

# **System Requirements Document 2.0**

**Client: Daintree (Group 7)**

**Project: Ocean Data Aggregation**

## **Horizon Software (Group 2)**

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## Revision History

Name	Date	Reason for Changes	Version
RD – Initial Document	Jan. 30 2019	Transcribing RFP and elicitation notes to a structured document.	RD 0.7
RD – Formatted Sections	Feb. 1 2019	Formatting notes into sections and filling out more info.	RD 0.8
RD – First Complete Draft	Feb. 4 2019	All sections complete, ready for team review.	RD 0.9
RD – Final Copy	Feb. 5 2019	All sections complete and reviewed, ready for client reading.	RD 1.0
RSD 0.9 – First Draft	Feb. 12 2019	Made changes that Daintree requested when reviewing RD 1.1.	RSD 0.6
RSD 0.9 – Second Draft	Mar. 11 2019	Added diagrams.	RSD 0.7
RSD 0.9 – Third Draft	Mar. 12 2019	Consistency changes.	RSD 0.8
RSD 0.9 – Complete Draft	Mar. 12 2019	Final consistency changes, ready for client review.	RSD 0.9
RSD 1.0 – Post Feedback Draft	Mar. 18 2019	Added the changes requested by Daintree after RSD 0.9 feedback meeting.	RSD 0.9.1
RSD 1.0 – Final Copy	Mar. 19 2019	Final consistency changes, ready for client review.	RSD 1.0
RSD 1.8 – Post Feedback	Mar. 25 2019	Added changes based off of feedback from Daintree and Zane	RSD 1.8
RSD 1.9 – Traceability Draft	Mar. 26	Added traceability matrices and test cases	RSD 1.9
RSD 2.0 – Final Copy	Mar. 27 2019	All sections completed and reviewed, ready for final submission	RSD 2.0

# 1 Introduction

## 1.1 Purpose

This document describes the requirements and features for the Daintree Ocean Data Aggregation Project. The purpose of the Daintree Ocean Data Aggregation project is to improve the accessibility of Daintree's collection of data. Currently, the lack of a unified solution for data visualization hinders the usability of Daintree's collection of data. The Daintree Ocean Data Aggregation Project will result in the creation of a new data visualization system. The new system will use Daintree's existing API, a set of functions that programmatically access Daintree's data, (hereafter referred to as the API) for data retrieval.

## 1.2 Project Scope

The Daintree Ocean Data Aggregation Project has two main objectives. The first objective is to visualize the data sets returned by the API. Currently when a user asks to visualize a new data set, Daintree must develop a unique visualization solution. A centralized system to generate visualizations would benefit Daintree by reducing cost and time spent developing unique solutions for their customers. The second objective is to make visualizations easily accessible to a user through a single interface. Making visualizations accessible would help more people make use of Daintree's collection of data and would align with Daintree's mission of supporting ocean education and public awareness.

The Daintree Ocean Data Aggregation project will look at the current system and the way that the current system allows a customer to visualize one or more data sets. The Daintree Ocean Data Aggregation Project does not need to change the way that sensor readings are retrieved from sensors, how this data is stored, or how it is accessed from Daintree.

## 1.3 Glossary

<b>Account Creation Page</b>	Page where a user can create a new account.
<b>Account Credentials</b>	What a user enters into the Daintree Ocean Dashboard to log in to their account.
<b>Account Information</b>	Information associated with a user's account. Such as first name, last name, email, and password.
<b>Account Information Page</b>	Page where account information can be viewed and modified.
<b>Admin Page</b>	Page only accessible to an Admin User. Where sensor data classifications can be modified, other user accounts can be deleted, and other user accounts can be upgraded to an Admin User.
<b>Admin User</b>	A user type. An employee of Daintree who uses the Daintree Ocean Dashboard.
<b>Annotation</b>	Text comment which is linked to a single data point. Only Paid Users and Admin Users can create, delete, edit, and view annotations.
<b>Application Programming Interface (API)</b>	A set of functions that programmatically access the contents of Daintree's databases. The API is an existing system which is maintained by Daintree.

<b>Client</b>	Daintree Ocean Division is the client for the Daintree Ocean Data Aggregation project.
<b>Daintree</b>	Client for the Ocean Data Aggregation Project.
<b>Daintree's Collection of Data</b>	Refers to all the measurements made by Daintree's sensors and stored by Daintree.
<b>Daintree Ocean Dashboard (DOD)</b>	The name of the system being specified in this document.
<b>Dashboard Page</b>	Main page of the Daintree Ocean Dashboard where a user can filter/search/view visualizations.
<b>Data Classification</b>	Every sensor has a data classification within the Daintree Ocean Dashboard. A sensor's data classification determines which user types are permitted to visualize a data set from the sensor. The classifications are: All users or Paid/Admin Users.
<b>Data Point</b>	A sensor reading at a specific point in time. Consists of a row in a Daintree database table, a single image, or a single frame of a video.
<b>Data Set</b>	A set of multiple data points from a single sensor ranging over a user-specified time range.
<b>Designer</b>	The designers are Horizon Software
<b>Filter Criteria</b>	Filter criteria are created by a user to view a list of sensors matching the specified criteria. The sensors in the returned list can then be selected to generate a visualization of a data set. Filter criteria consist of location, sensor type, and time range.
<b>Filter</b>	A user selects one or more filter criteria to match with one or more data sets.
<b>Free User</b>	A user type. A user who accesses the Daintree Ocean Dashboard free of charge. They do not have access to annotations and can only create visualizations from a subset of Daintree's sensors. A Free User can also be a user who has not created an account yet.
<b>Horizon Software</b>	A team of dedicated systems analysts and developers in the Software Engineering and Computer Science programs at the University of Victoria. Authors of this document.
<b>Landing Page</b>	Page where an incoming user begins. From the landing page, a user can access the login page and account creation page.
<b>Login Page</b>	Page where a user can enter their account credentials and gain access to the Daintree Ocean Dashboard.
<b>Paid User</b>	A user type. A user who pays for access to all sensors, and the annotations feature. A user becomes a Paid User by upgrading from a Free User.

