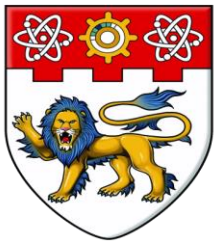

NANYANG TECHNOLOGICAL UNIVERSITY

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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

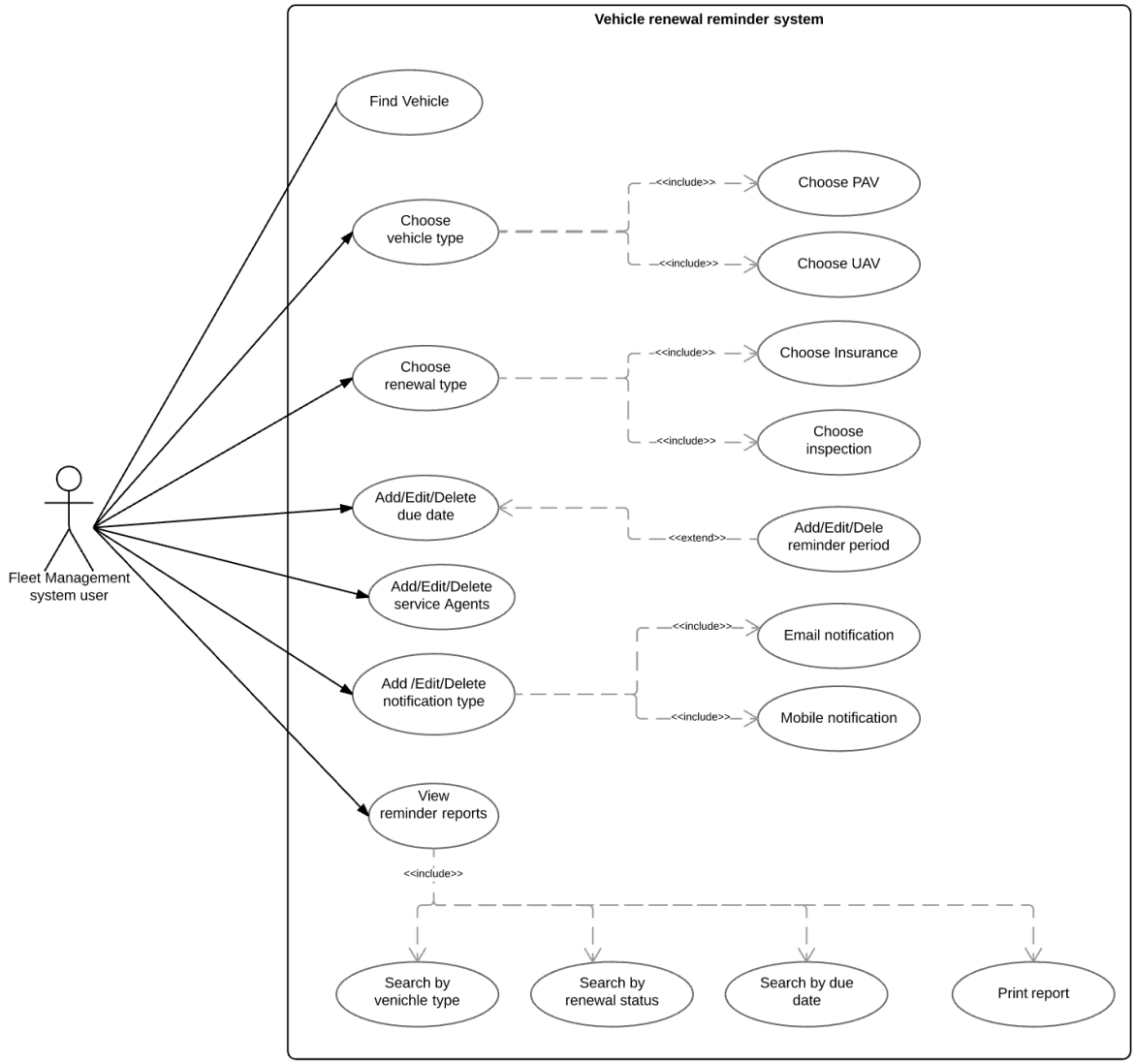
2.1.1.1 Vehicle Documents

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

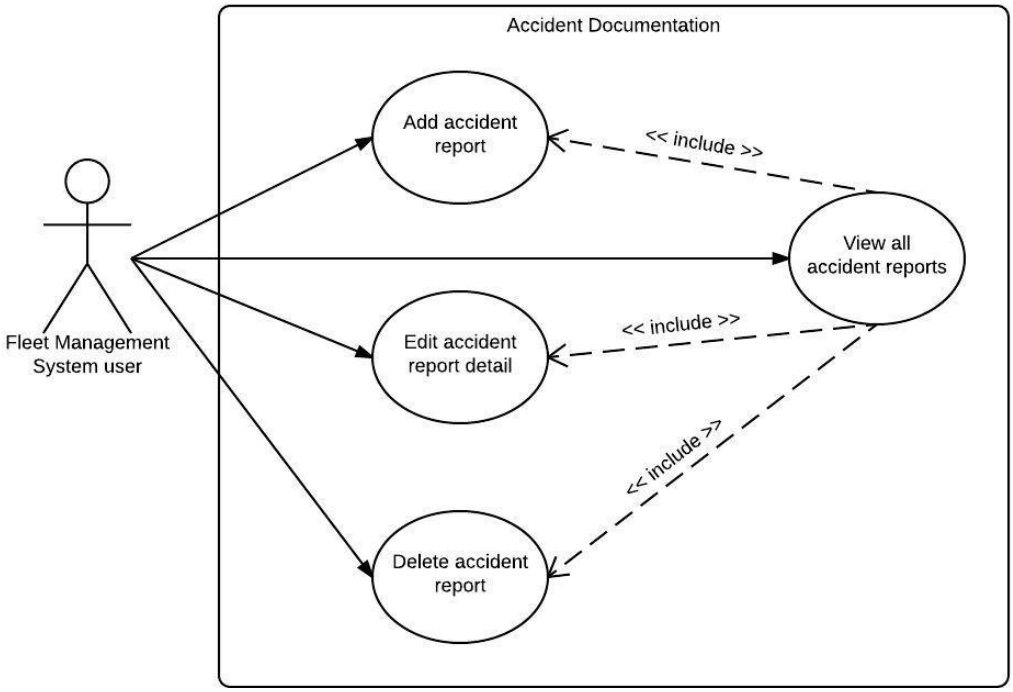
The Vehicle renewal reminder module allows FLEETMS user to inform the vehicle renewal information to the responsible service agent. The system user can store the vehicle renewal type such as insurance renewal, vehicle inspection renewal and the service agent's information who is responsible for the renewal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

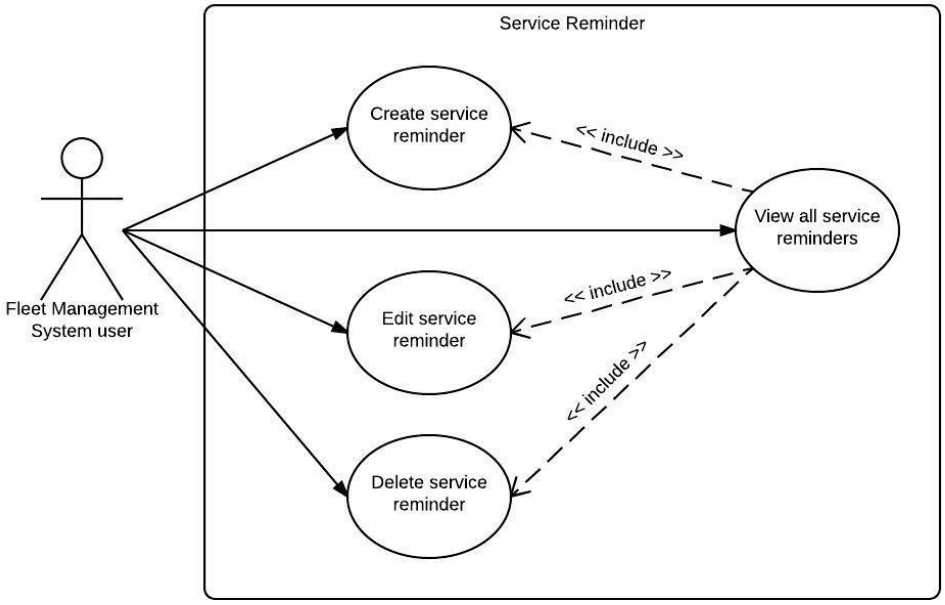
The Accident Documents module allows the FLEETMS user to keep a record of all accidents that have occurred. Details to be documented includes the date/time of accident, and accident detail. This will help the administrators in scheduling maintenance (or services) of the vehicle.



2.1.2 Module – Fleet Maintenance

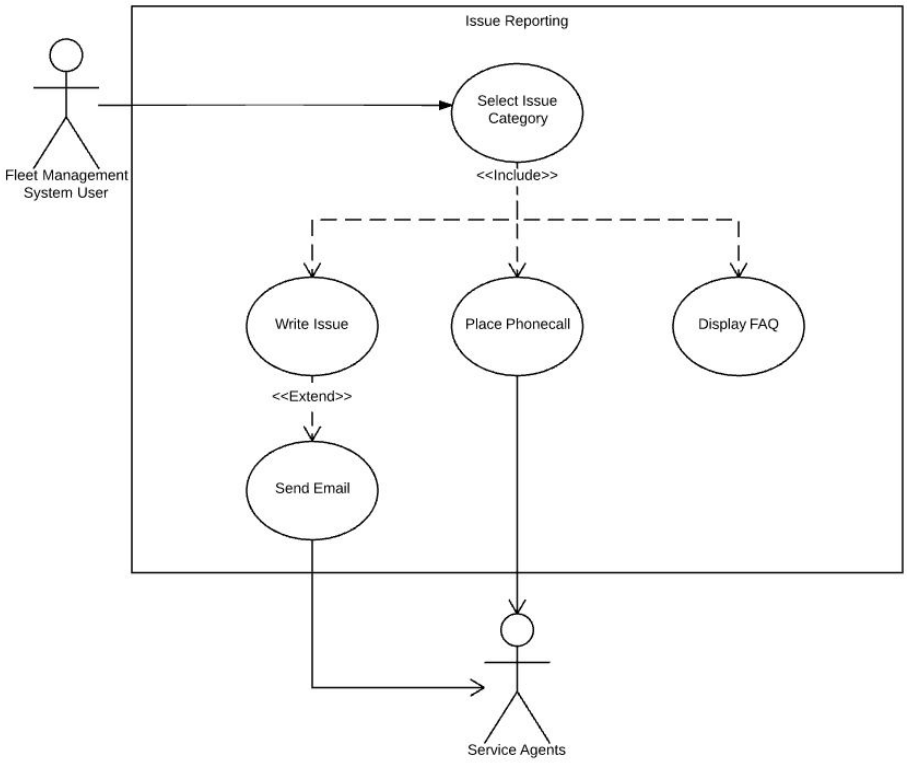
2.1.2.1 Service Reminder

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.



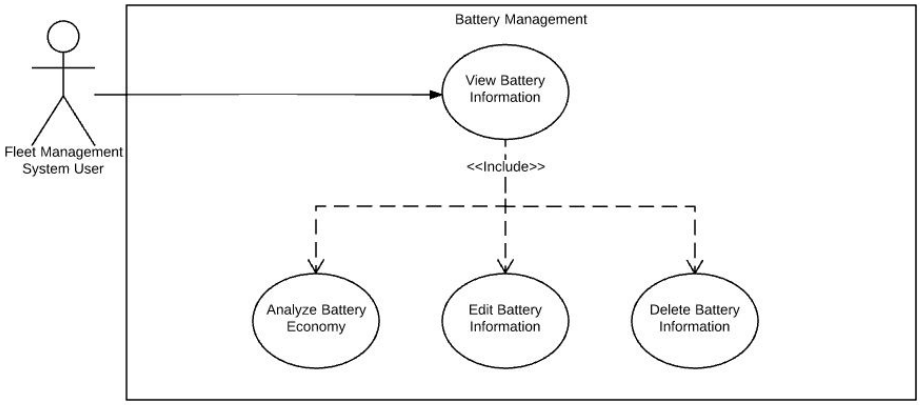
2.1.2.2 Issue Reporting

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

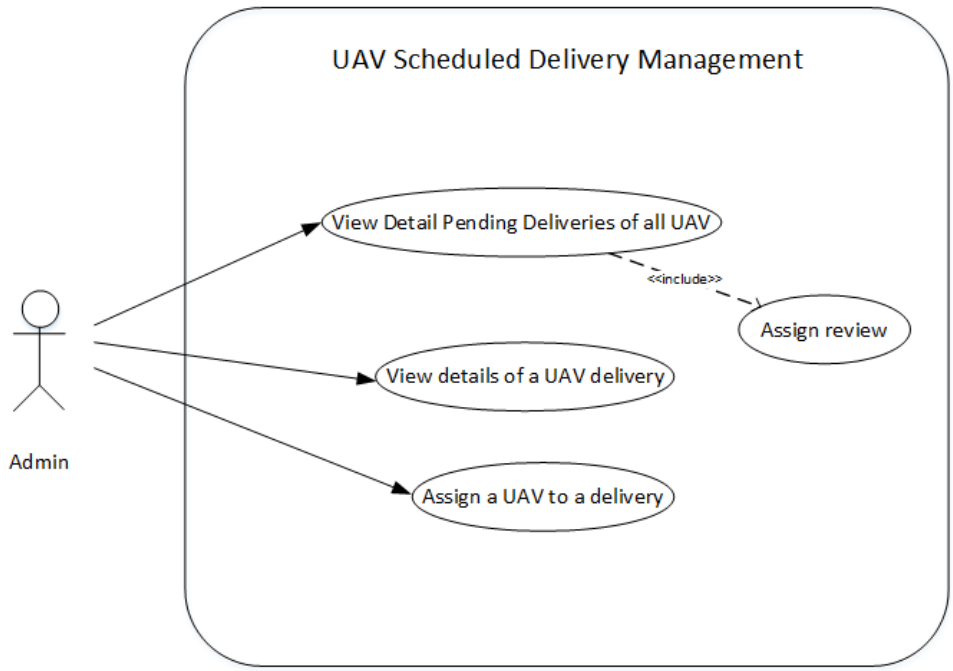
The battery management offers analytic tools to allow users to monitor the economy and efficiency of the UAV/PAV operations. It also allows user to edit and remove battery information for maintenance purposes, which in turn can provide more accurate analysis of the battery economy.



