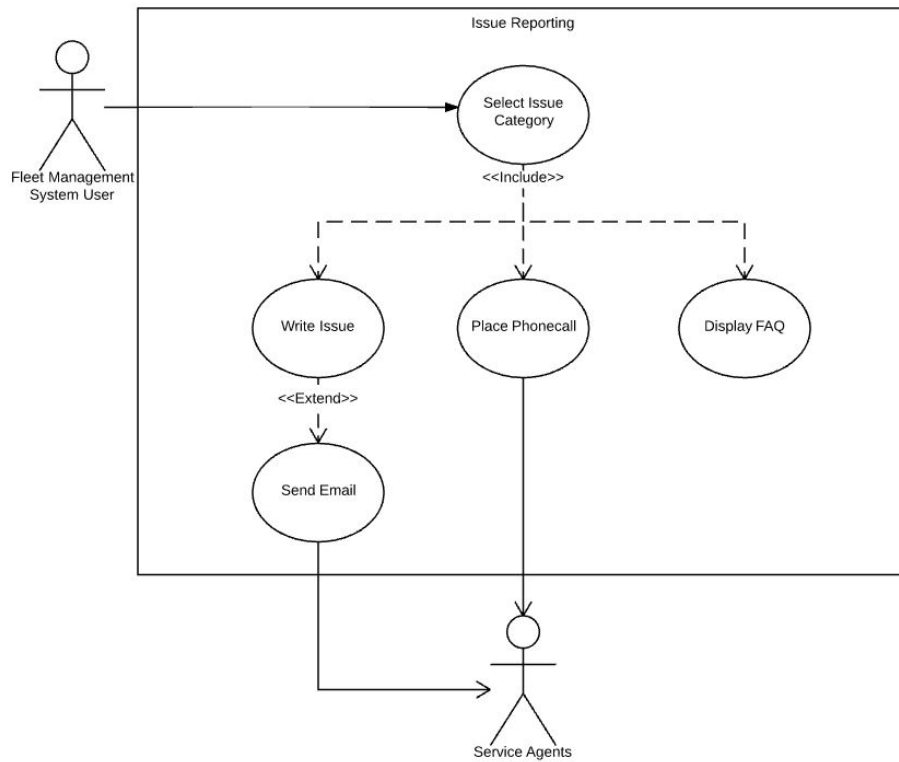
2.1.2.1 Service Reminder

The Service Reminder module sends a reminder to a group of selected FLEETMS users, to remind them that it is time to send a particular vehicle for service.



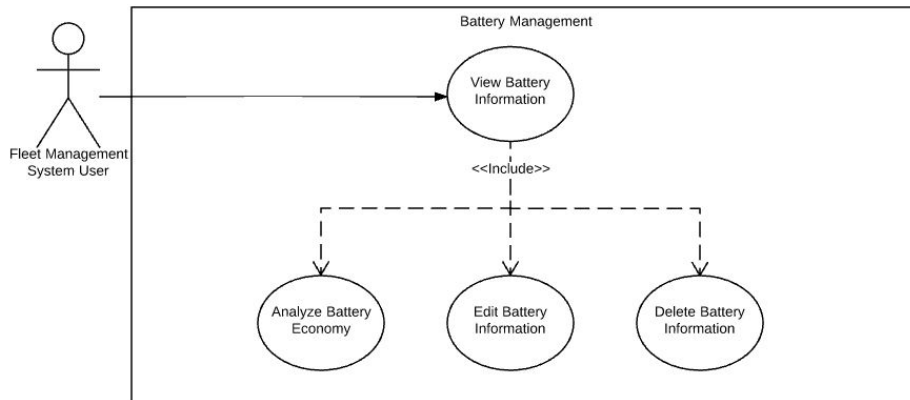
2.1.2.2 Issue Reporting

The Issue Reporting is intended to give user a way to contact service agents of the UAV/PAV when any issue is encountered such as technical difficulties or legal issues. Example of technical difficulties is a UAV that operates with unusual high battery temperature or damaged system by bird strikes. Example of legal issues includes the infringement of no-fly zone and air near-miss.



2.1.2.3 Battery Management

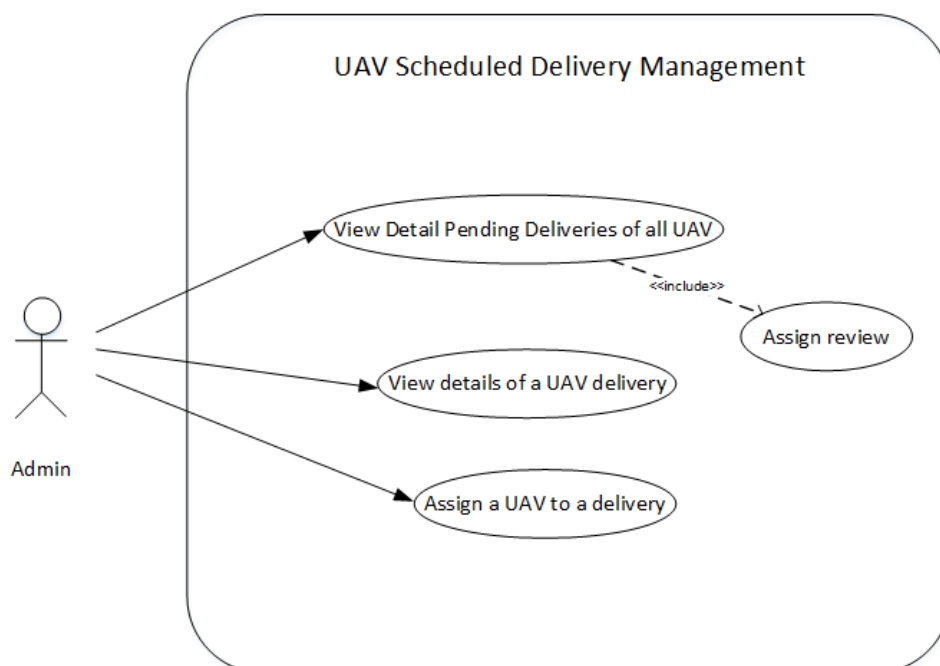
The battery management offers analytic tools to allow users to monitor the economy and efficiency of the UAV/PAV operations. It also allows user to edit and remove battery information for maintenance purposes, which in turn can provide more accurate analysis of the battery economy.



2.1.3 Module – Operations

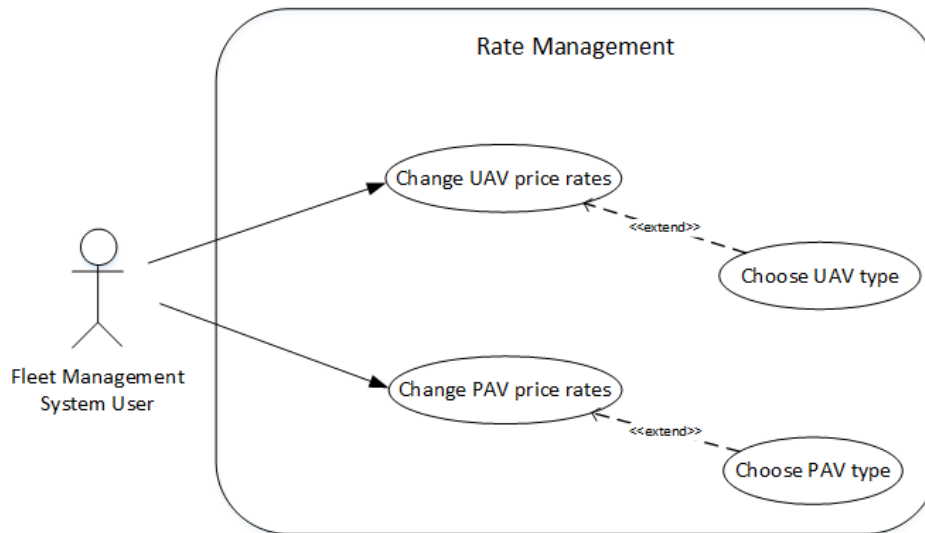
2.1.3.1 UAV Scheduled Delivery Management

This use case diagram allows admin to verify allocation of UAV to the bookings and view status of delivery. Admin who deliver the item review the delivery processes. It includes three parts; Admin check about the detail pending of all UAV, details of UAV delivery and assign delivery process of UAV.