<b>Saved Visualizations List</b>	Page with a list of saved visualizations for a user.
<b>Search</b>	A user provides the Daintree Ocean Dashboard with one or more keywords to match with one or more data sets.
<b>Sensor</b>	A tool that measures a single property of the physical world. Sensors create readings. Every sensor is uniquely identifiable through the API.
<b>Sensor Type</b>	A class of sensor. Some sensor type examples include: temperature, pressure, imagery, video, and radiation.
<b>User</b>	All user types. This includes Free Users, Paid Users, and Admin Users.
<b>User Interface (UI)</b>	The interface through which the user interacts with the software.
<b>Visualization</b>	A visual or graphical presentation of at least 1 and at most 50 data sets. A visualization of a temperature data set consists of a graph of temperature against time. A temperature data set can be combined with a pressure data set on the same graph. Images and videos cannot be combined with any other data set. A visualization of an image consists of rendering the image for the user. A visualization of a video consists of rendering and playing the video for the user.

## 1.4 References

[1] Daintree Request for Proposals, [Online]

Available: <https://sites.google.com/view/daintree-company/documents>

[2] Daintree Ocean Division, [Online]

Available: <https://sites.google.com/view/daintree-company/home>

[3] Daintree Elicitation notes, [Online]

Available: [https://kerfootj.github.io/seng321\\_designer/docs/Daintree%20Elicitation%20Notes.pdf](https://kerfootj.github.io/seng321_designer/docs/Daintree%20Elicitation%20Notes.pdf)

[4] Requirements Document 1.0 [Online]

Available: [https://kerfootj.github.io/seng321\\_designer/docs/Requirements.pdf](https://kerfootj.github.io/seng321_designer/docs/Requirements.pdf)

[5] Requirements Document 1.1 [Online]

Available: <https://sites.google.com/view/daintree-company/home>

[6] RD 1.1 Feedback Meeting Notes [Online]

Available:

[https://docs.google.com/document/d/1tiMmNPBjXOErl2PWAl03rgOZH\\_CATZy3is\\_ENmKHwTqs/edit](https://docs.google.com/document/d/1tiMmNPBjXOErl2PWAl03rgOZH_CATZy3is_ENmKHwTqs/edit)

[7] RSD 0.9 Feedback Meeting Notes [Online]

Available:

[https://docs.google.com/document/d/1Vu10AeFcuYLfuzBNfcic3\\_vXKyXwbPJ1t2sImbPw5YA/edit](https://docs.google.com/document/d/1Vu10AeFcuYLfuzBNfcic3_vXKyXwbPJ1t2sImbPw5YA/edit)

## 1.5 Overview

This document contains 7 sections and 2 appendices. Section 2 includes an overview of the current system, main product features are described along with project stakeholders, user types and assumptions about the API. Section 3 describes functional requirements, associated use cases, and associated sequence diagrams. Section 4 contains software systems the Daintree Ocean Dashboard (DOD) must interact with. Section 5 outlines non-functional requirements. Section 6 shows analysis models along with descriptions. Finally, section 7 includes UI mock-ups with associated scenarios.

## 2 Overall Description

### 2.1 Product Perspective

Daintree maintains a network of sensors that measure various ocean conditions such as salinity, acidity and temperature. The measurements are collected, processed and stored by Daintree. The data stored by Daintree is accessible through their API. The existing system for creating visualizations involves making a custom application for each user which is inefficient and costly for Daintree.

The Daintree Ocean Dashboard (DOD) is the system currently being developed by Horizon Software to replace Daintree's existing system for data visualization. The DOD will provide a single interface where one or more data sets can be visualized. With the implementation of the DOD, no more custom applications will need to be developed.

The primary stakeholders for the Daintree Ocean Data Aggregation Project include Daintree, the users of the DOD, and the Horizon Software development team. Potential users of the DOD include the general public, students, scientists, research and educational organizations, ocean sensor suppliers, and environmental agencies.

### 2.2 Product Features

The major features of the DOD being developed by Horizon Software can be summarized as follows:

- Managing and creating accounts.
- Visualizations of one or more data sets.
- Creating, editing and viewing annotations on visualizations.
- Searching/Filtering for sensors by location, sensor type, and time range.
- Saving and loading visualizations.

### 2.3 User Types and Characteristics

There are three user types for the DOD: Free User, Paid User and Admin User. The user types are outlined below.

#### 2.3.1 Free User

A Free User does not pay to use the DOD. A Free User typically consists of anyone who is curious about Daintree's collection of data. A Free User has limited access to Daintree's collection of data. A Free User may wish to save visualizations for future reference. A Free User is not interested in reading or making annotations. It is assumed that each Free User will have varying levels of domain knowledge.

#### 2.3.2 Paid User

A Paid User pays to use the DOD. A Paid User has the same capabilities as a Free User, plus two additional features. The first additional feature is that a Paid User has access to Daintree's entire collection of data. The second additional feature is that a Paid User will also be able to view, create,

edit, and delete annotations. A Paid User can be, but is not restricted to, a member of the general public, a student, a researcher, or a business.