2.1.3 Module – Operations

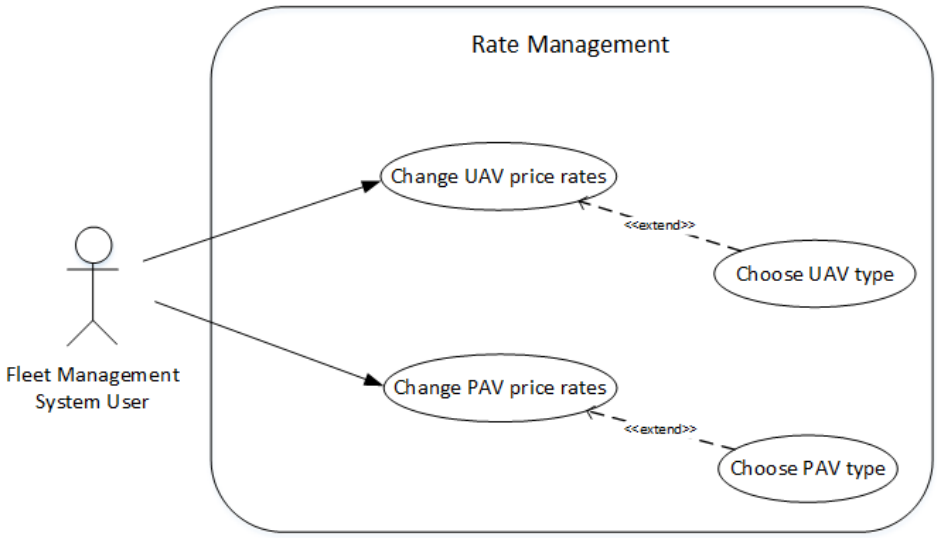
2.1.3.1 UAV Scheduled Delivery Management

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

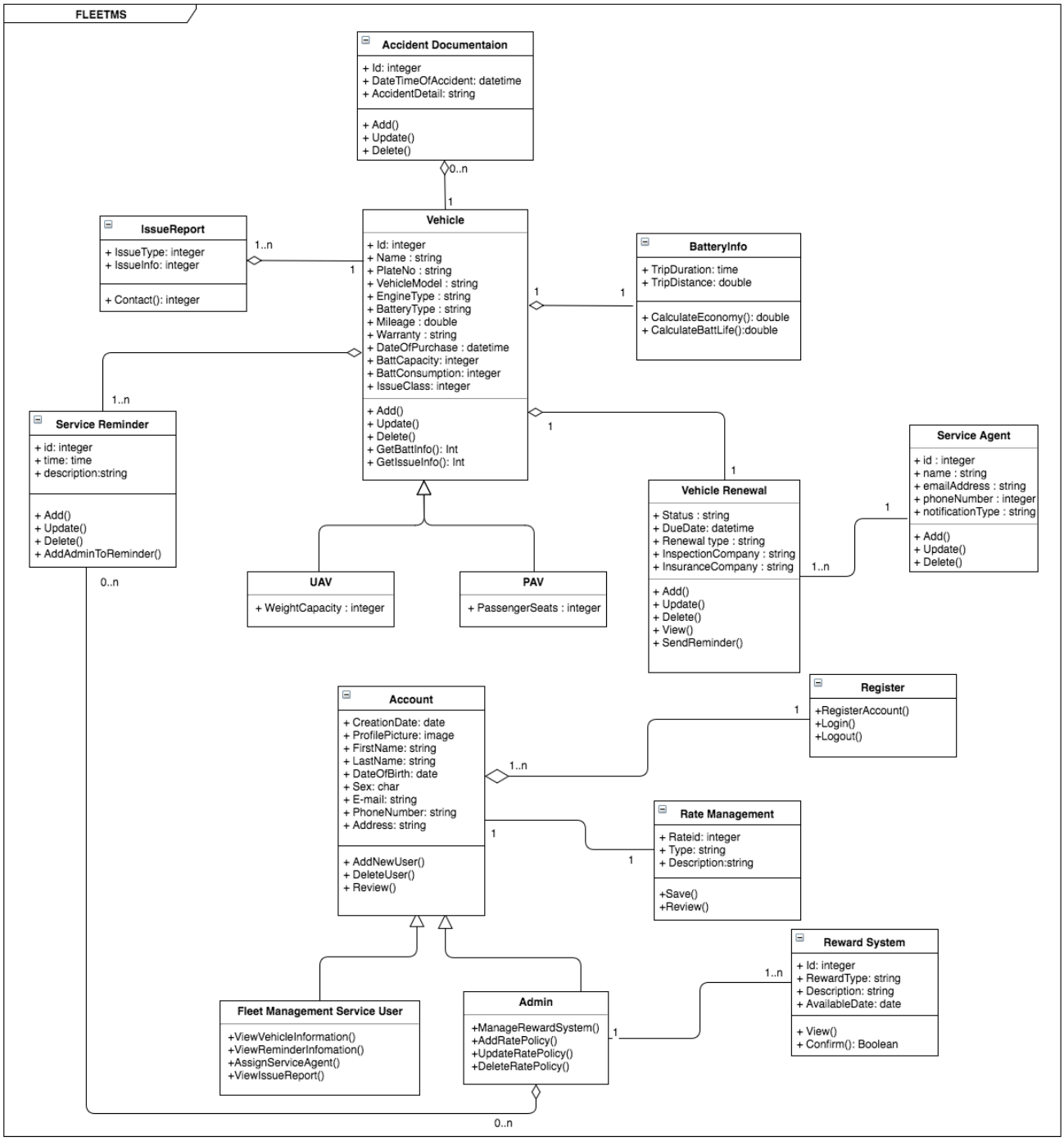
Manages the cost per distance to charge customers for both UAV and PAV. Fleet Management System User can change the price rates of UAV and PAV. It has two use cases UAV price rates and PAV price rates. Fleet Management User choose the type of UAV or PAV and then change the price rate of UAV or PAV.



2.2 NON-FUNCTIONAL REQUIREMENTS

- The system should have fast access and quick response.
- The system should 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 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.

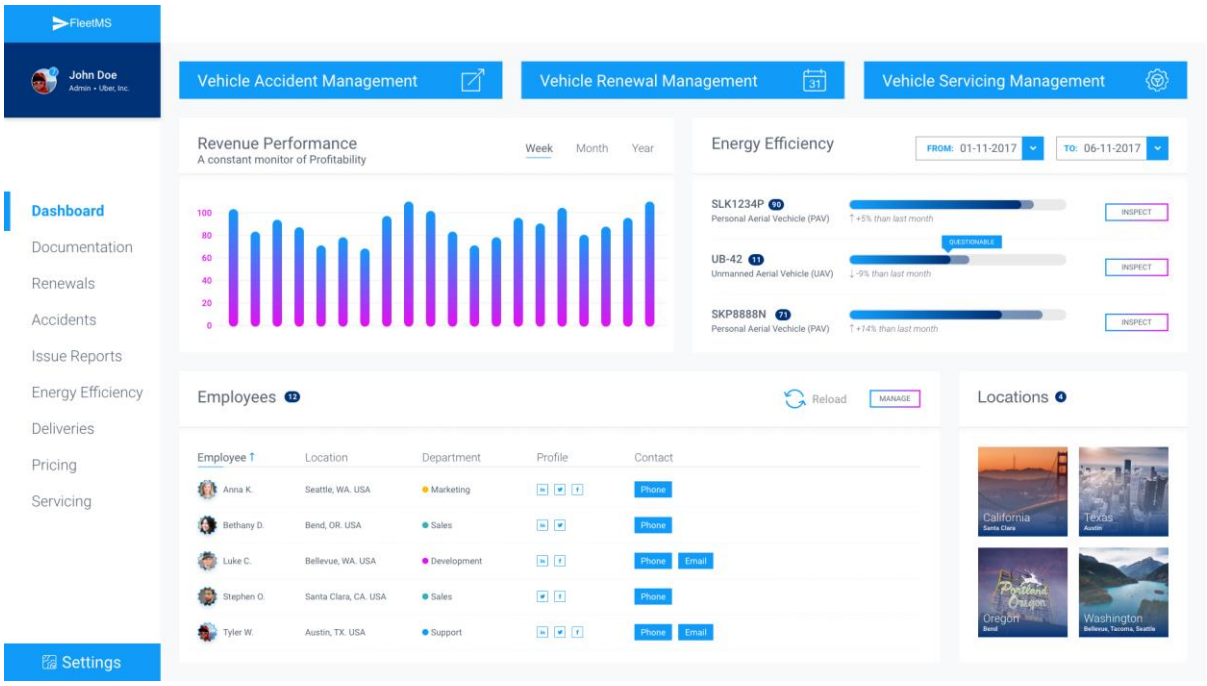
2.3 CLASS DIAGRAM



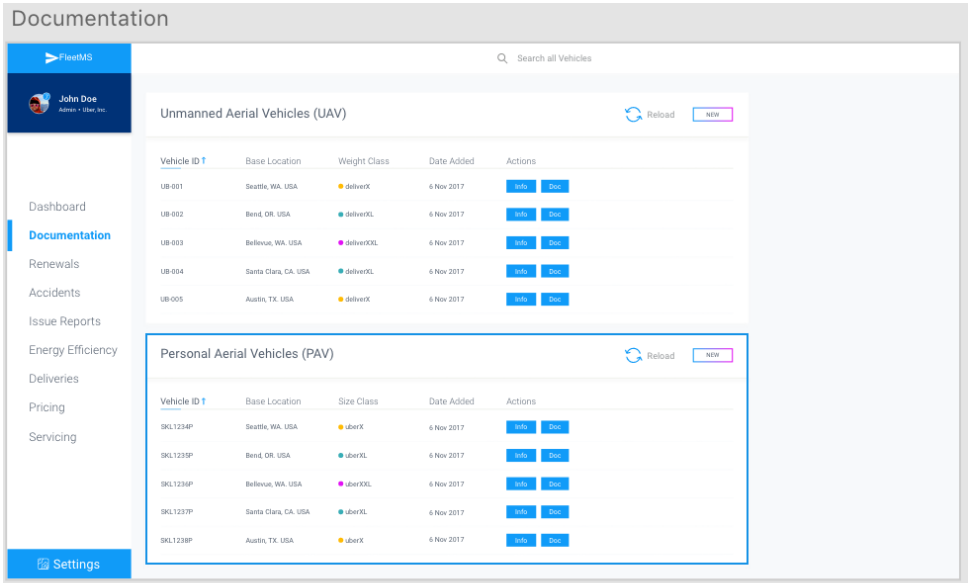
2.4 USER INTERFACE WIREFRAMES

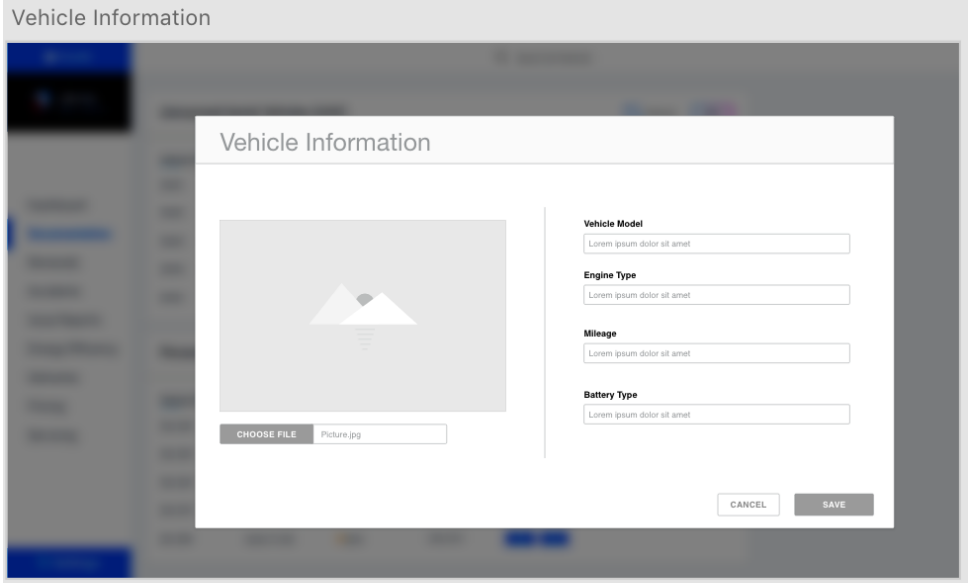
The following pages contain screenshots of the various functionalities of the FLEETMS system.