2.1.3.2 Rate Management

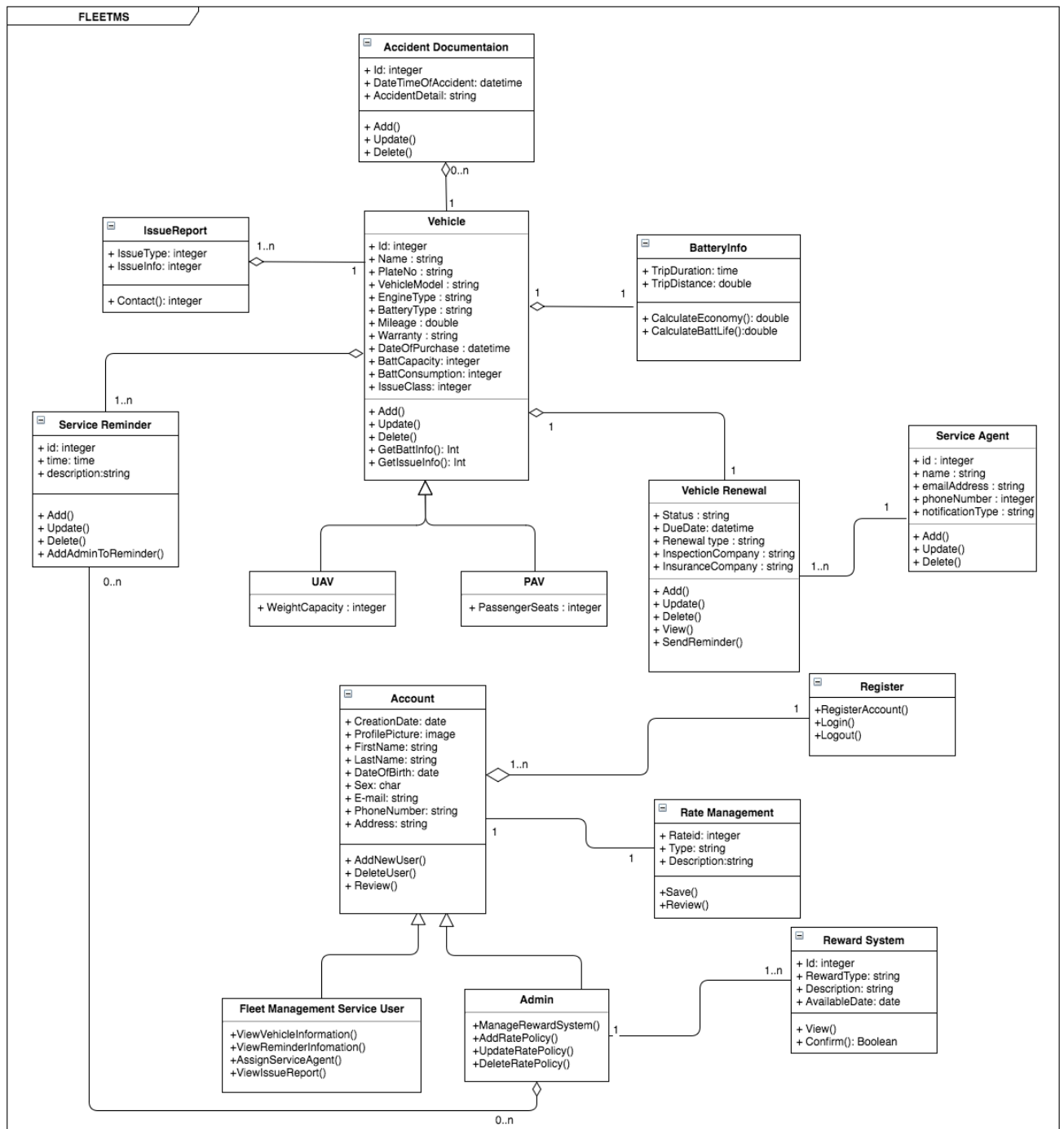
Manages the cost per distance to charge customers for both UAV and PAV. Fleet Management System User can change the price rates of UAV and PAV. It has two use cases UAV price rates and PAV price rates. Fleet Management User choose the type of UAV or PAV and then change the price rate of UAV or PAV.



2.2 NON-FUNCTIONAL REQUIREMENTS

- The system should have fast access and quick response.
- The system should be able to handle 10 million users.
- The system should have backup redundancy in case of power failure for the main server, backup servers get deployed immediately.
- Access to databases and centrally-managed server should be available 24/7.
- The system should be flexible to allow the upgrades. (e.g. Beta upgrade version for bug fixes or new version for additional features)
- The system should have user authentication. (e.g. Account Register/Account sign in). Only authorized person can be able to access the system.
- The system should have minimal problems with robust error handling.
- All transactions with the server should be secured by minimally on SSL.

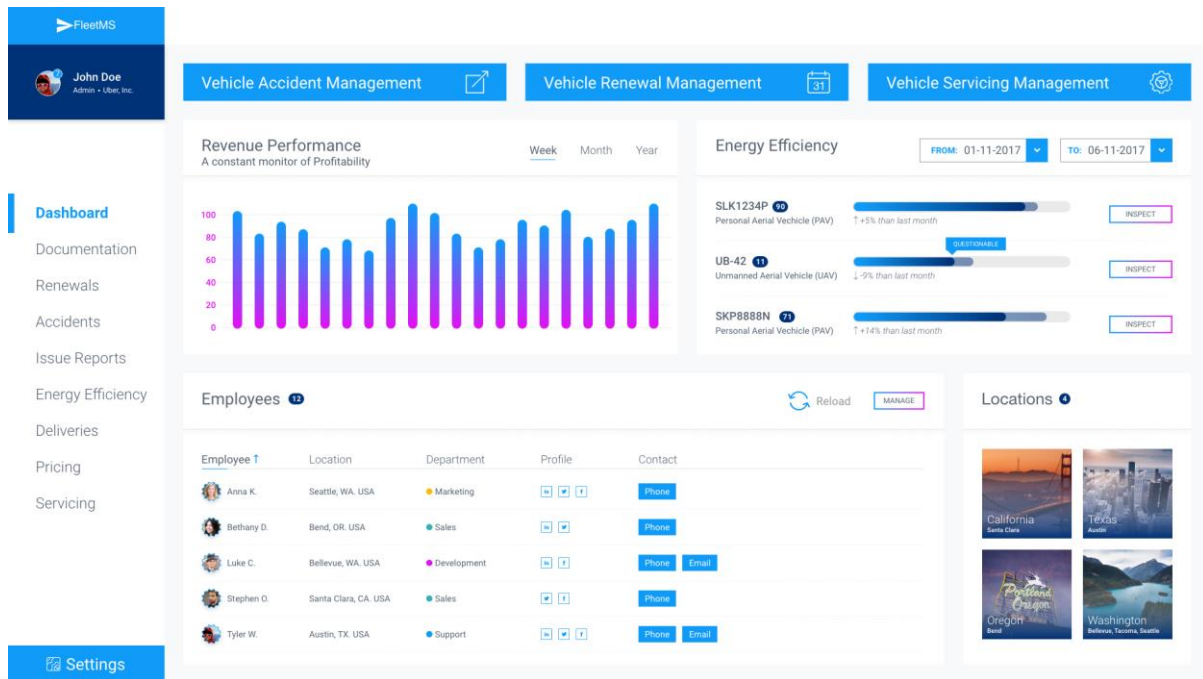
2.3 CLASS DIAGRAM



2.4 USER INTERFACE WIREFRAMES

The following pages contain screenshots of the various functionalities of the FLEETMS system.

A fully interactive (clickable) mockup is available online at: <https://xd.adobe.com/view/56d7ec7a-4bc7-4cb5-b613-b3080e66a654/>.



2.4.1 Vehicle Documents

Documentation

Search all Vehicles

John Doe
Admin - Uber, Inc.

Dashboard
Documentation
Renewals
Accidents
Issue Reports
Energy Efficiency
Deliveries
Pricing
Servicing
Settings

Unmanned Aerial Vehicles (UAV)


Vehicle ID	Base Location	Weight Class	Date Added	Actions
UB-001	Seattle, WA, USA	deliverXX	6 Nov 2017	Info Doc
UB-002	Bend, OR, USA	deliverXXL	6 Nov 2017	Info Doc
UB-003	Bellevue, WA, USA	deliverXXXL	6 Nov 2017	Info Doc
UB-004	Santa Clara, CA, USA	deliverXXL	6 Nov 2017	Info Doc
UB-005	Austin, TX, USA	deliverXX	6 Nov 2017	Info Doc

Personal Aerial Vehicles (PAV)

Vehicle ID	Base Location	Size Class	Date Added	Actions
SKL1234P	Seattle, WA, USA	uberXX	6 Nov 2017	Info Doc
SKL1235P	Bend, OR, USA	uberXXL	6 Nov 2017	Info Doc
SKL1236P	Bellevue, WA, USA	uberXXXL	6 Nov 2017	Info Doc
SKL1237P	Santa Clara, CA, USA	uberXXL	6 Nov 2017	Info Doc
SKL1238P	Austin, TX, USA	uberXX	6 Nov 2017	Info Doc

Vehicle Information

Vehicle Information



CHOOSE FILE

Vehicle Model

Engine Type

Mileage

Battery Type

CANCEL SAVE

Vehicle Documentation

Vehicle Documentation

Drag & Drop Files

CHOOSE FILES

Warranty Number

Purchase Date

Supplier

CANCEL SAVE

2.4.2 Vehicle Renewal Reminder

Renewals

FleetMS

John Doe
Admin - Uber, Inc.