### 2.3.3 Admin User

An Admin User manages the DOD. An Admin User has the same capabilities as a Paid User, with four additional features. The first additional feature is that an Admin can modify the data classification of data sets. The second additional feature is that an Admin User can also delete any annotations from any user. The third additional feature is that an Admin User can delete other Admin, Free and Paid Users' accounts. Finally, an Admin User can upgrade a Free User to an Admin User.

## 2.4 Operating Environment

The DOD will request data from Daintree using the API. The DOD must therefore conform to the specifications for the API requests.

The users of the DOD are expected to access the DOD interface through their desktop machines. The DOD interface will therefore need to be accessible on major desktop environments: Windows, Mac OS, Linux.

## 2.5 Design and Implementation Constraints

Daintree is very flexible regarding the design and implementation of the DOD. The only constraint on the DOD is that it must be built on top of Daintree's existing API:

- C-1: The DOD must request data sets from Daintree's existing API.

## 2.6 Domain Assumptions

The DOD will be based on the following assumptions and dependencies as outlined below.

### 2.6.1 Assumptions

In order to generate reliable visualizations, the data sets sent to the DOD from the API must be reliable. If the API responses contain inconsistencies, the visualization being generated will be inconsistent. If the API responses contain errors, the visualizations will contain errors. It is not the responsibility of the DOD to notify Daintree of errors or correct these errors.

- A-1: The API responses provided by the API are free of inconsistencies and errors.
- A-2: Daintree never deletes a data set from their collection of data.
- A-3: Daintree will never delete an existing data set.
- A-4: Horizon Software will add the first Admin user's account manually when creating the DOD.
- A-5: A new sensor's data classification must be classified as Paid/Admin Users by default.
- A-6: Annotations on video are associated with a specific point in time in the video.

### 2.6.2 Dependencies

The DOD needs to access data sets through the API. It is critical that the API is always available, and the API calls must not change. Should a change to the API specification occur, the DOD must be manually changed to match the new specification.

- D-1: The existing API is robust and consistent.

The DOD expects data sets to be returned from the API in specific data formats (e.g. JSON, JPEG). The DOD must be built to accept data formats currently provided by the API. Any new data formats provided by the API will need to be added to the DOD manually.

- D-2: The DOD depends on the existing API's responding with consistent data formats.

## 3 System Features and Requirements

This section describes the features and functional requirements of the Daintree Ocean Dashboard (DOD). Account management features allow a user to create and maintain the account they use to access the DOD. Administration features allow an Admin User to manage user accounts and select the subset of data that is available to a Free User. Visualization features are the primary purpose of the DOD and allow a user to select and visualize data sets which are retrieved from Daintree's collection of data. Annotation features allow a Paid or Admin User to create or view comments on specific data points, images and videos.

### 3.1 F-1 Account Management

#### 3.1.1 Description and Priority

A user needs to be able to create, delete and manage their own account. Without accounts and the ability to manage accounts, there would be no way to distinguish which user is which. A Free User can upgrade to a Paid User and a Paid User can downgrade to a Free User.

**Priority: Medium**

#### 3.1.2 Functional Requirements

*REQ-AM-1*

Description	A Free User must be able to create an account.
Associated Feature	F-1: Account Management
Priority	High
Rationale (Backwards Traceability)	A Free User must be able to create an account in order to begin using the Daintree Ocean Dashboard (DOD). To use the DOD the user needs an account as discussed during the initial client developer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-1: Verify if a Free User can create an account.</li> </ul>

*REQ-AM-2*

Description	A user must be able to log in to and log out of their account.
Associated Feature	F-1: Account Management
Priority	High
Rationale (Backwards Traceability)	A user must be able to log in to and out of their account in order to access the DOD as discussed during the initial client developer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-2a: Verify if a user can log out of their account.</li> <li>• TC-AM-2b: Verify if a user can log in to their account.</li> </ul>

#### *REQ-AM-3*

Description	A user must be able to delete their account.
Associated Feature	F-1: Account Management
Priority	Low
Rationale (Backwards Traceability)	A user must be able to delete their account in order to remove their personal information from the DOD if they no longer wish to use the DOD. The account deletion requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-3: Verify if a user can delete their account.</li> </ul>

#### *REQ-AM-4*

Description	A user must be able to update their account information.
Associated Feature	F-1: Account Management
Priority	Medium
Rationale (Backwards Traceability)	A user must be able to update their account information in order to keep an account name, email, or password up to date when necessary. The update account information requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-4: Verify if a user can change their account information.</li> </ul>

#### *REQ-AM-5*

Description	A Free User must be able to upgrade to a Paid User.
Associated Feature	F-1: Account Management
Priority	Medium
Rationale (Backwards Traceability)	A Free User must be able to upgrade to a Paid User in order to access the features only available to Paid Users such as annotations and all data sets. The account upgrade requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-5: Verify if a Free User can upgrade to a Paid User.</li> </ul>

#### *REQ-AM-6*

Description	A Paid User must be able to downgrade to a Free User.
Associated Feature	F-1: Account Management
Priority	High
Rationale (Backwards Traceability)	A Paid User must be able to downgrade to a Free User in order to opt out of the features only available to Paid Users such as annotations and all data sets. The account downgrade requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AM-6: Verify if a Free User can downgrade to a Paid User.</li> </ul>