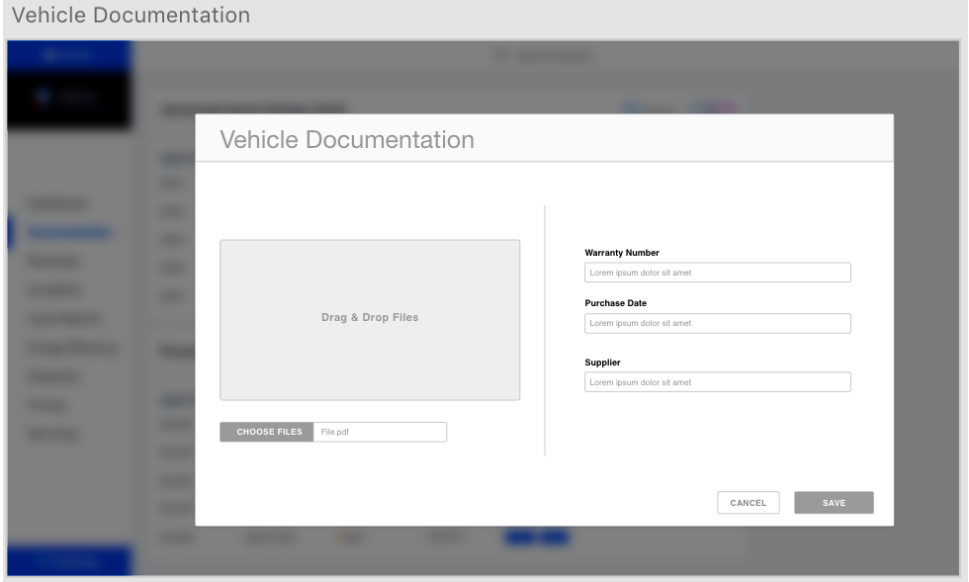
A fully interactive (clickable) mockup is available online at: https://xd.adobe.com/view/56d7ec7a-4bc7-4cb5-b613-b3080e66a654/.