Search all Vehicles

Unmanned Aerial Vehicles (UAV) Reload View All

Vehicle ID ↑	Base Location	Weight Class	Renewal Date	Actions
UB-001	Seattle, WA, USA	deliverX	6 Nov 2017	Reminders
UB-002	Bend, OR, USA	deliverXL	6 Nov 2017	Reminders
UB-003	Bellevue, WA, USA	deliverXXXL	6 Nov 2017	Reminders
UB-004	Santa Clara, CA, USA	deliverXL	6 Nov 2017	Reminders
UB-005	Austin, TX, USA	deliverX	6 Nov 2017	Reminders

Reminders 0

[VIEW ALL](#)

Personal Aerial Vehicles (PAV) Reload View All

Vehicle ID ↑	Base Location	Size Class	Renewal Date	Actions
SKL1234P	Seattle, WA, USA	uberX	6 Nov 2017	Reminders
SKL1235P	Bend, OR, USA	uberXL	6 Nov 2017	Reminders
SKL1236P	Bellevue, WA, USA	uberXXXL	6 Nov 2017	Reminders
SKL1237P	Santa Clara, CA, USA	uberXL	6 Nov 2017	Reminders
SKL1238P	Austin, TX, USA	uberX	6 Nov 2017	Reminders

Dashboard

Documentation

Renewals

Accidents

Issue Reports

Energy Efficiency

Deliveries

Pricing

Servicing

[Settings](#)

Renewal Reminder

Reminder Information

Reminder Date

← AUGUST 1988 →

MON	TUE	WED	THU	FRI	SAT	SUN
	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Renewal Type

Select from list

Mobile Notification

Email Notification

[CANCEL](#) [SAVE](#)

2.4.3 Accident Documents

FleetMS

John Doe
Admin • Uset, Inc.

- Dashboard
- Documentation
- Renewals
- Accidents**
- Issue Reports
- Energy Efficiency
- Deliveries
- Pricing
- Servicing

Settings

Search all Reports

Accident Reports Reload NEW

Vehicle ID ↑	Base Location	Vehicle Type	Report Date	Actions
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit
SKL1235P	Santa Clara, CA, USA	PAV	6 Nov 2017	Edit
UB-005	Austin, TX, USA	UAV	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit
SKL1235P	Santa Clara, CA, USA	PAV	6 Nov 2017	Edit
UB-005	Austin, TX, USA	UAV	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit

Accident Information

Accident Information

Accident Location

Search Location

Vehicle ID

Time of Occurrence

Accident Details

CANCEL SAVE

2.4.4 Service Reminder

Servicing

FleetMS Search all Reports

John Doe Admin - User Profile

Service Reminders Reload NEW

Vehicle ID ↑	Base Location	Vehicle Type	Reminder Date	Actions
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit
SKL1235P	Santa Clara, CA, USA	PAV	6 Nov 2017	Edit
UB-005	Austin, TX, USA	UAV	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit
SKL1235P	Santa Clara, CA, USA	PAV	6 Nov 2017	Edit
UB-005	Austin, TX, USA	UAV	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	UAV	6 Nov 2017	Edit
SKL1234P	Bend, OR, USA	PAV	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	UAV	6 Nov 2017	Edit

Settings

Reminder Information

Reminder Date

← AUGUST 1988 →

MON	TUE	WED	THU	FRI	SAT	SUN
	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Service Task

Select from list

Mobile Notification

Email Notification

CANCEL SAVE

2.4.5 Issue Reporting

FleetMS

John Doe
Admin - User, Inc.

Search all Reports

Issue Reporting FAQs

Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet
Lorem ipsum dolor sit amet

Support Personnel Email: yourname@gmail.com

Support Contact Number: [12345678](tel:12345678)

Settings

- Dashboard
- Documentation
- Renewals
- Accidents
- Issue Reports**
- Energy Efficiency
- Deliveries
- Pricing
- Servicing

2.4.6 Battery Management

FleetMS

John Doe
Admin - Uber, Inc.

Dashboard

Documentation

Renewals

Accidents

Issue Reports

Energy Efficiency

Deliveries

Pricing






Servicing

Settings

Search all Vehicles





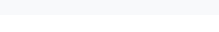
Unmanned Aerial Vehicles (UAV)

Reload View All

Vehicle ID ↑	Base Location	Weight Class	Energy Efficiency	INSPECT
UB-001	Seattle, WA, USA	deliveX	↑ +5% than last month 	INSPECT
UB-002	Bend, OR, USA	deliveXL	↓ -9% than last month 	INSPECT
UB-003	Bellevue, WA, USA	deliveXXL	↑ +14% than last month 	INSPECT
UB-004	Santa Clara, CA, USA	deliveXL	↑ +5% than last month 	INSPECT
UB-005	Austin, TX, USA	deliveX	↑ +5% than last month 	INSPECT

Personal Aerial Vehicles (PAV)

Reload View All

Vehicle ID ↑	Base Location	Size Class	Energy Efficiency	INSPECT
SKL1234P	Seattle, WA, USA	uberX	↑ +5% than last month 	INSPECT
SKL1235P	Bend, OR, USA	uberXL	↓ -9% than last month 	INSPECT
SKL1236P	Bellevue, WA, USA	uberXXL	↑ +14% than last month 	INSPECT
SKL1237P	Santa Clara, CA, USA	uberXL	↑ +5% than last month 	INSPECT
SKL1238P	Austin, TX, USA	uberX	↑ +5% than last month 	INSPECT

2.4.7 Delivery Management

Deliveries

FleetMS

John Doe
Admin • Ubers, Inc.

Search all Reports

Pending Deliveries

Reload NEW

Vehicle ID ↑	Destination	Vehicle Type	Delivery Date	Actions
UB-001	Seattle, WA, USA	deliverX	6 Nov 2017	Edit
Unassigned	Bend, OR, USA	deliverXL	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	deliverXXL	6 Nov 2017	Edit
Unassigned	Santa Clara, CA, USA	deliverXL	6 Nov 2017	Edit
UB-005	Austin, TX, USA	deliverX	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	deliverX	6 Nov 2017	Edit
Unassigned	Bend, OR, USA	deliverXL	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	deliverXXL	6 Nov 2017	Edit
Unassigned	Santa Clara, CA, USA	deliverXL	6 Nov 2017	Edit
UB-005	Austin, TX, USA	deliverX	6 Nov 2017	Edit
UB-001	Seattle, WA, USA	deliverX	6 Nov 2017	Edit
Unassigned	Bend, OR, USA	deliverXL	6 Nov 2017	Edit
UB-003	Bellevue, WA, USA	deliverXXL	6 Nov 2017	Edit

Settings

Delivery Information

Delivery Information

Delivery Destination

Search Location

UAV Vehicle ID

Delivery Date & Time

Additional Details

CANCEL SAVE

2.4.8 Pricing Management

Pricing

FleetMS

John Doe Admin - Uber, Inc.