*Traceability Matrix – F1: Account Management*

<b>Functional Requirement ID#</b>	<b>Associated Use Case</b>	<b>Priority</b>	<b>Test Case ID#</b>
REQ-AM-1	Use Case 1	High	TC-AM-1
REQ-AM-2	Use Case 2 Use Case 3	High	TC-AM-2a TC-AM-2b
REQ-AM-3	Use Case 4	Low	TC-AM-3
REQ-AM-4	Use Case 5	Medium	TC-AM-4
REQ-AM-5	Use Case 6	Medium	TC-AM-5
REQ-AM-6	Use Case 7	High	TC-AM-6

<b>Requirements</b>	TC-AM-1	TC-AM-2a	TC-AM-2b	TC-AM-3	TC-AM-4	TC-AM-5	TC-AM-6
REQ-AM-1	X						
REQ-AM-2		X	X				
REQ-AM-3				X			
REQ-AM-4					X		
REQ-AM-5						X	
REQ-AM-6							X

### 3.1.3 Models

*Use Case 1 – Create Account*

Actors	A Free User
Preconditions	<ul style="list-style-type: none"> <li>The Free User has navigated to the account creation page from the landing page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The Free User enters their account information</li> <li>The Free User submits their account information</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The Free User's account is created</li> <li>The Free User is notified that an account has been created</li> <li>The user is logged into their account</li> </ul>
Alternate Paths	<p>2a.i. The Free User cancels account creation 2a.ii. The account is not created</p> <p>2b.i. Account information is invalid 2b.ii. The Free User is notified that their account information is invalid</p>

Use Case 1 corresponds to the following requirement:

- REQ-AM-1

*Sequence Diagram 1 – Create Account*



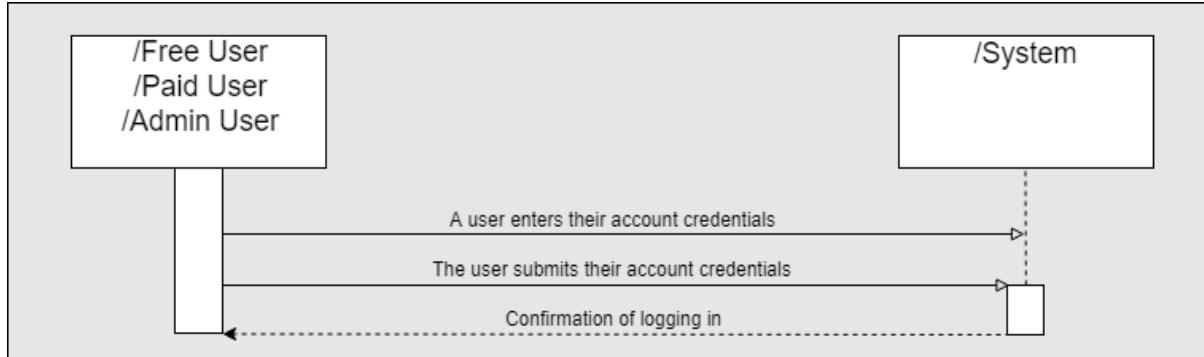
*Use Case 2 – Log In*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is not logged in</li> <li>The user has navigated to the login page from the landing page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. The user enters their account credentials</li> <li>2. The user submits their account credentials</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user is logged into their account</li> </ul>
Alternate Paths	2a.i. Account credentials are invalid 2a.ii. The user is notified that their account credentials are invalid

Use Case 2 corresponds to the following requirement:

- REQ-AM-2

*Sequence Diagram 2 – Log In*



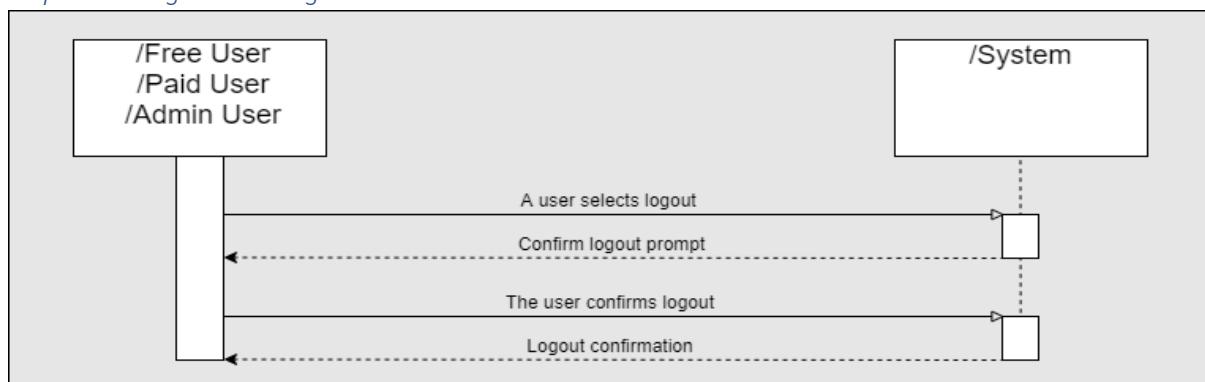
### *Use Case 3 – Log Out*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user selects log out</li> <li>The user is prompted to confirm log out</li> <li>The user confirms log out</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user is logged out of their account</li> <li>The user is on the landing page</li> </ul>
Alternate Paths	3a.i. The user cancels log out 3a.ii. The user is not logged out

Use Case 3 corresponds to the following requirement:

- REQ-AM-2

### *Sequence Diagram 3 – Log Out*



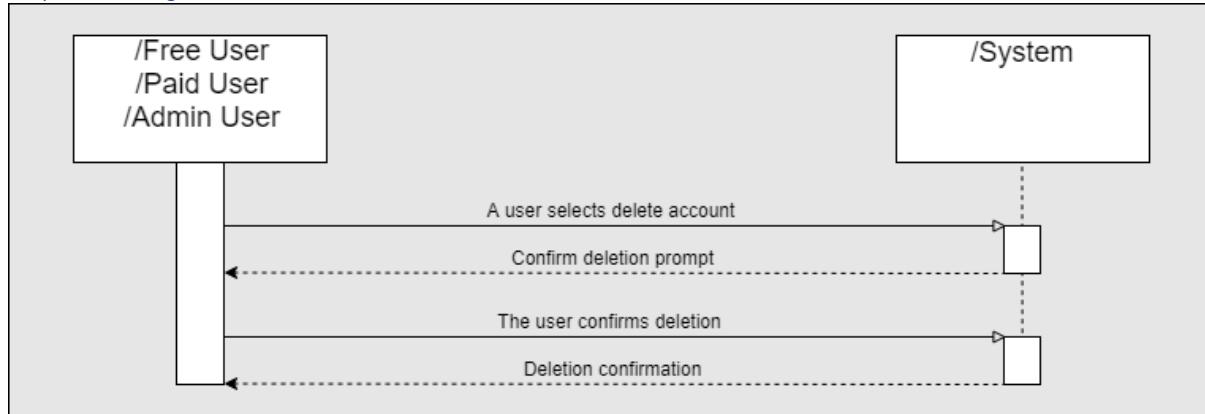
### *Use Case 4 – User Deletes Their Account*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the account information page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user selects delete account</li> <li>The user is prompted to confirm account deletion</li> <li>The user confirms the account deletion</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user's account is deleted</li> <li>The user is notified that their account was deleted</li> <li>The user is on the landing page</li> </ul>
Alternate Paths	3a.i. The user cancels account deletion 3a.ii. The user's account is not deleted

Use Case 4 corresponds to the following requirement:

- REQ-AM-3

*Sequence Diagram 4 – User Deletes Their Account*



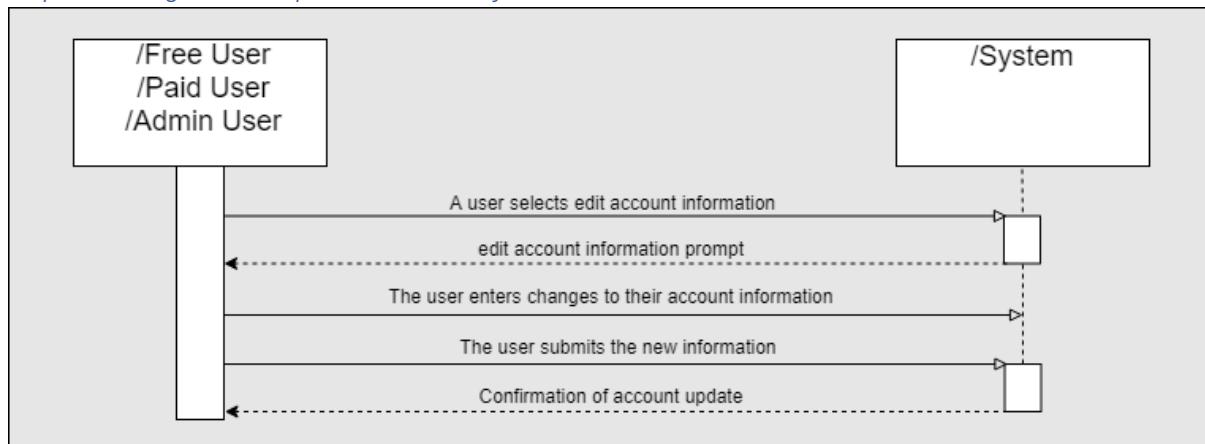
*Use Case 5 – Update Account Information*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the account information page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user selects edit account information</li> <li>The user enters changes to their account information</li> <li>The user saves changes to their account information</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user's account information is updated</li> <li>The user is notified that the update was successful</li> </ul>
Alternate Paths	3a.i. The user cancels editing their account information 3a.ii. The user's account information is not updated

Use Case 5 corresponds to the following requirement:

- REQ-AM-4

*Sequence Diagram 5 – Update Account Information*



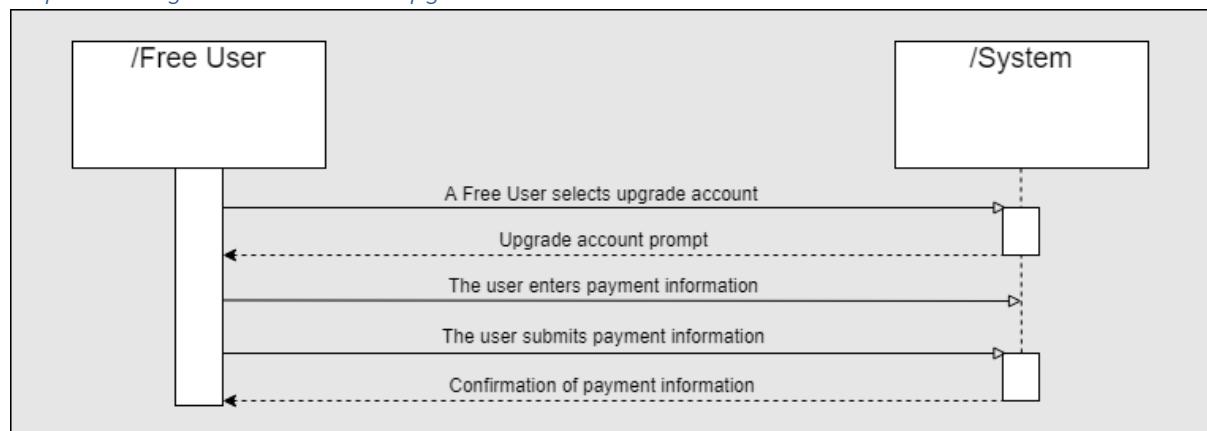
### *Use Case 6 - Free User Upgrades to a Paid User*