2.4.1 Vehicle Documents

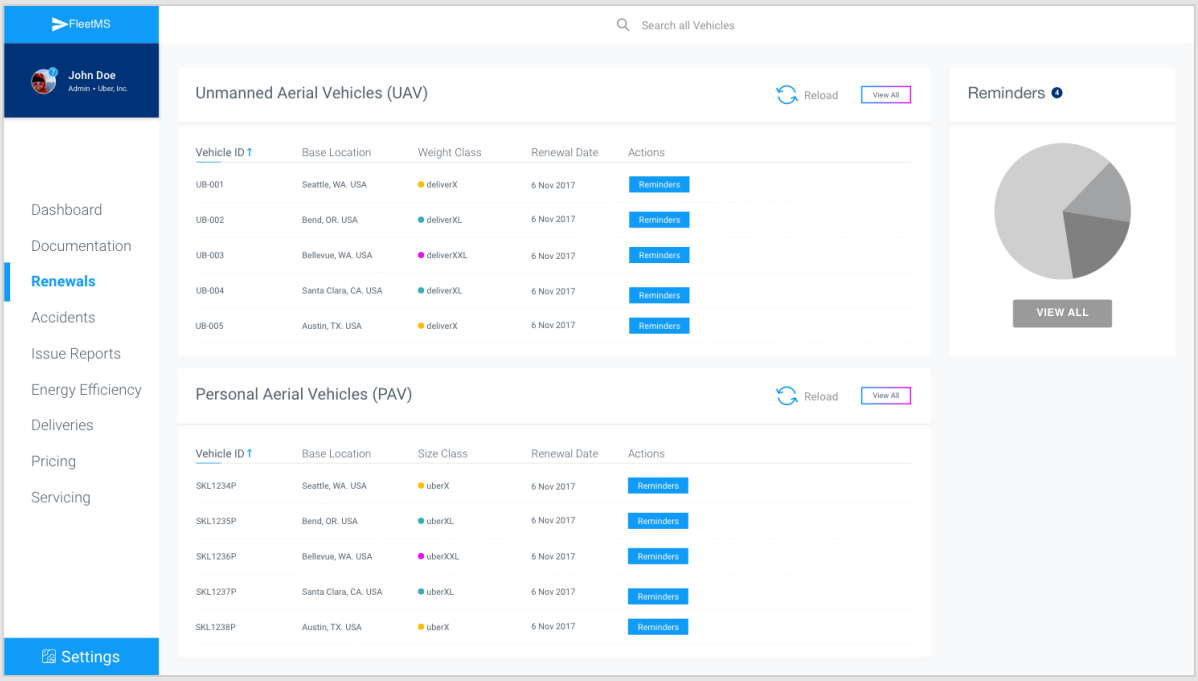




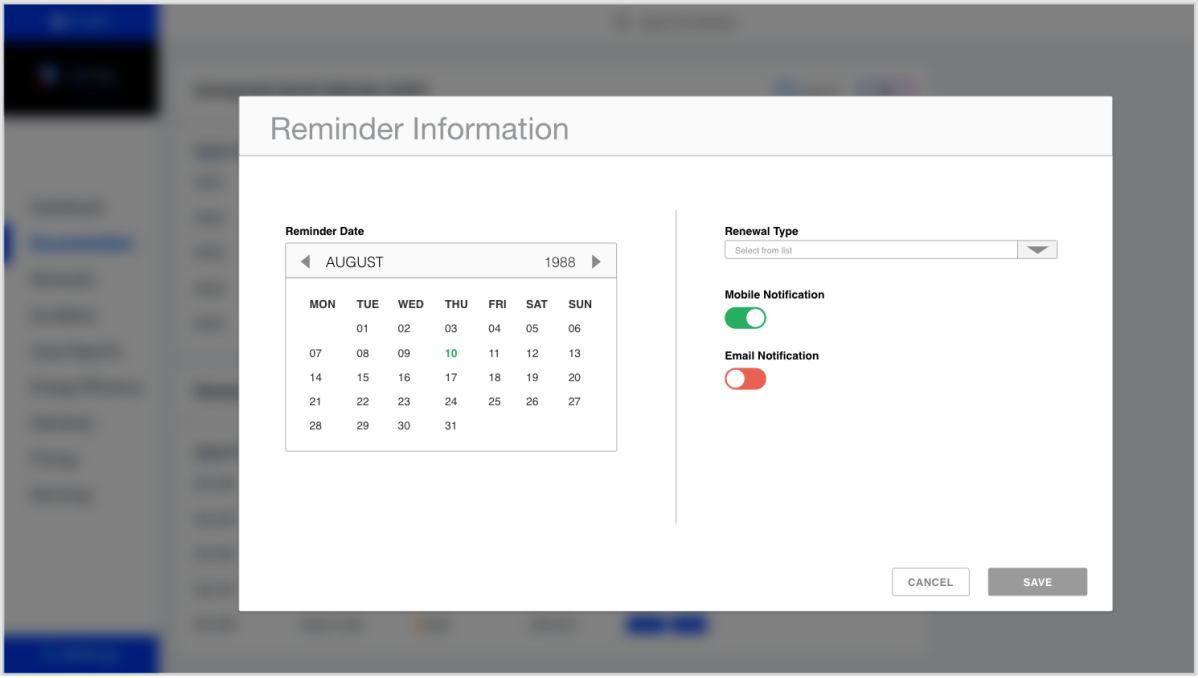


2.4.2 Vehicle Renewal Reminder

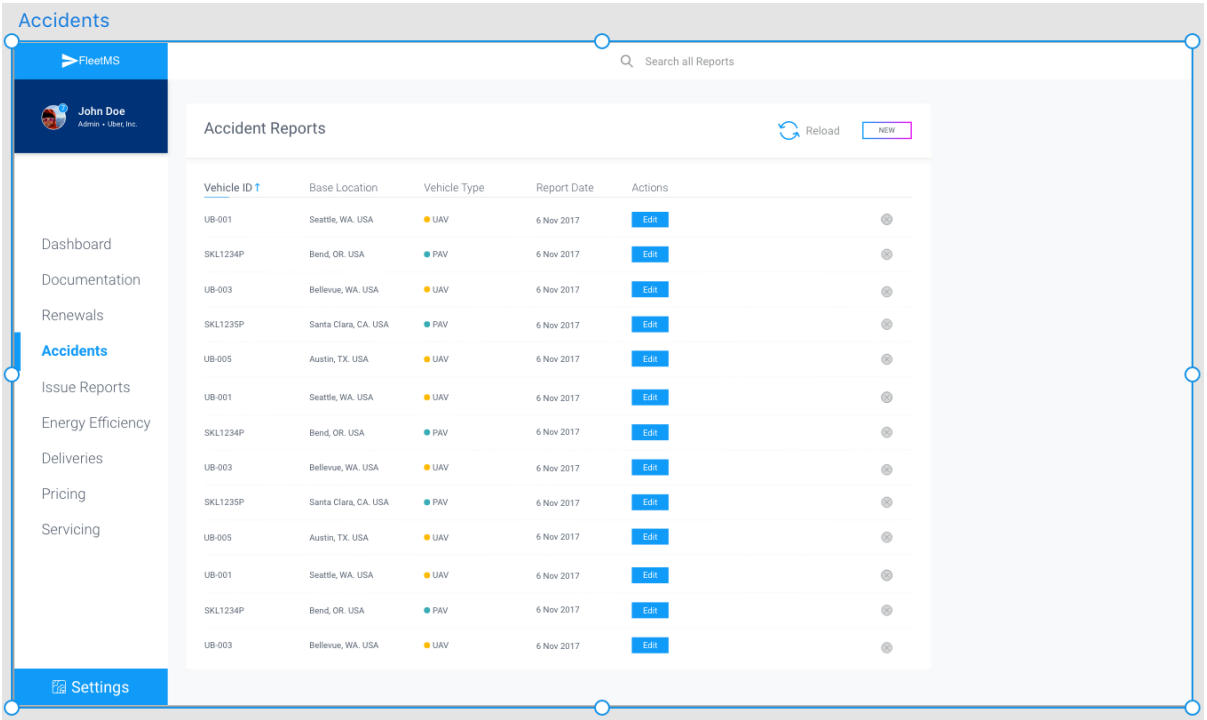
Renewals

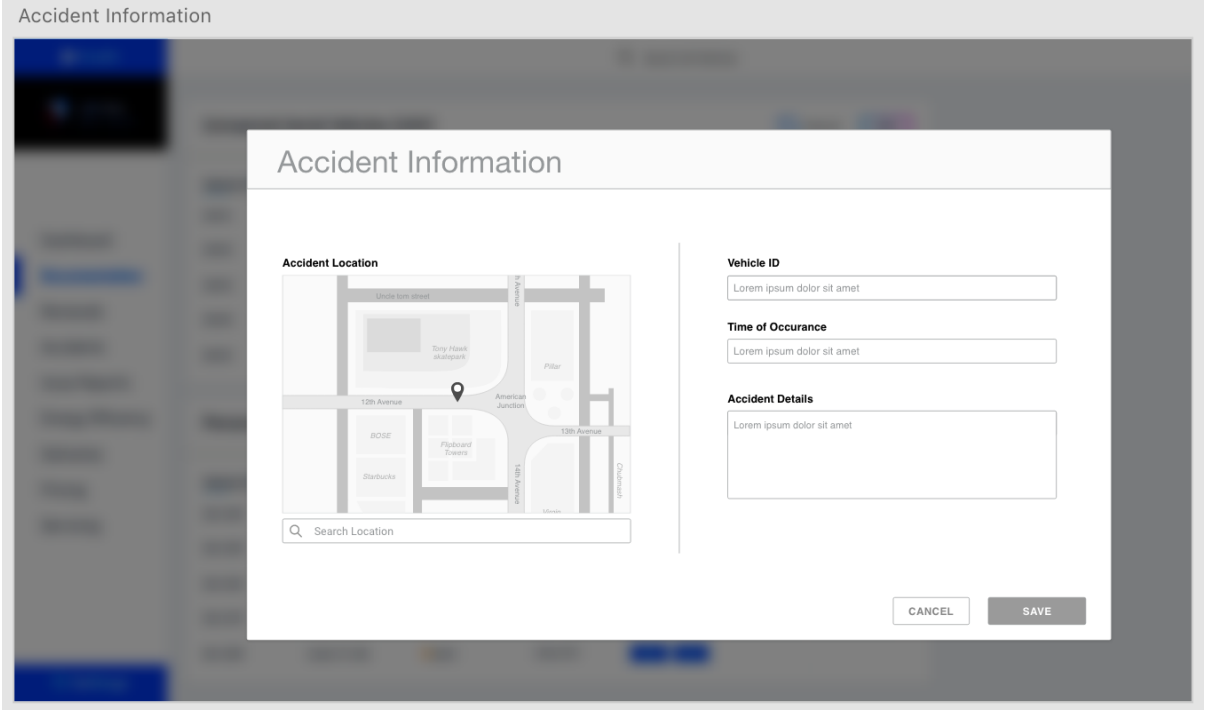


Renewal Reminder

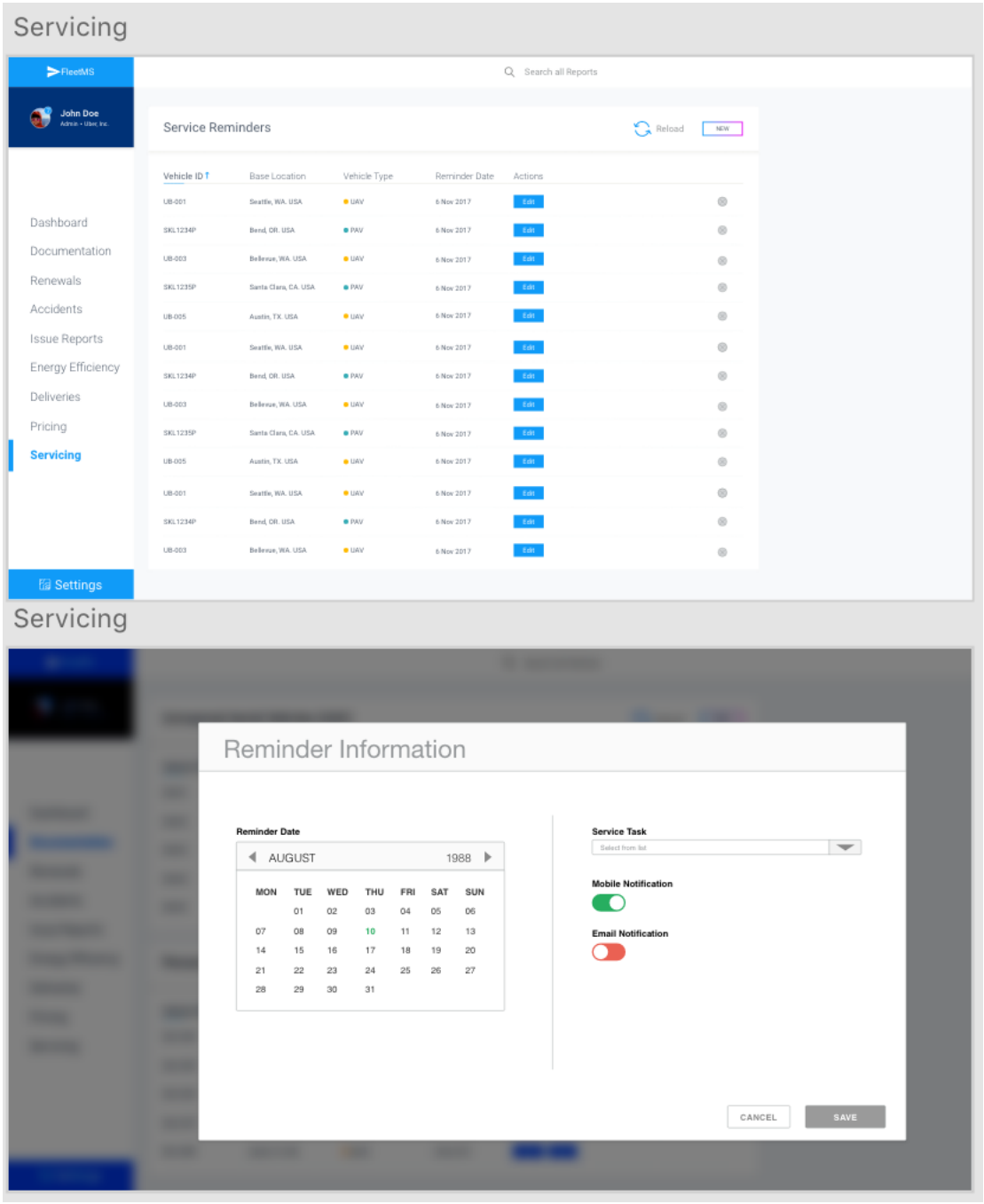


2.4.3 Accident Documents

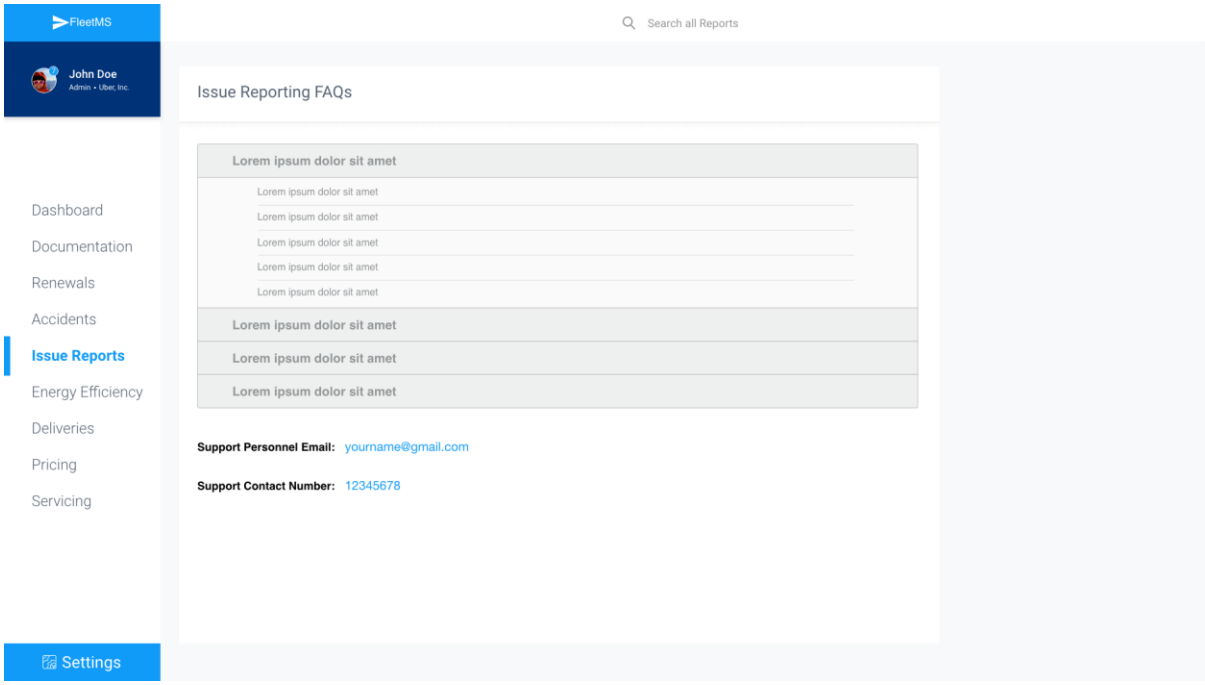




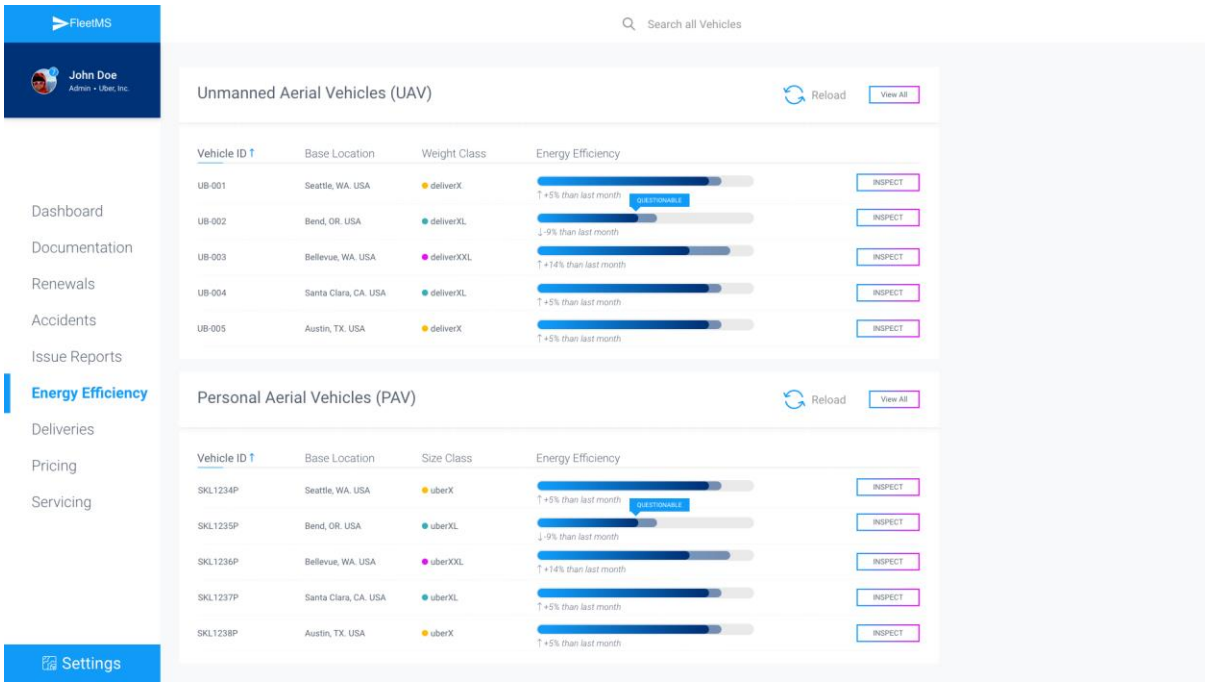
2.4.4 Service Reminder



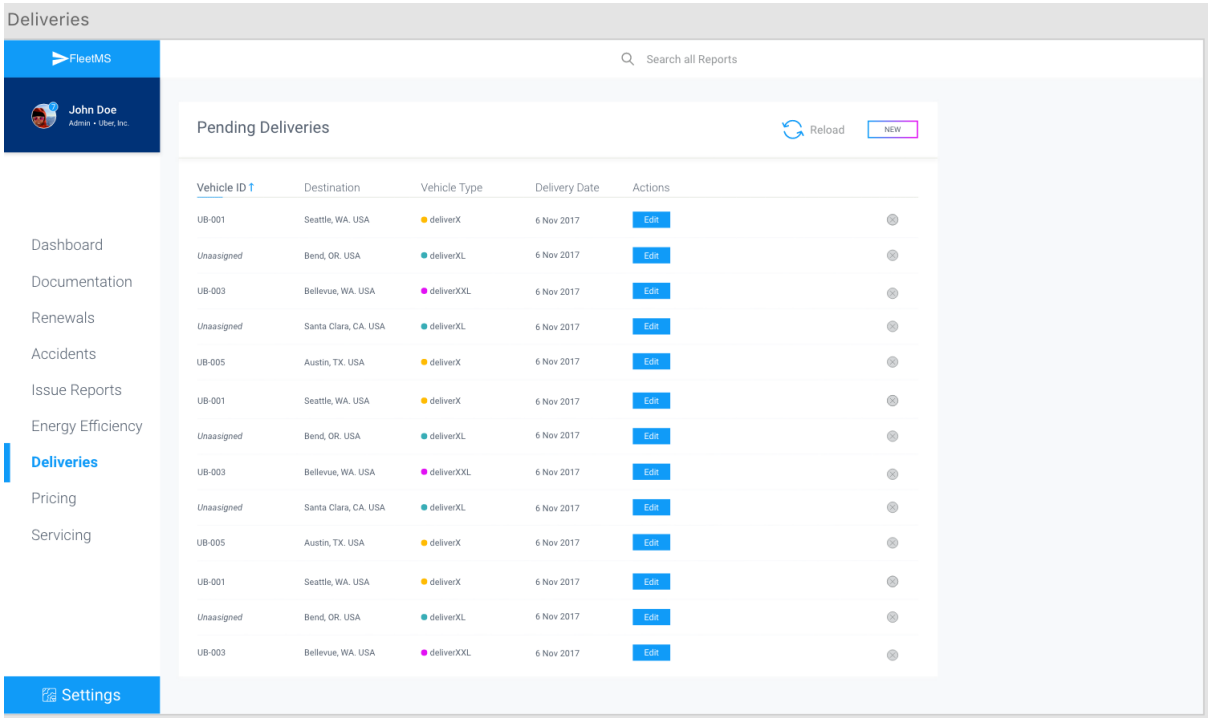
2.4.5 Issue Reporting

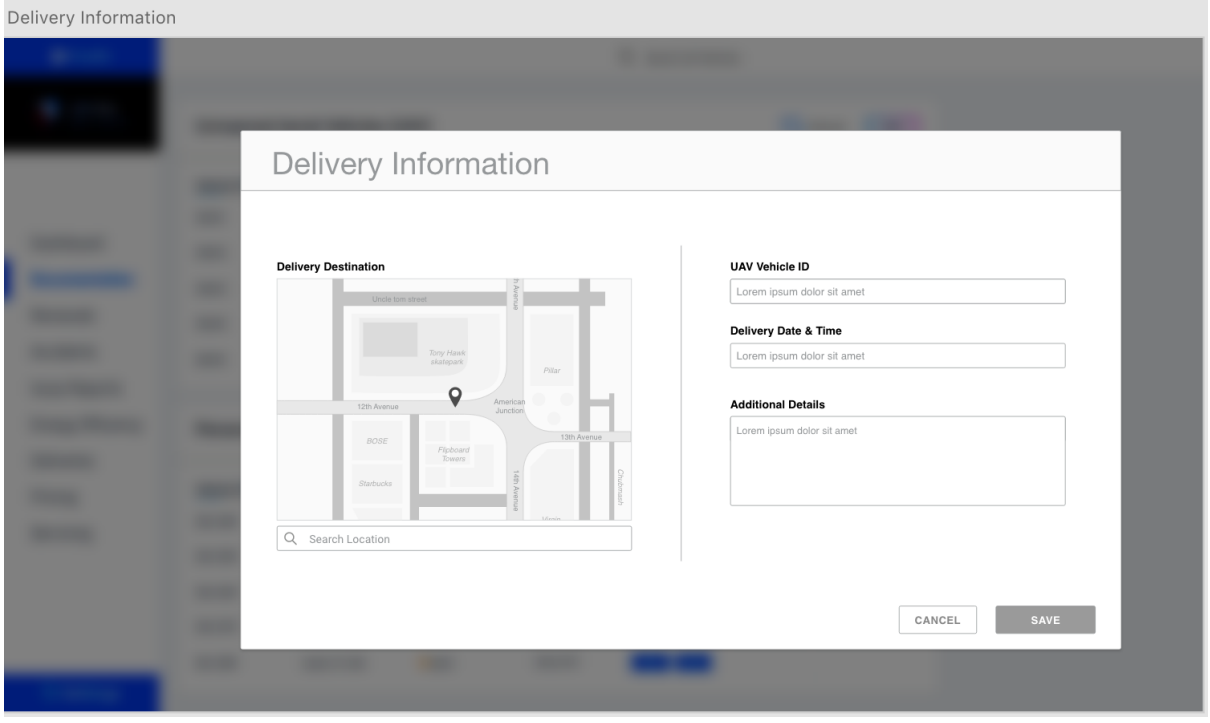


2.4.6 Battery Management

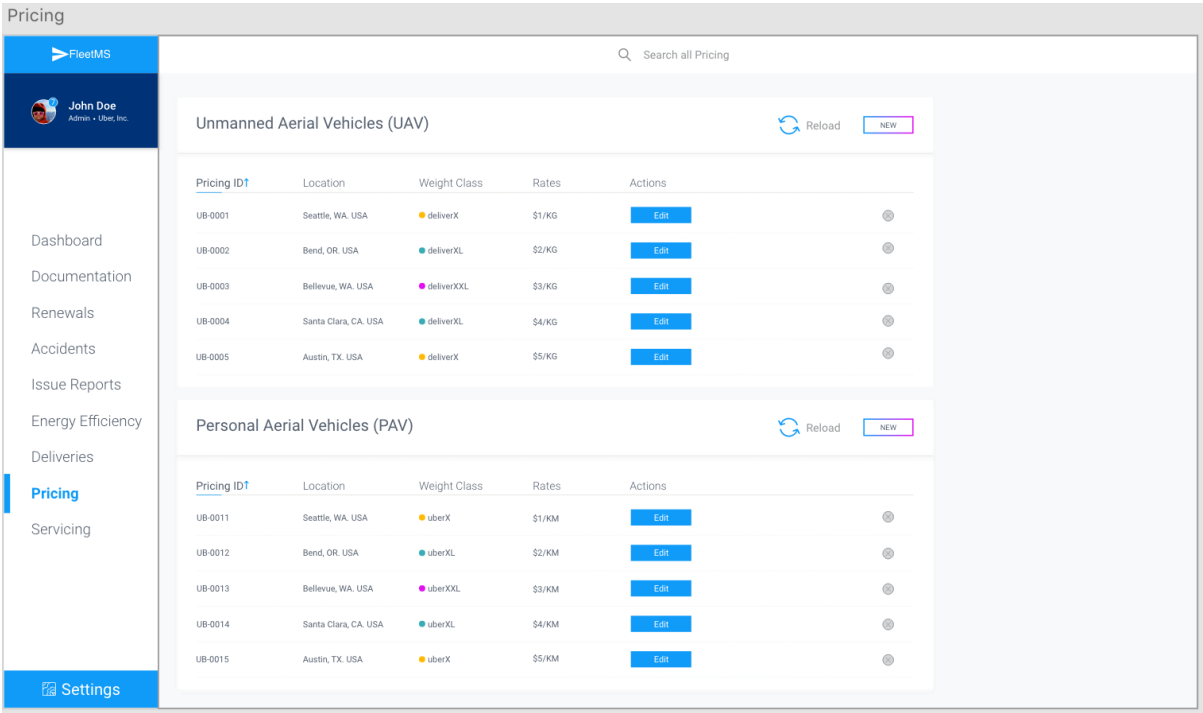