Dashboard

Documentation

Renewals

Accidents

Issue Reports

Energy Efficiency

Deliveries

Pricing

Serviceing

Settings

Search all Pricing

Unmanned Aerial Vehicles (UAV)

Reload NEW

Pricing ID†	Location	Weight Class	Rates	Actions
UB-0001	Seattle, WA, USA	deliverX	\$1/KG	Edit
UB-0002	Bend, OR, USA	deliverXL	\$2/KG	Edit
UB-0003	Bellevue, WA, USA	deliverXXL	\$3/KG	Edit
UB-0004	Santa Clara, CA, USA	deliverXL	\$4/KG	Edit
UB-0005	Austin, TX, USA	deliverX	\$5/KG	Edit

Personal Aerial Vehicles (PAV)

Reload NEW

Pricing ID†	Location	Weight Class	Rates	Actions
UB-0011	Seattle, WA, USA	uberX	\$1/KM	Edit
UB-0012	Bend, OR, USA	uberXL	\$2/KM	Edit
UB-0013	Bellevue, WA, USA	uberXXL	\$3/KM	Edit
UB-0014	Santa Clara, CA, USA	uberXL	\$4/KM	Edit
UB-0015	Austin, TX, USA	uberX	\$5/KM	Edit

Pricing Information

Pricing Information

Pricing Location Zone

Search Location

Weight Class

Select from list

Pricing Rate (\$)

Lorem ipsum dolor sit amet

Effective Start Date

Lorem ipsum dolor sit amet

Expiry Date

Lorem ipsum dolor sit amet

CANCEL SAVE

3 AIRBOOKING

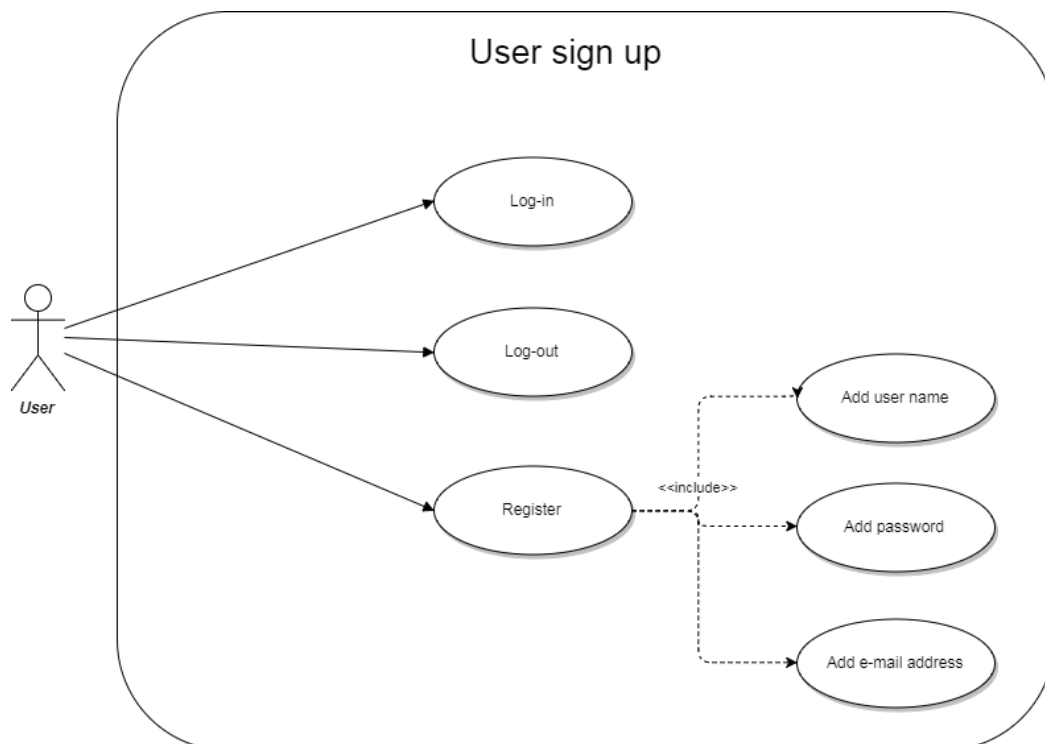
The AIRBOOKING system is a mobile application that allows the public to book a vehicle to transport themselves or to transport goods.

The user has to first register themselves from the User Sign-up function. Once they have logged in, they can book a vehicle via Vehicle booking function. During the vehicle booking process, they can track the vehicle real-time from the Real-time vehicle tracking function. The application also lets the user manage their rewards that they have accumulated from their rides, via the Rewards management function. The Help Center function lets the user ask for help when they need it. At any one time, the user is able to manage his/her account via the User account management function.

3.1 FUNCTIONAL REQUIREMENTS

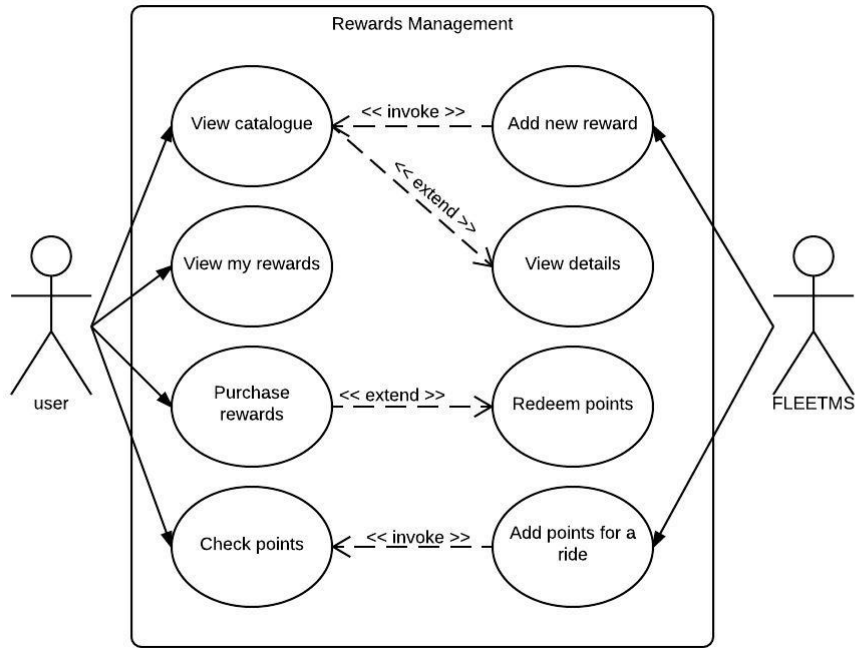
3.1.1 User Sign-up

The user sign-up is intended for account registration and authentication to the system.



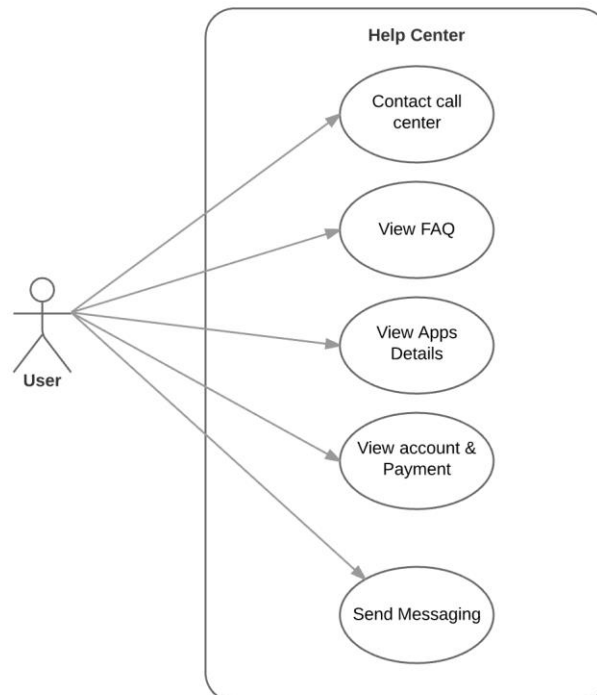
3.1.2 Rewards management

Rewards management module allows user to manage their reward points which will accumulate for each ride. This option provide user to check their rewards point, catalogue and to add points & redeem points.



3.1.3 Help Center

Help center module provides more information to user about Uber. User can contact or send message to enquire on application, user account, payment, etc., and FAQ will summarize the answer for most frequently asked question which can be referred by user.



3.1.4 User account management

The user account management is intended for managing and viewing a user's profile. Once the user has created an account and log-in successfully to the mobile application, he can:

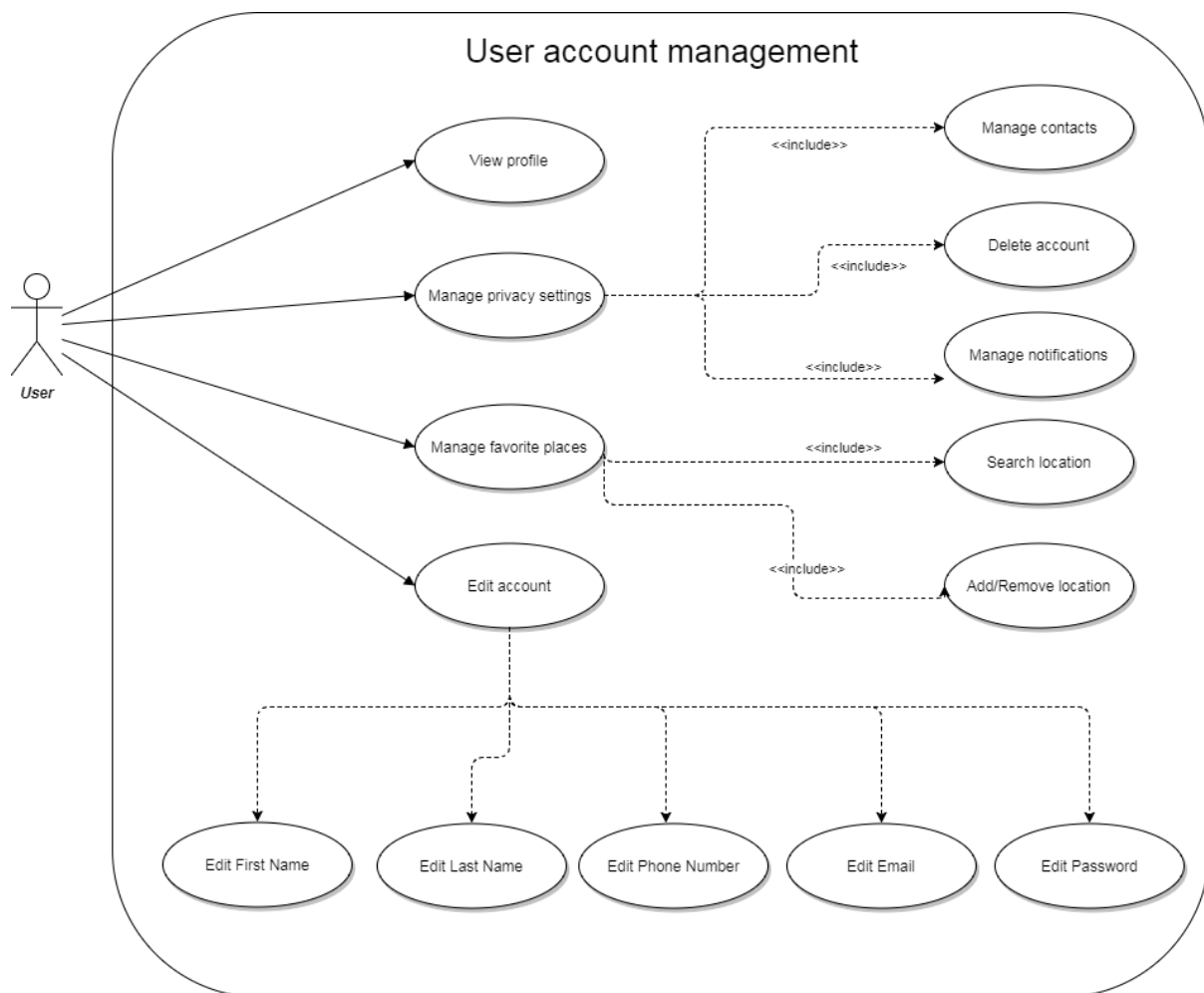
View his profile

Edit data on his account

Manage favorite places such as home, to easily select the location every time when ordering a cab from/to this place

Manage privacy settings such as contacts and notifications

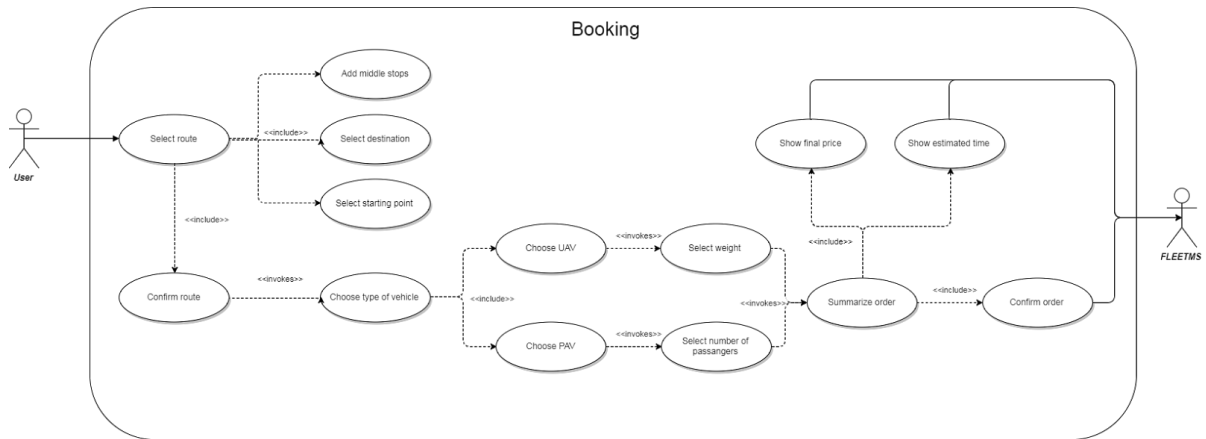
Delete the account



3.1.5 Vehicle booking

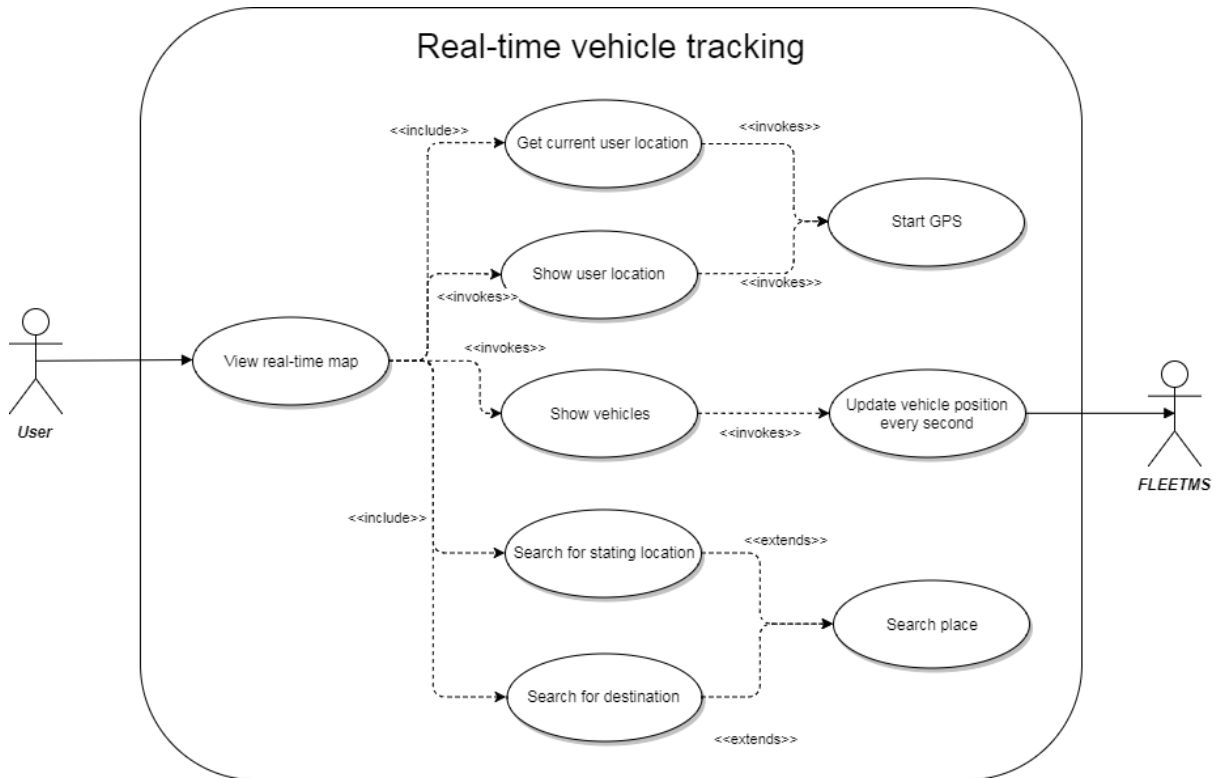
The vehicle booking is a core part of the mobile application intended for booking vehicles, either PAV or UAV. The module allows the user to select a route by adding starting location, destination and optionally middle stops. Once, the route is confirmed user selects type of a vehicle and accordingly parameters. The last function provides a summary of the booking.

The use case diagram presents a connection with the FLEETMS system, which indicates that the confirmed order will be stored and managed there.