Actors	A Free User
Preconditions	<ul style="list-style-type: none"> <li>The Free User has a valid account</li> <li>The Free User is logged in</li> <li>The Free User has navigated to the account information page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The Free User selects upgrade account</li> <li>The Free User enters payment information</li> <li>The Free User submits their payment information</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The Free User is upgraded to a Paid User</li> <li>The Free User is notified that they are now a Paid User</li> </ul>
Alternate Paths	<p>3a.i. The Free User cancels upgrading their account      3a.ii. The Free User is not upgraded to a Paid User</p> <p>3b.i. Payment information is invalid      3b.ii. The Free User is notified that their payment information is invalid</p>

Use Case 6 corresponds to the following requirement:

- REQ-AM-5

### *Sequence Diagram 6 - Free User Upgrades to a Paid User*



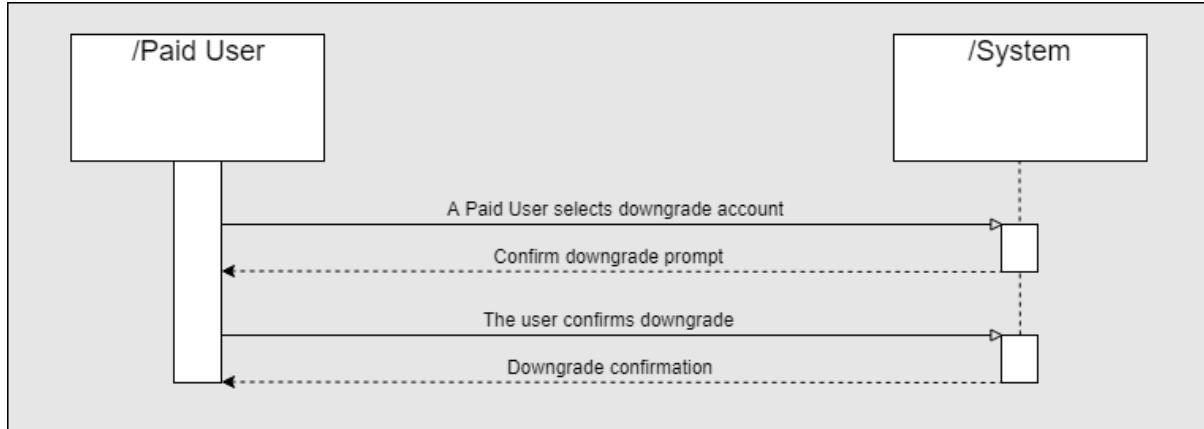
### *Use Case 7 - Paid User Downgrades to a Free User*

Actors	A Paid User
Preconditions	<ul style="list-style-type: none"> <li>The Paid User has a valid account</li> <li>The Paid User is logged in</li> <li>The Paid User has navigated to the account information page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The Paid User selects downgrade account</li> <li>The Paid User is prompted to confirm account downgrade</li> <li>The Paid User confirms account downgrade</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The Paid User is downgraded to Free User</li> <li>The Paid User is notified that they are now a Free User</li> </ul>
Alternate Paths	<p>3a.i. The Paid User cancels account downgrade      3a.ii. The Paid User is not downgraded to Free User</p>

Use Case 7 corresponds to the following requirement:

- REQ-AM-6

*Sequence Diagram 7 - Paid User Downgrades to a Free User*



### 3.2 F-2 Administration

#### 3.2.1 Description and Priority

An Admin User must be able to delete a Free, Paid or Admin User's account; this feature is critical to the maintainability of the DOD. An Admin must also have the ability to upgrade a Free User to an Admin User, and to select the subset of data which is available to Free Users.

**Priority:** High

#### 3.2.2 Functional Requirements

*REQ-AD-1*

Description	An Admin User must be able to delete a Free, Paid or Admin User's account.
Associated Feature	F-2: Administration
Priority	Medium
Rationale (Backwards Traceability)	An Admin User must be able to delete a Free, Paid or Admin User's account in order to allow Admin Users to administrate user accounts on the DOD. The delete user requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AD-1: Verify if an Admin User can delete Free, Paid, and other Admin User's accounts</li> </ul>

*REQ-AD-2*

Description	An Admin User must be able to upgrade a Free User to an Admin User.
Associated Feature	F-2: Administration
Priority	Low
Rationale (Backwards Traceability)	An Admin User must be able to upgrade a Free User to an Admin User in order to allow Daintree to add new Admin Users. The make admin requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AD-2: Verify if a Free User can be upgraded to Admin User by another Admin User.</li> </ul>