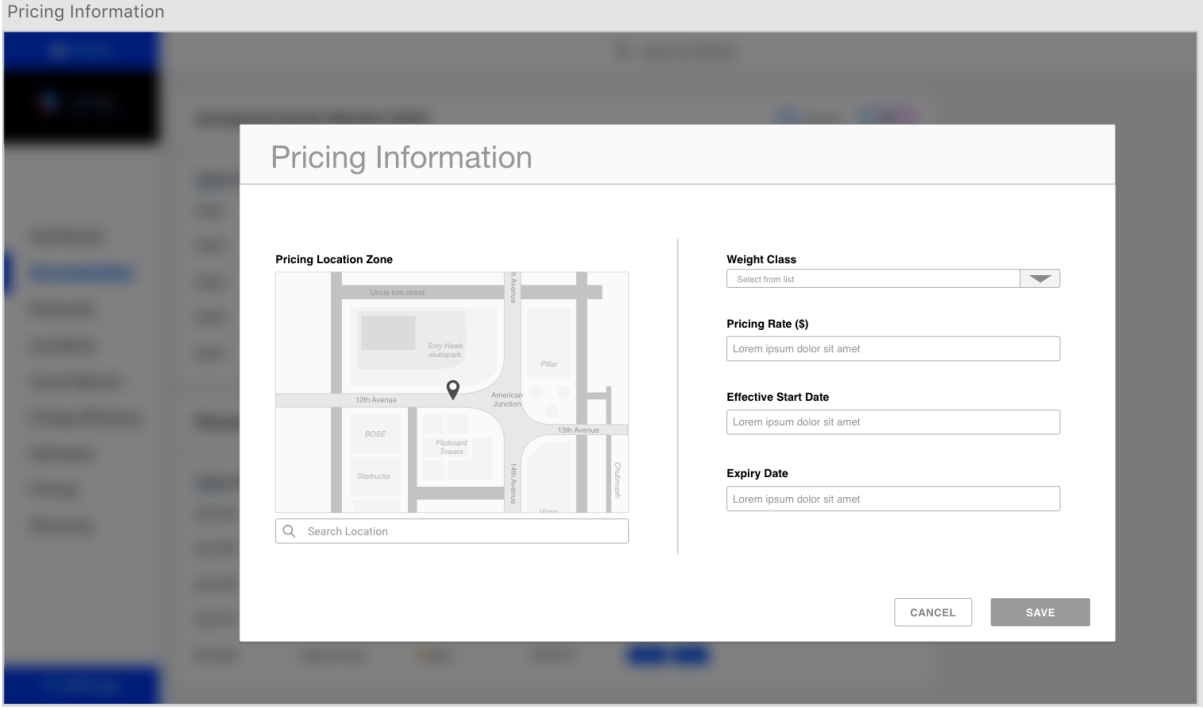
2.4.7 Delivery Management





2.4.8 Pricing Management





3 AIRBOOKING

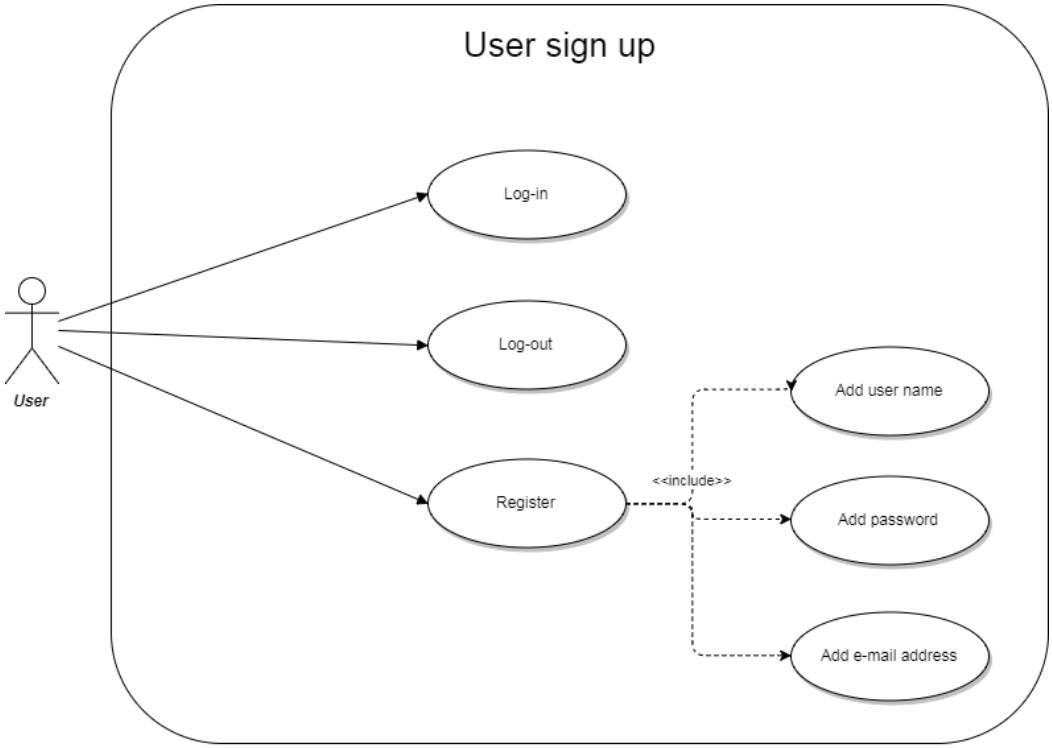
The AIRBOOKING system is a mobile application that allows the public to book a vehicle to transport themselves or to transport goods.

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

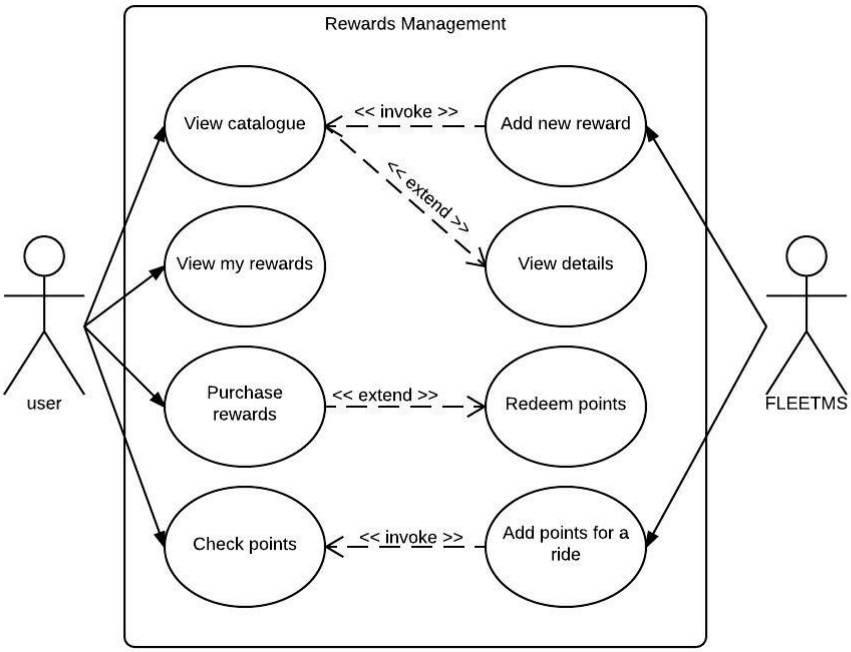
3.1.1 User Sign-up

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



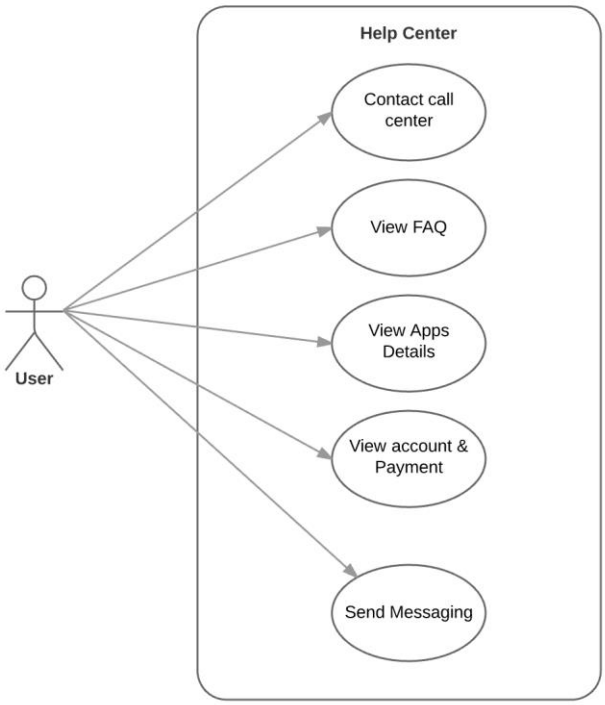
3.1.2 Rewards management

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.