3.1.6 Real-time vehicle tracking

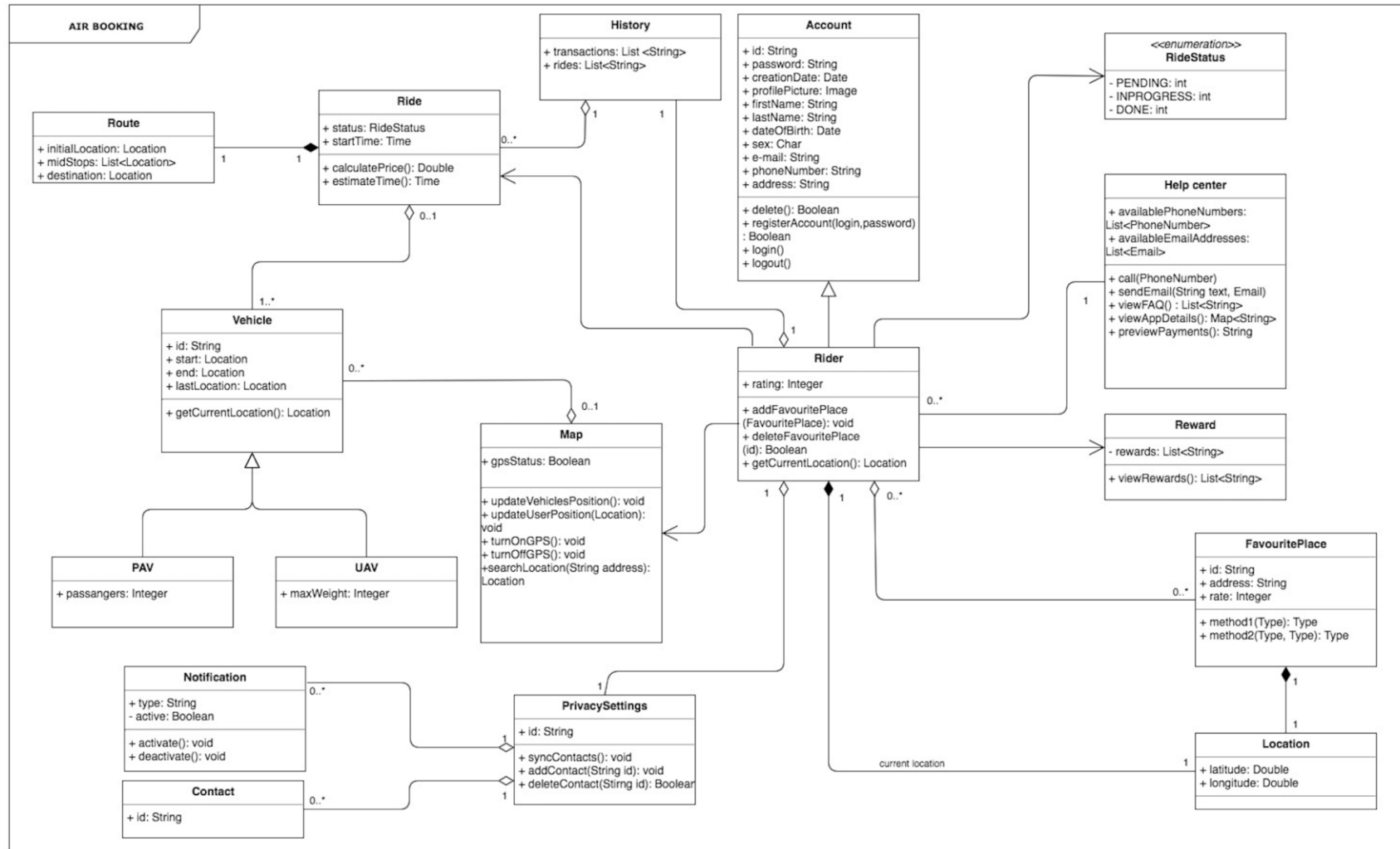
The real-time vehicle tracking provides an interactive real-time map for the user. The map makes it more convenient to book, preview and manage a ride. User can also easily, localize the route and himself on the map.



3.2 NON-FUNCTIONAL REQUIREMENTS

- The system should have fast access and quick response.
- Mobile application needs to be supported by Android, Windows Mobile and iOS.
- The system should be flexible to allow the upgrades. (e.g. Beta upgrade version for bug fixes or new version for additional features)
- The system should be user friendly and easy to interact.
- The system should responsive to user actions and provide clear feedback.
- The system should accurate with data and navigation.
- All transactions with the server should be secured by minimally on SSL.

3.3 CLASS DIAGRAM

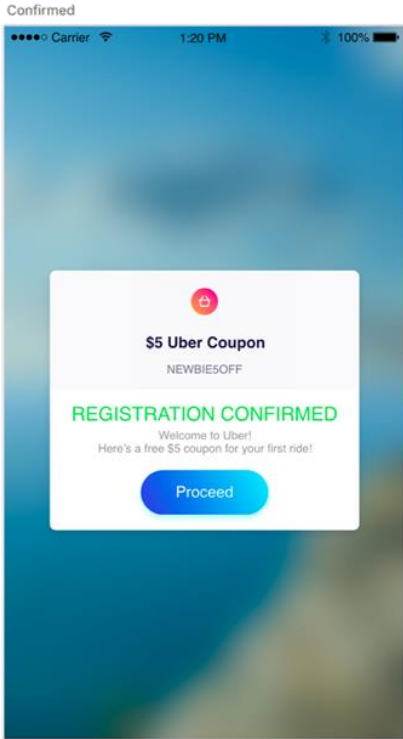
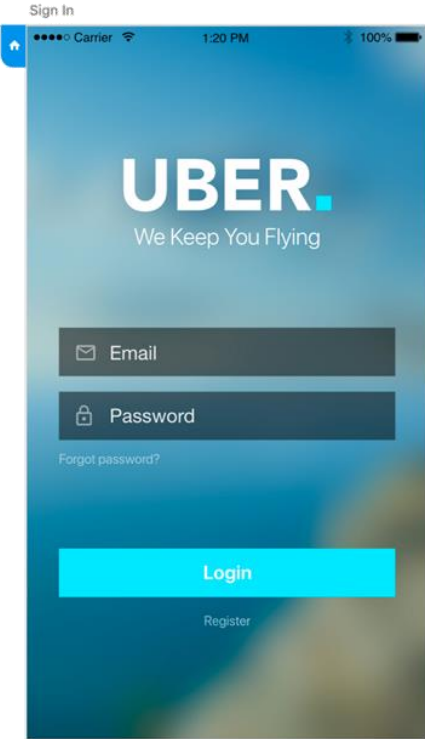
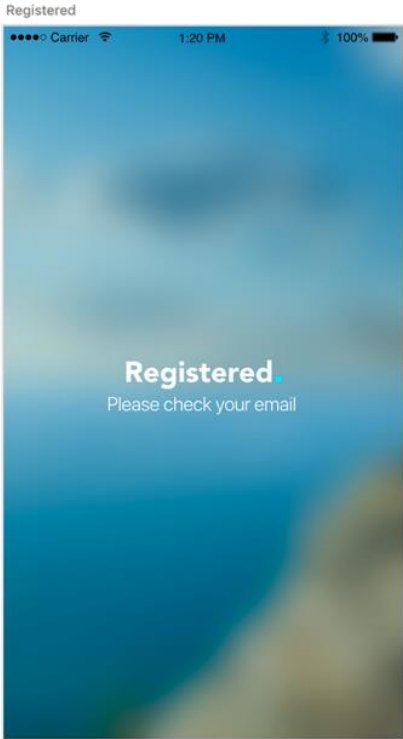
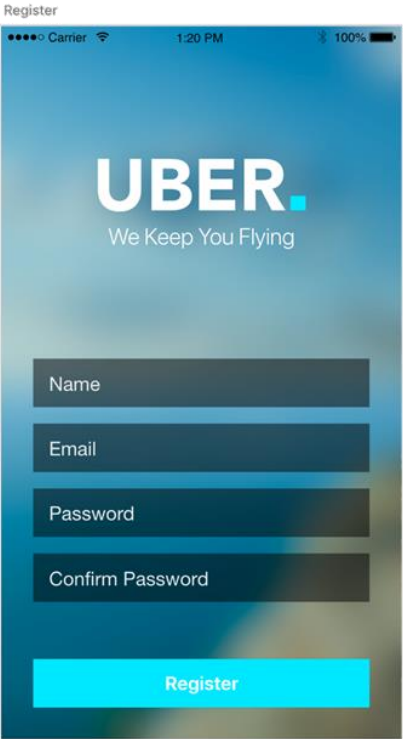