*REQ-AD-3*

Description	An Admin User must be able to modify the subset of data available to a Free User.
Associated Feature	F-2: Administration
Priority	Medium
Rationale (Backwards Traceability)	An Admin User must be able to modify the subset of data available to a Free User in order to allow Daintree to decide which sensors a user must pay to access. This was discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AD-3a: Verify if an Admin User can toggle the data classification of a sensor to “All Users”.</li> <li>• TC-AD-3b: Verify if an Admin User can toggle the data classification of a sensor to “Paid/Admin Users”.</li> </ul>

*Traceability Matrix – F2: Administration*

Functional Requirement ID#	Associated Use Case	Priority	Test Case ID#
REQ-AD-1	Use Case 8	Medium	TC-AD-1
REQ-AD-2	Use Case 9	Low	TC-AD-2
REQ-AD-3	Use Case 10	Medium	TC-AM-3a TC-AM-3b

Requirements	TC-AD-1	TC-AD-2	TC-AD-3a	TC-AD-3b
REQ-AD-1	X			
REQ-AD-2		X		
REQ-AD-3			X	X

### 3.2.3 Models

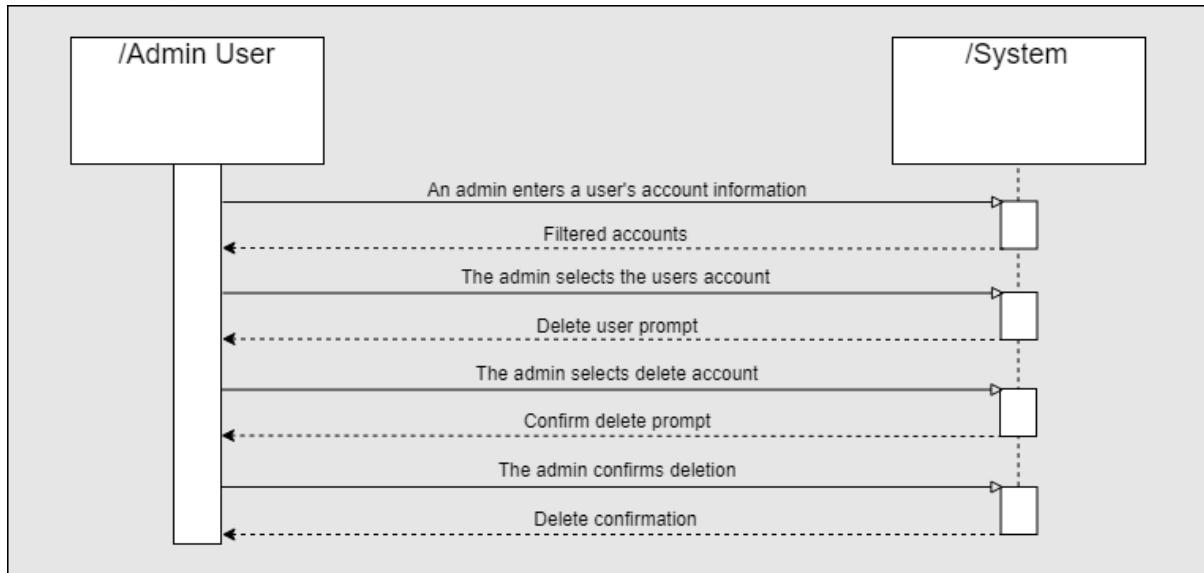
*Use Case 8 - Admin User Deletes Another User’s Account*

Actors	An Admin User
Preconditions	<ul style="list-style-type: none"> <li>• The Admin User has a valid account</li> <li>• The Admin User is logged in</li> <li>• The Admin User has navigated to the admin page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. The Admin User enters another user’s account information</li> <li>2. The Admin User selects another user’s account</li> <li>3. The Admin User selects delete account</li> <li>4. The Admin User is prompted to confirm account deletion</li> <li>5. The Admin User confirms account deletion</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>• The account is deleted</li> <li>• The Admin User is notified that the account was deleted</li> </ul>
Alternate Paths	5a.i The Admin User cancels account deletion 5a.ii The account is not deleted

Use Case 8 corresponds to the following requirement:

- REQ-AD-1

*Sequence Diagram 8 – Admin User Deletes Another User’s Account*



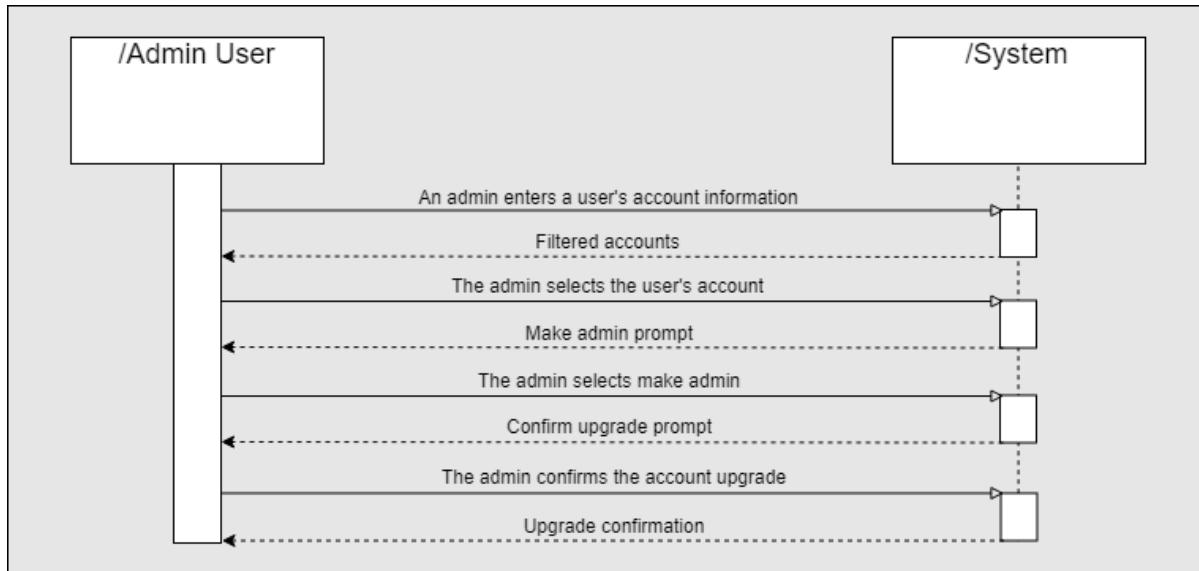
*Use Case 9 - Admin User Upgrades a Free User to an Admin User*