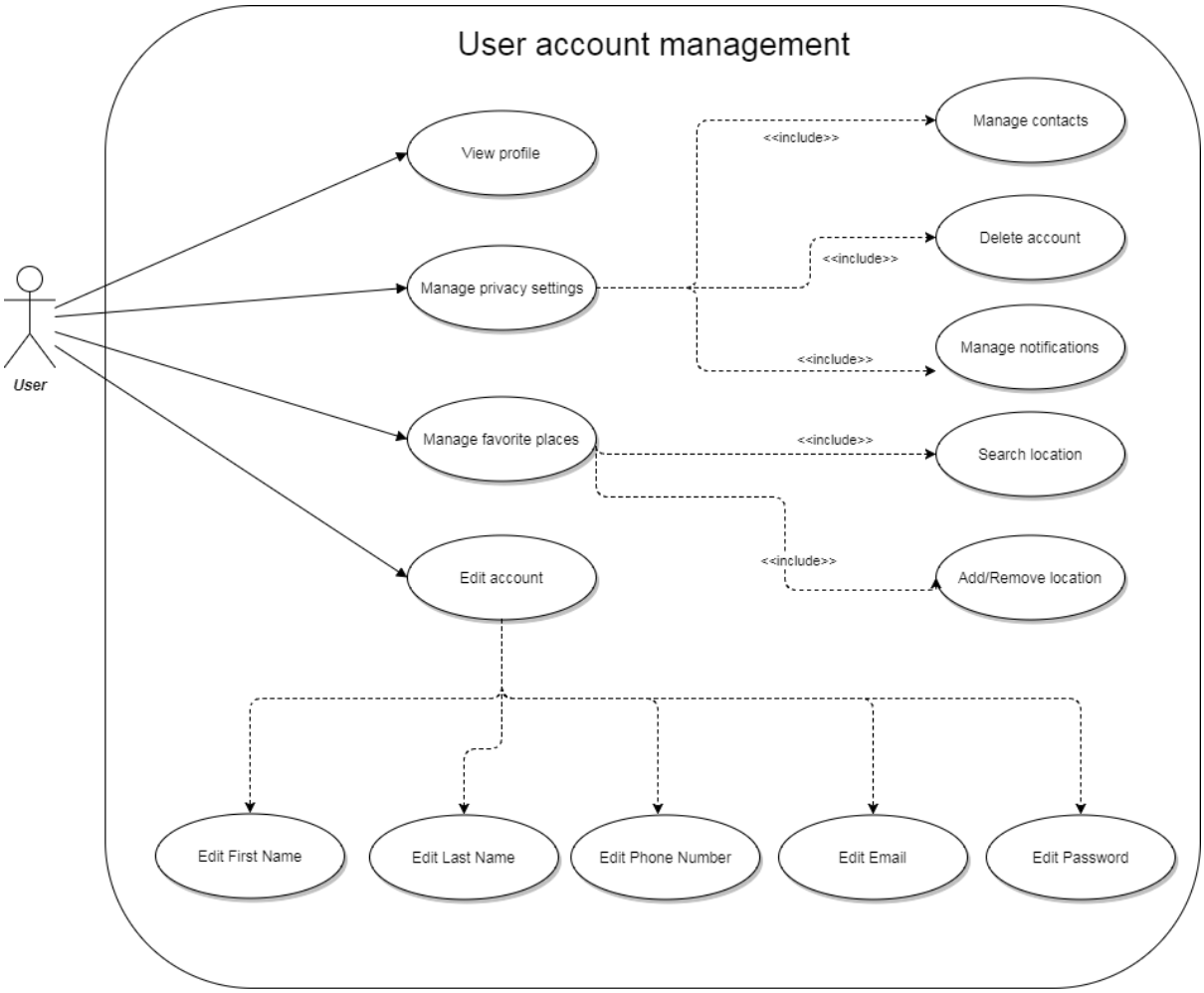
3.1.3 Help Center

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.



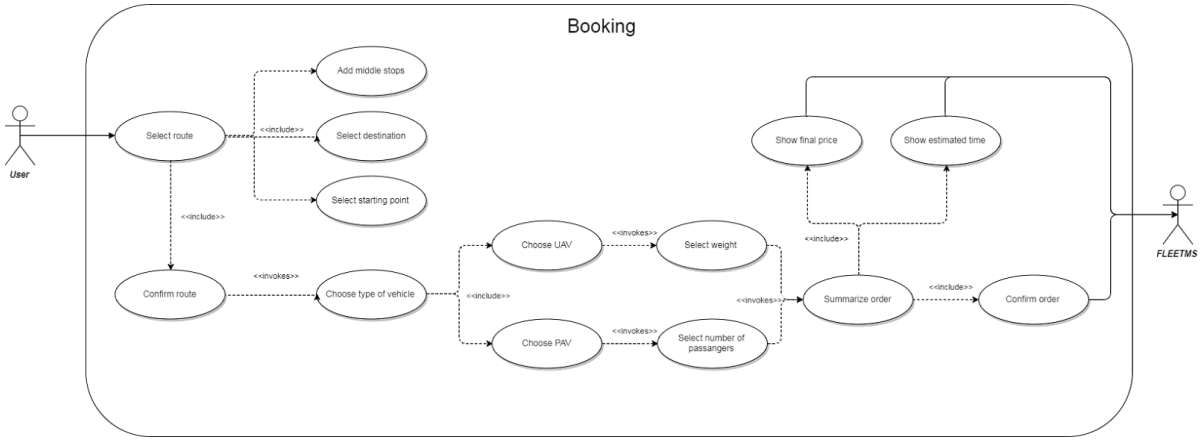
3.1.4 User account management

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



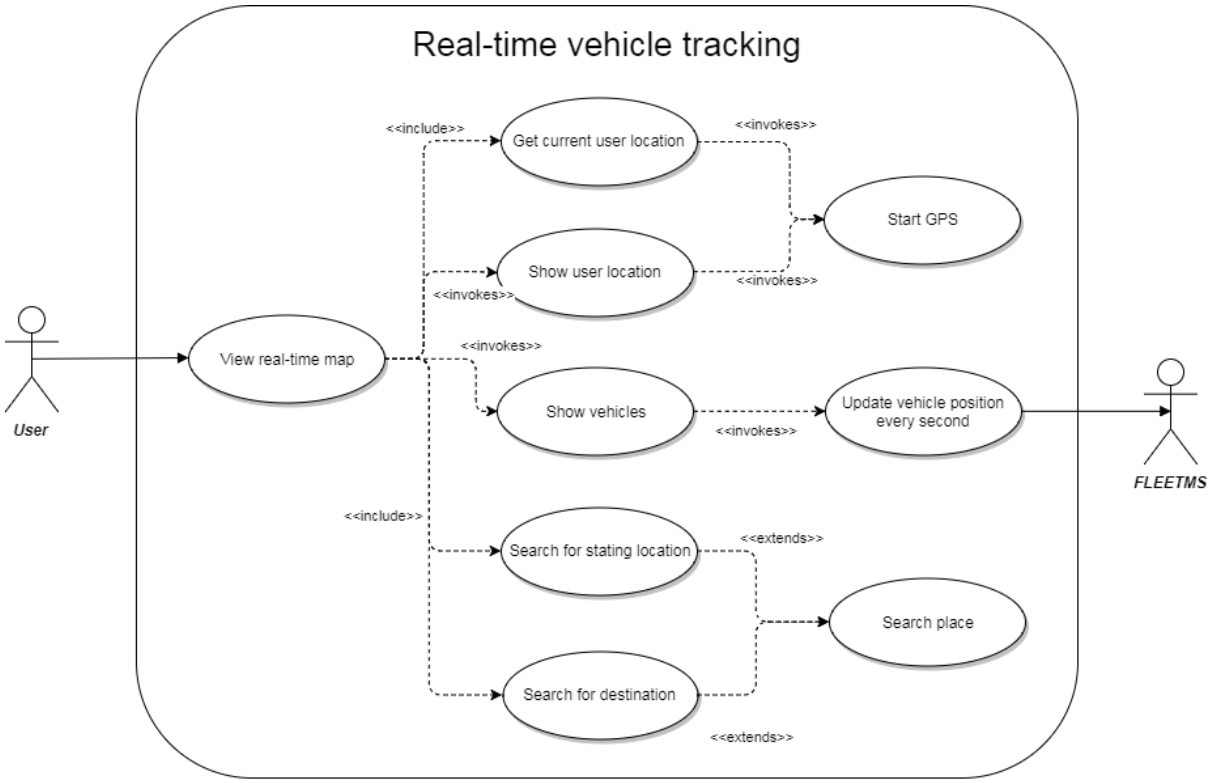
3.1.5 Vehicle booking

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

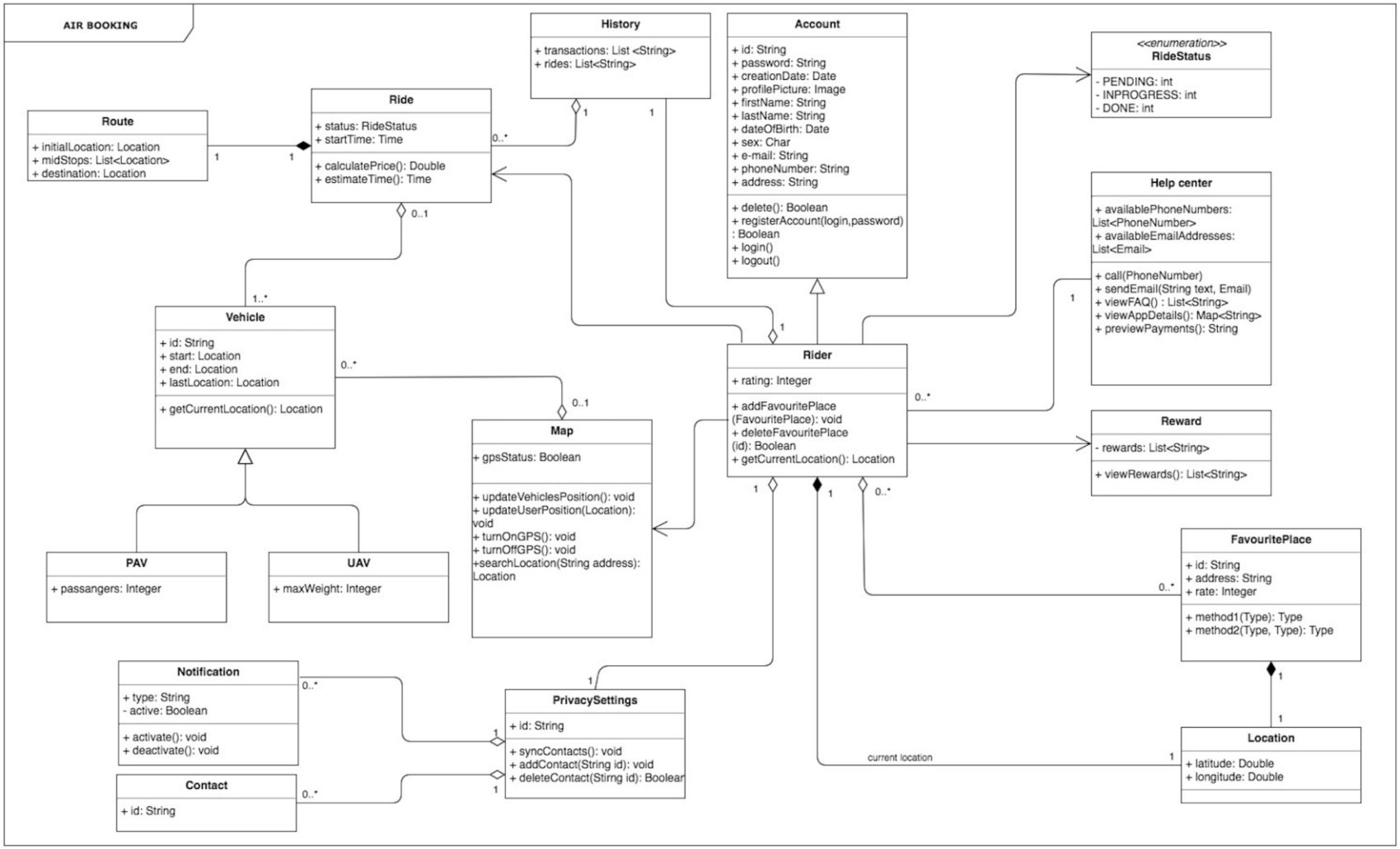
The real-time vehicle tracking provides an interactive real-time map for the user. The map makes it more convenient to book, preview and manage a ride. User can also easily, localize the route and himself on the map.