3.4 USER INTERFACE WIREFRAMES

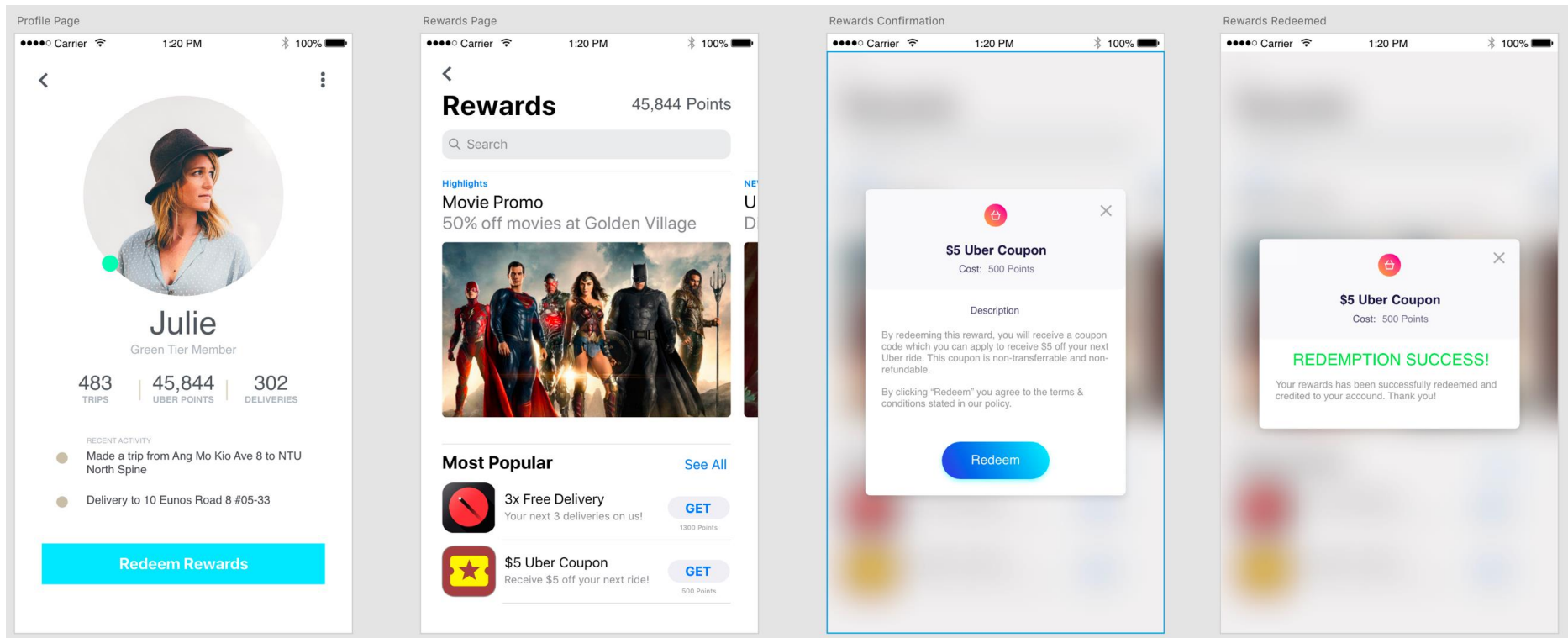
The following pages contain screenshots of the various functionalities of the AIRBOOKING application.

A fully interactive (clickable) mockup of the AIRBOOKING application is available online at: <https://xd.adobe.com/view/112682c1-3dd9-4769-8339-986329ebc208/>.

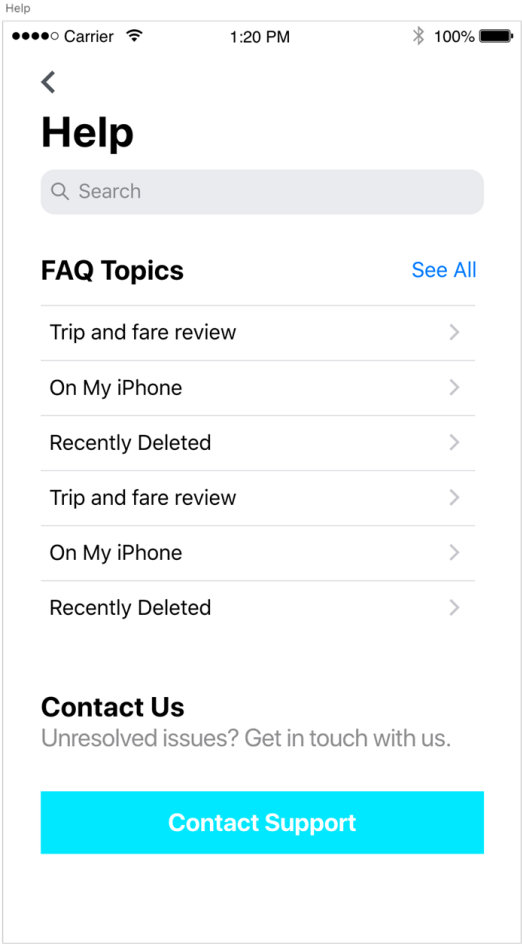
3.4.1 User Signup



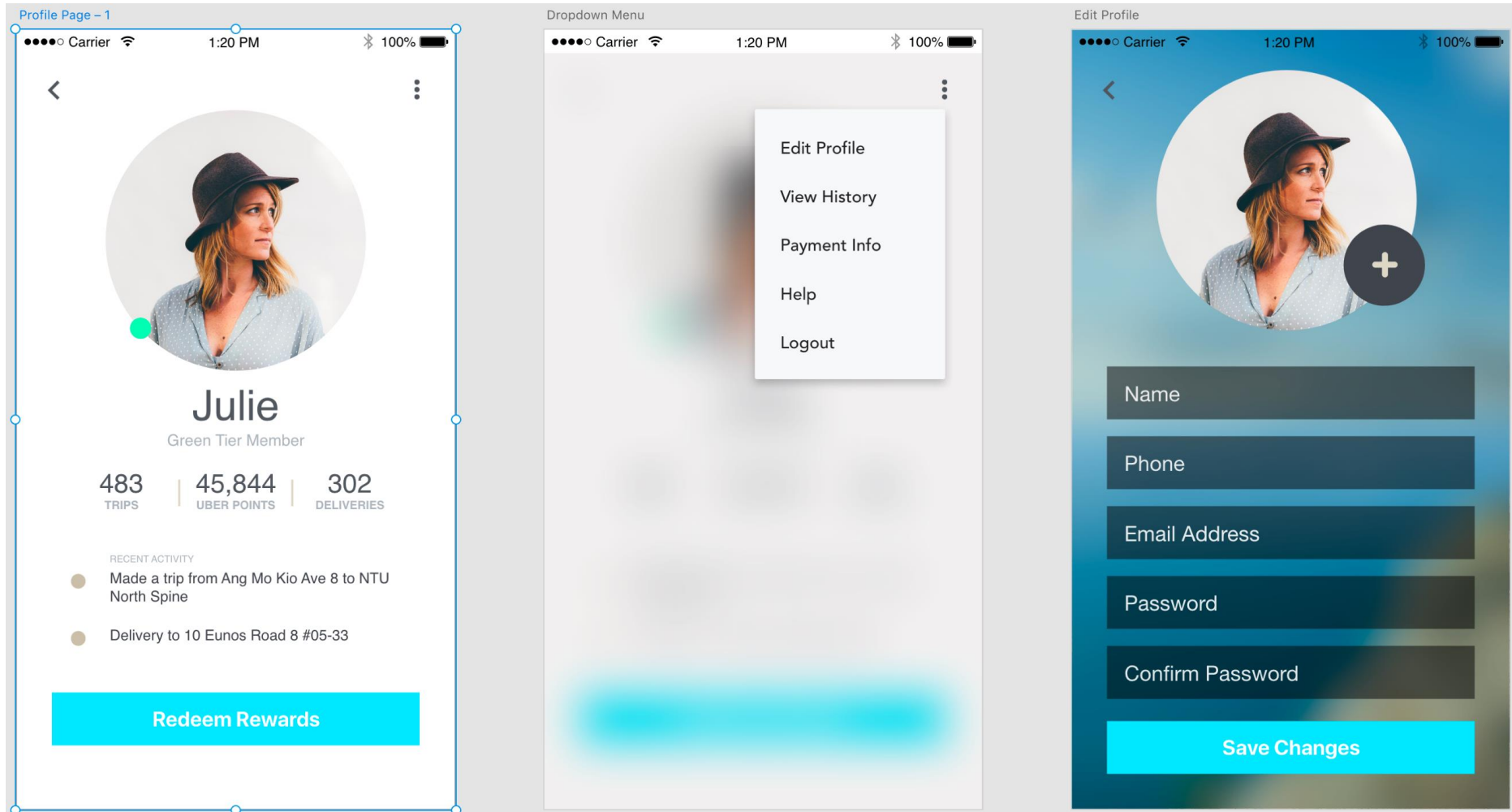
3.4.2 Rewards Management



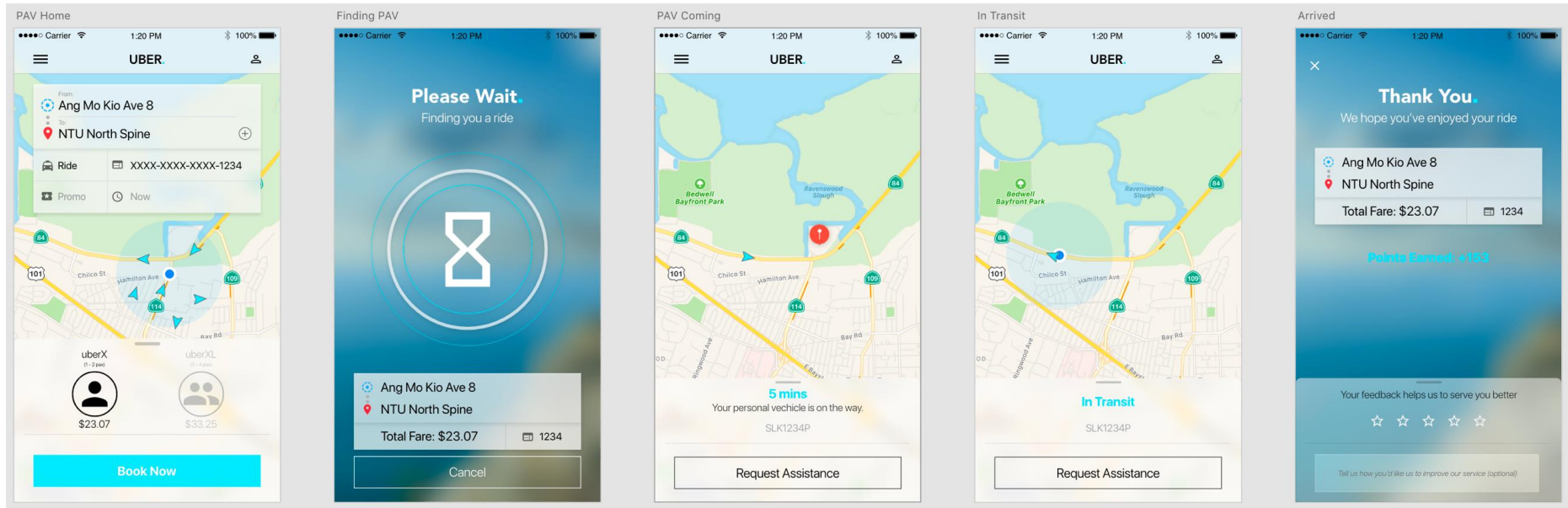
3.4.3 Help Centre



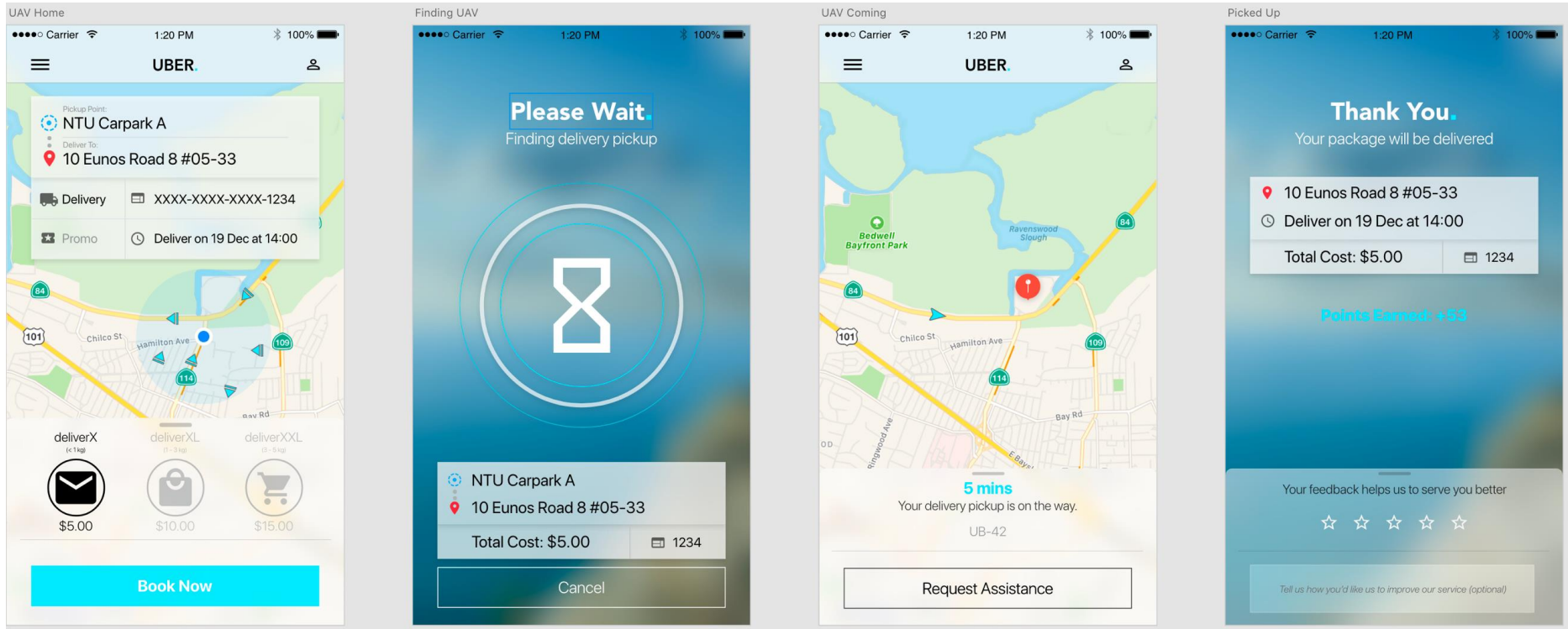
3.4.4 User Account Management



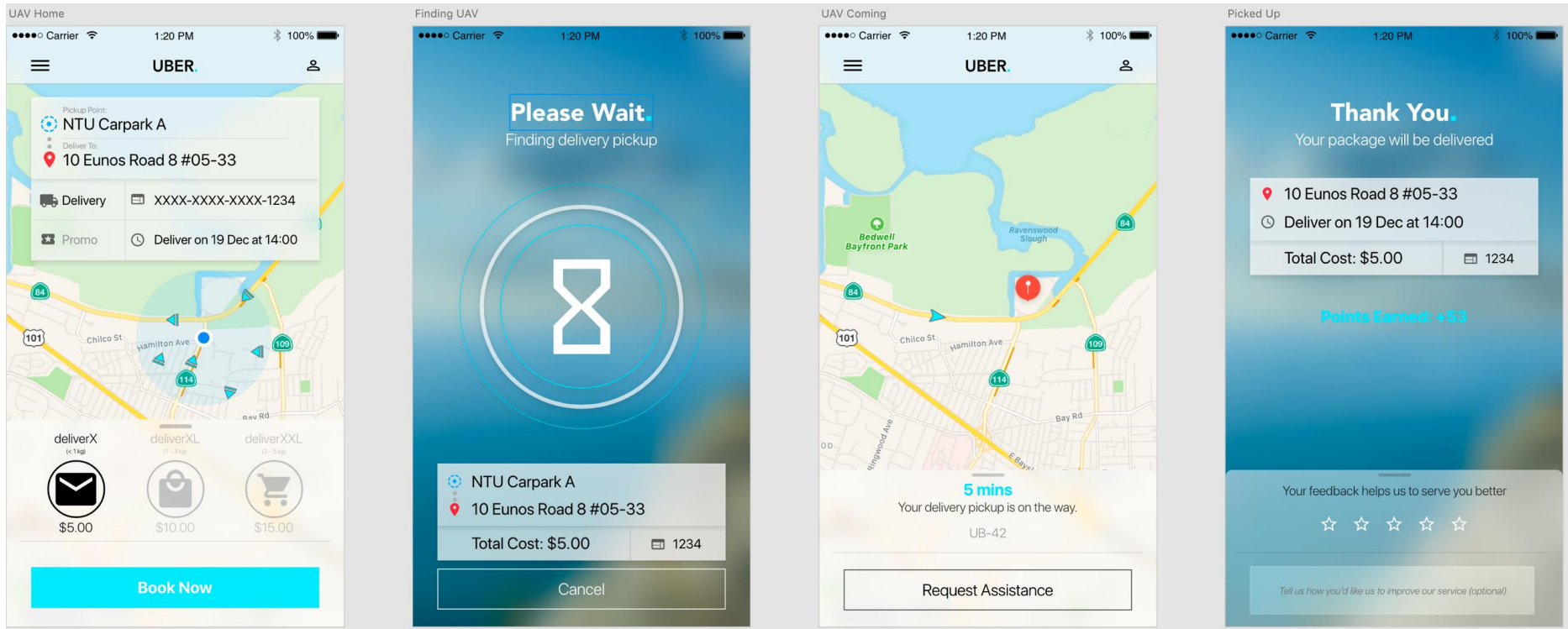
3.4.5 PAV Booking



3.4.6 UAV Booking



3.4.7 Ride History



3.4.8 Payment Settings