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

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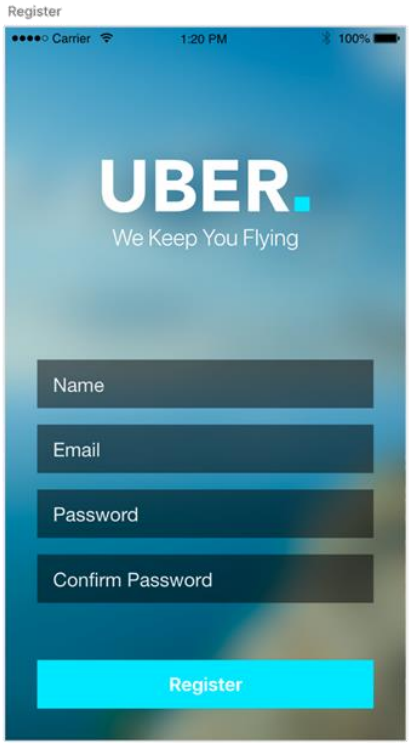
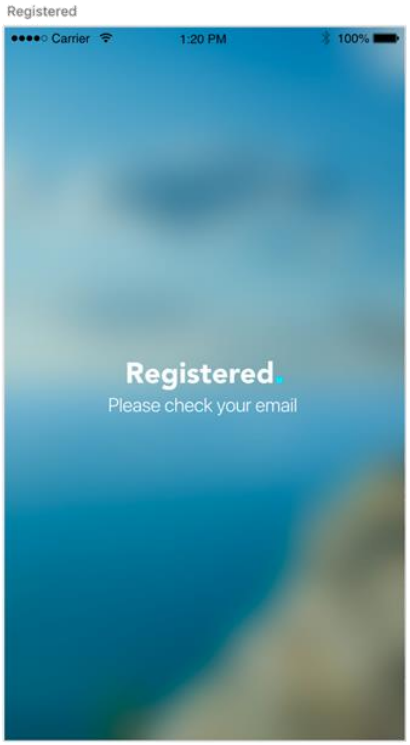
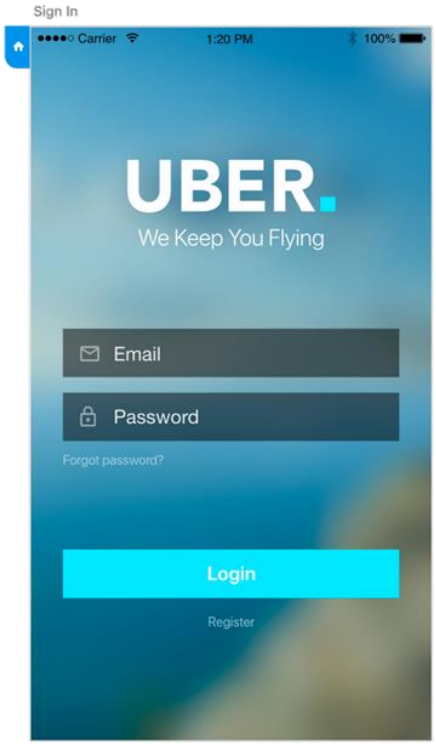
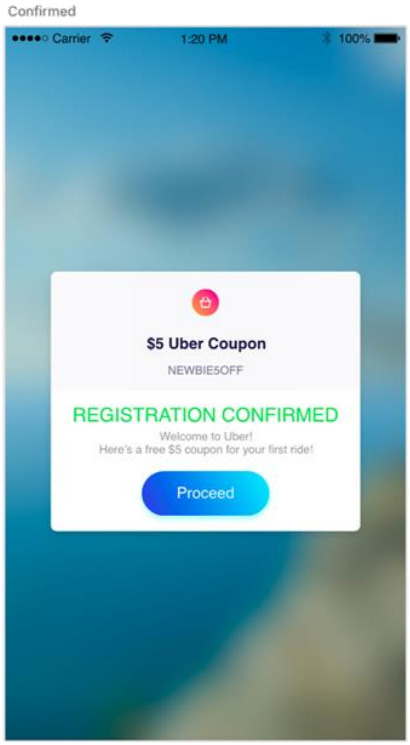
A fully interactive (clickable) mockup of the AIRBOOKING application is available online at: https://xd.adobe.com/view/112682c1-3dd9-4769-8339-986329ebc208/.

3.4.1 User Signup

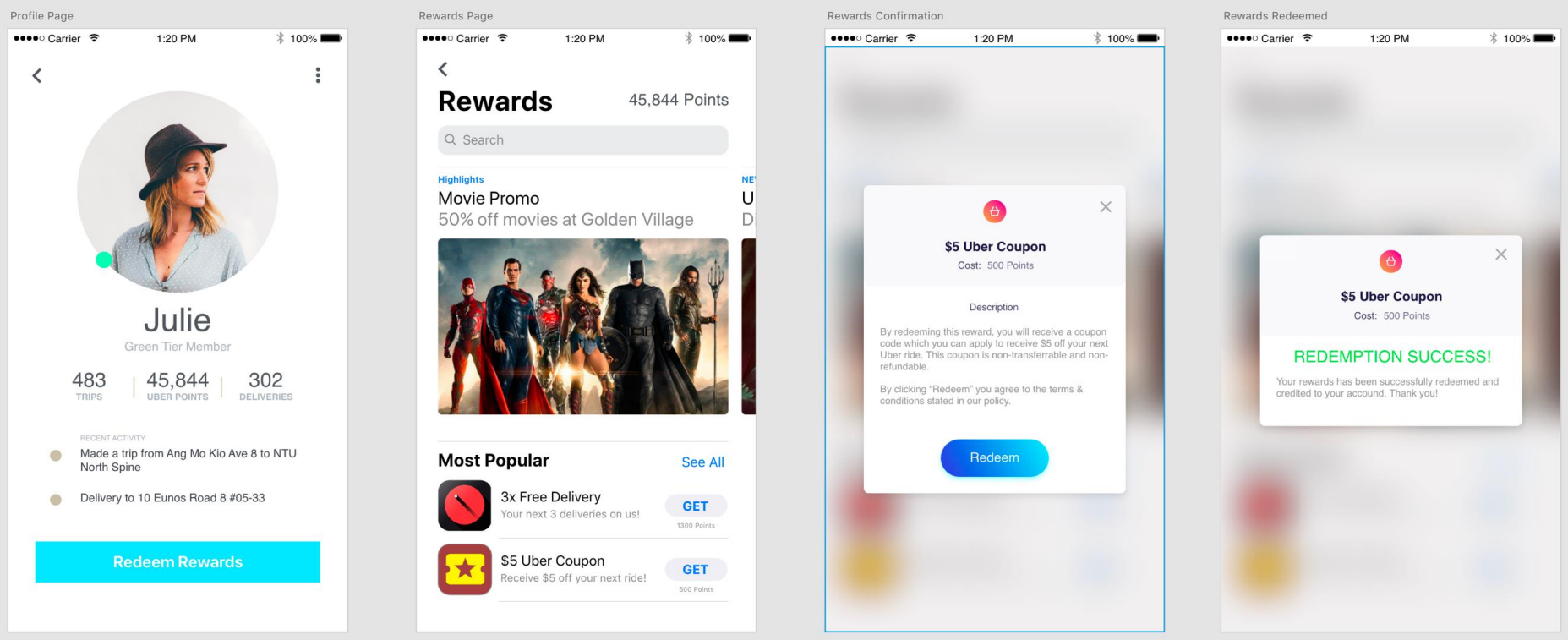




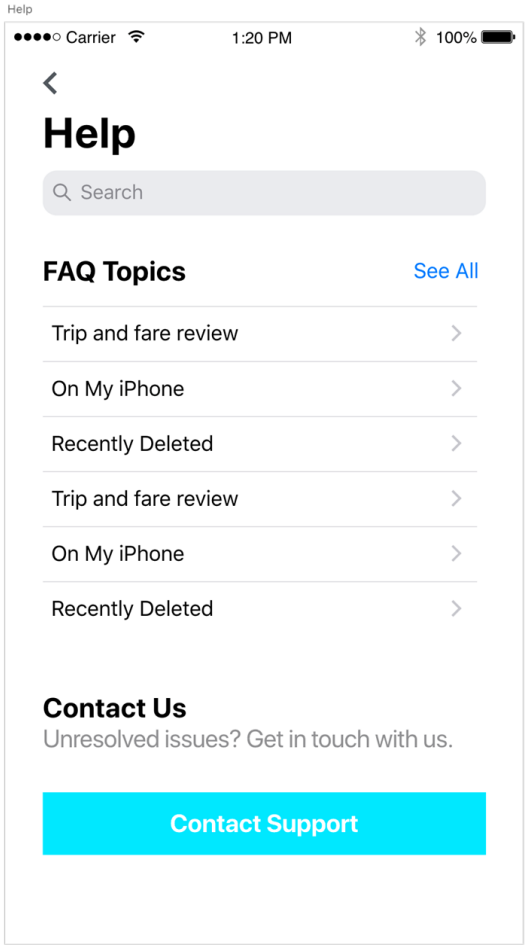




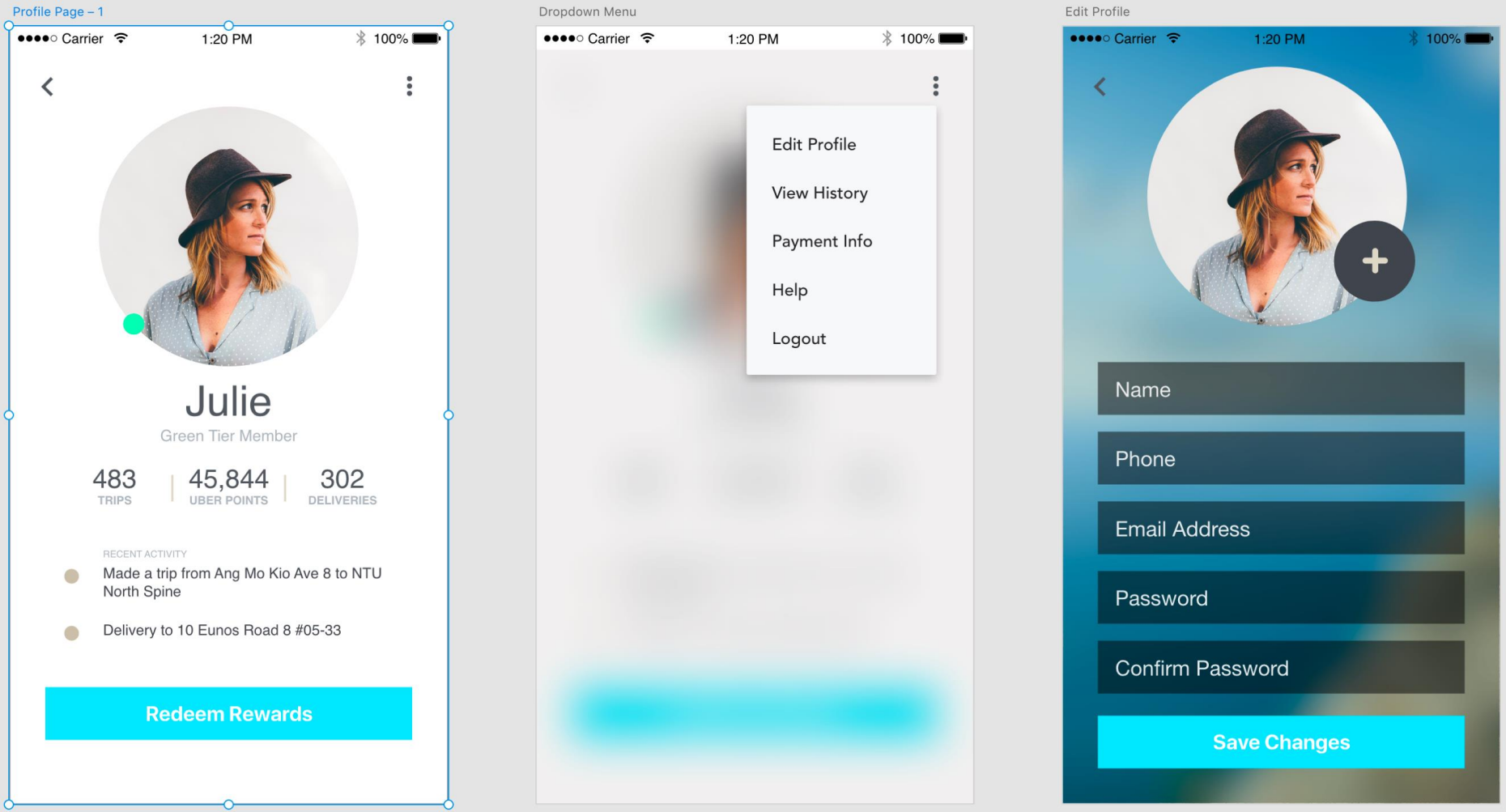
3.4.2 Rewards Management



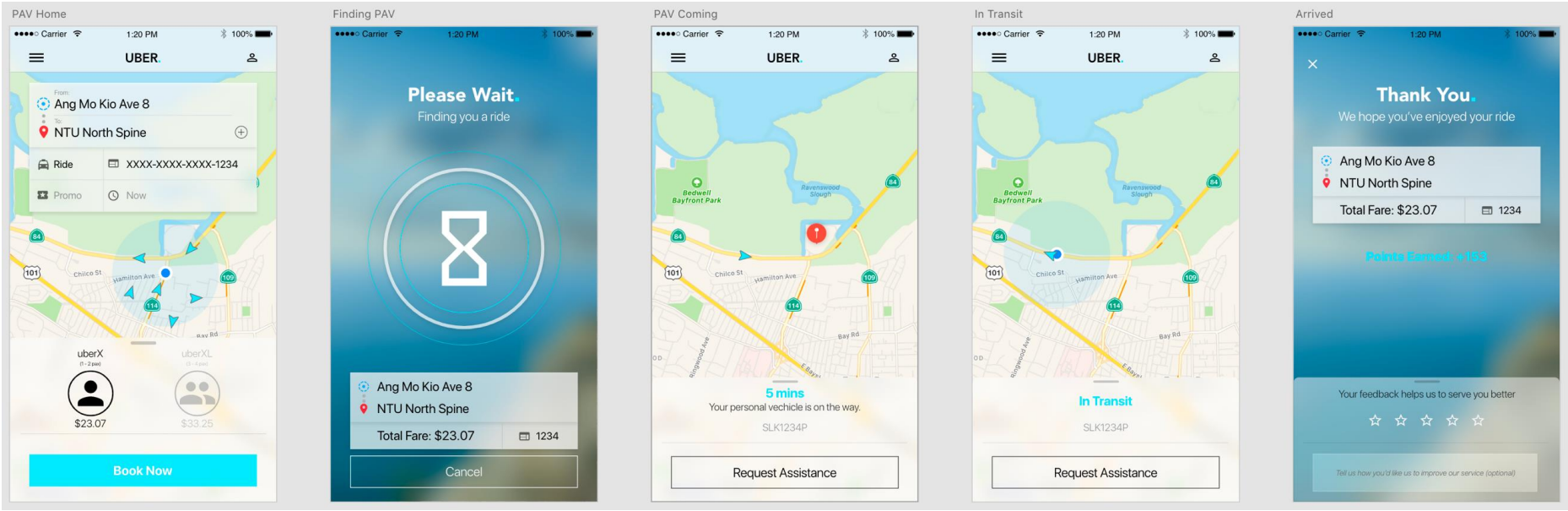
3.4.3 Help Centre



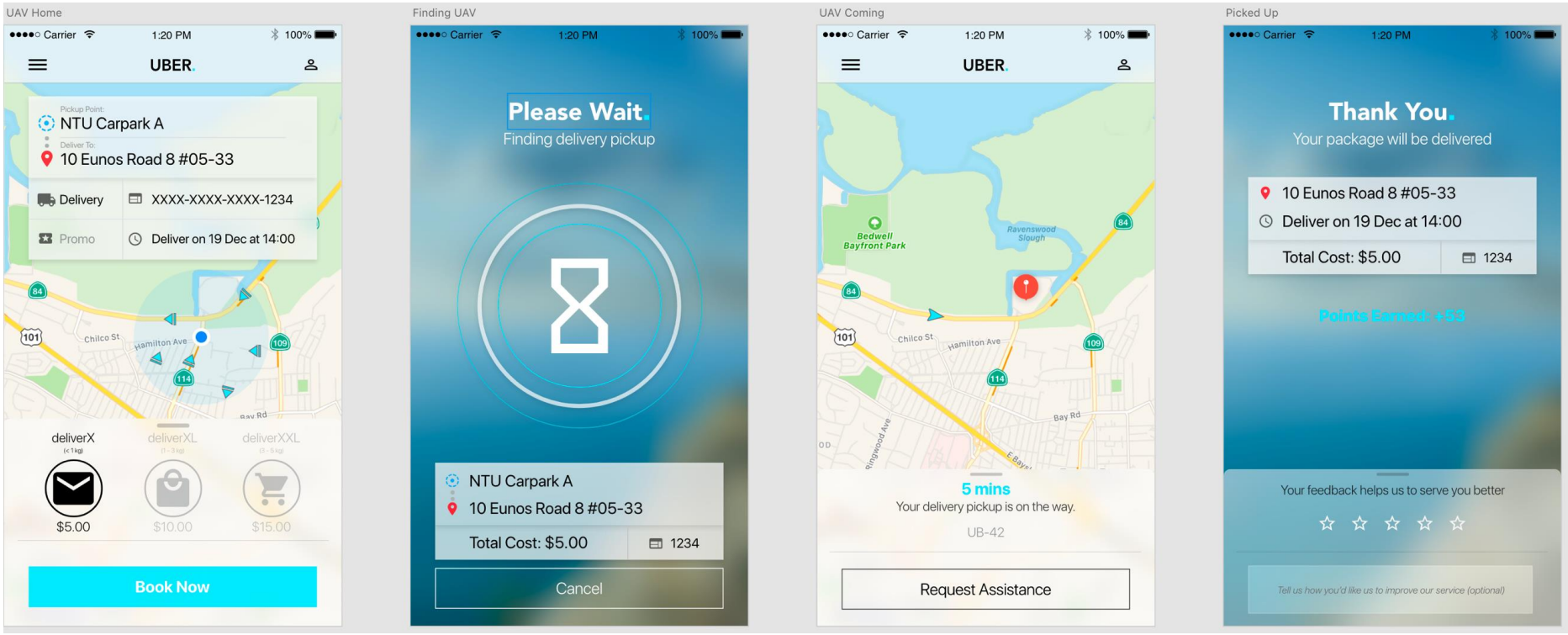
3.4.4 User Account Management



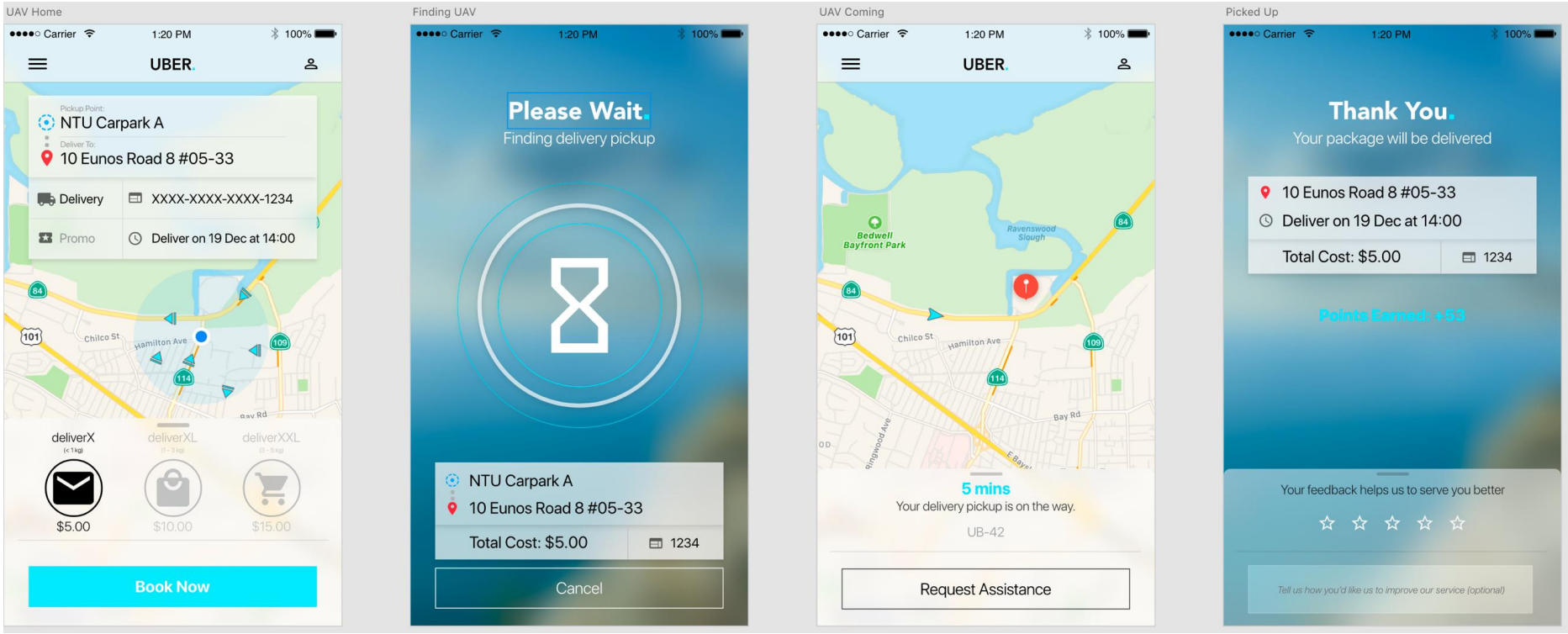
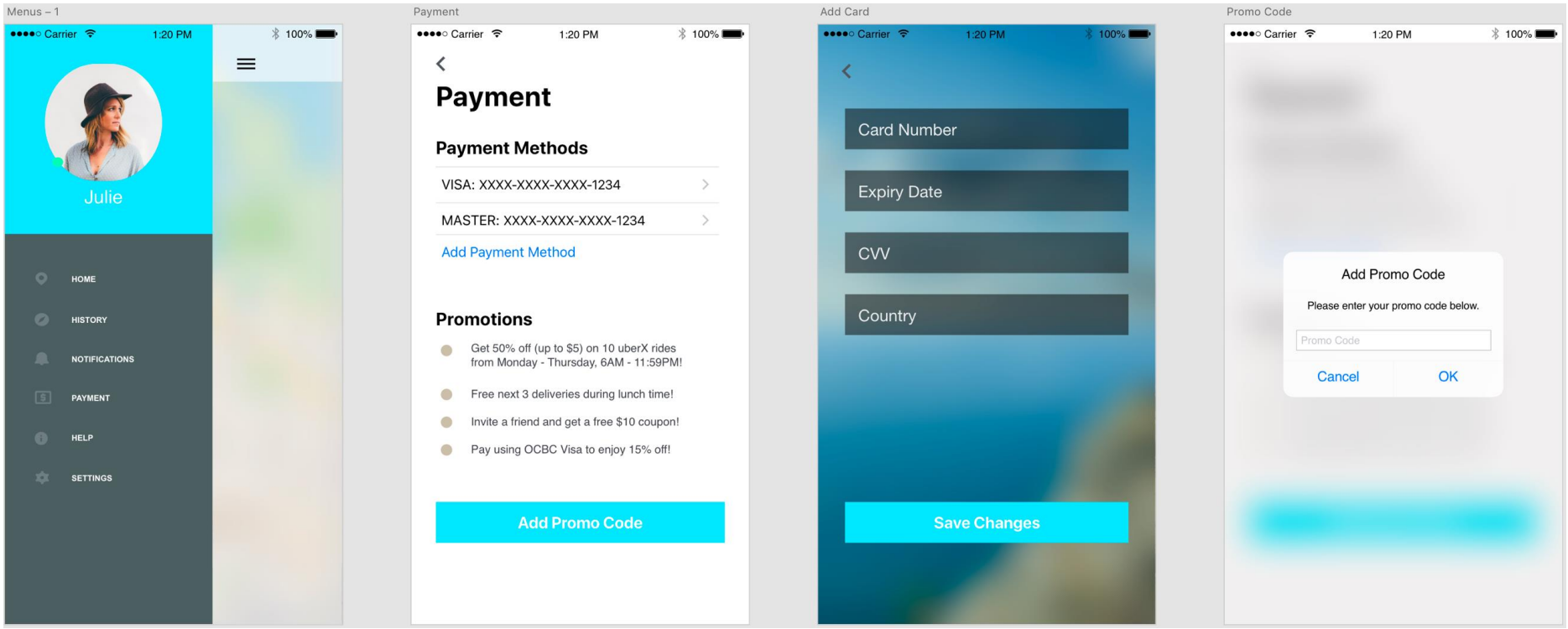
3.4.5 PAV Booking



3.4.6 UAV Booking



3.4.7 Ride History



3.4.8 Payment Settings