Actors	An Admin User
Preconditions	<ul style="list-style-type: none"> <li>• The Admin User has a valid account</li> <li>• The Admin User is logged in</li> <li>• The Admin User has navigated to the admin page</li> <li>• The user to be upgraded is a Free User</li> <li>• The Free User has a valid account</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. The Admin User enters the Free User's account information</li> <li>2. The Admin User selects the Free User's account</li> <li>3. The Admin User selects make admin</li> <li>4. The Admin User is prompted to confirm the account upgrade</li> <li>5. The Admin User confirms the account upgrade</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>• The Free User is upgraded to an Admin User</li> <li>• The Admin User is notified that the account was upgraded</li> </ul>
Alternate Paths	5a.i The Admin User cancels the account upgrade 5a.ii The Free User is not upgraded to an Admin User

Use Case 9 corresponds to the following requirement:

- REQ-AD-2

*Sequence Diagram 9 - Admin User Upgrades a Free User to an Admin User*



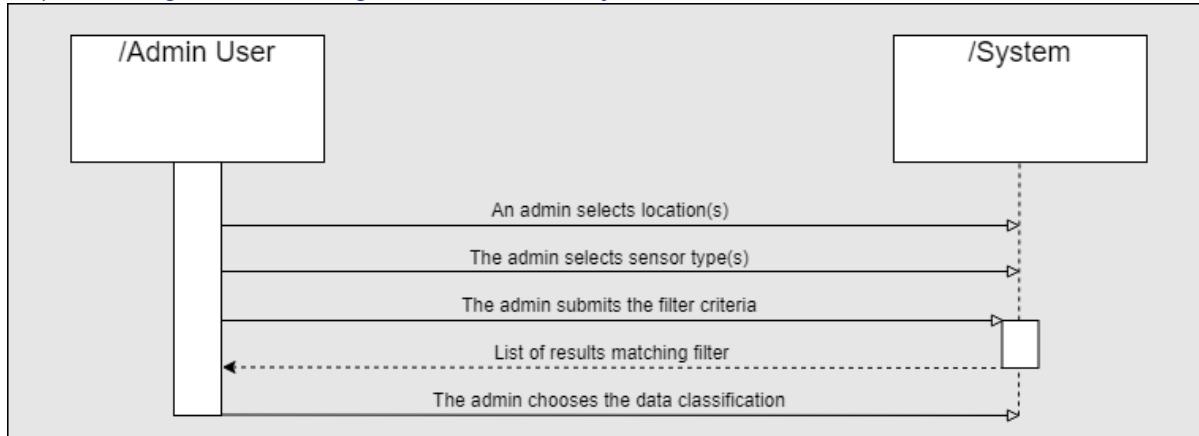
*Use Case 10 - Manage Sensor Data Classification*

Actors	An Admin User
Preconditions	<ul style="list-style-type: none"> <li>The Admin User has a valid account</li> <li>The Admin User is logged in</li> <li>The Admin User has navigated to the Admin page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The Admin User selects location(s)</li> <li>The Admin User selects sensor type(s)</li> <li>The Admin User submits the filter criteria</li> <li>The Admin User toggles the data classification for a sensor: All users, or Paid/Admin Users</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The sensor's data classification is updated</li> <li>The Admin User is notified that the change was successful</li> </ul>
Alternate Paths	N/A

Use Case 10 corresponds to the following requirement:

- REQ-AD-3

*Sequence Diagram 10 - Manage Sensor Data Classification*



### 3.3 F-3 Visualization

#### 3.3.1 Description and Priority

The visualization of one or more data sets is how a user can view and comprehend Daintree's collection of data. Without an effective way to visualize data sets, a user will be easily confused. A user must be able to visually compare different data sets. Viewing multiple data sets visualized on one visualization can help a user recognize relationships between data sets. Seeing the relationships between multiple data sets promotes education and awareness. Searching for sensors based on a certain sensor type, location or time is essential for a user who needs to find a specific data set from Daintree's collection of data.

Given a list of sensors, a user should be able to filter by location sensor type and/or time range. A user must be able to save visualizations. Saving visualizations is important because if a user finds one or more data sets and a visualization of interest, that user may desire the ability to easily view the same visualization again at a later time.

**Priority: High**

#### 3.3.2 Functional Requirements

##### *REQ-VI-1*

Description	The DOD must produce and display a visualization of one or more selected data sets
Associated Feature	F-3: Visualization
Priority	High
Rationale (Backwards Traceability)	The DOD must produce and display a visualization of one or more selected data sets in order to provide users with a meaningful interpretation of the one or more selected data sets. The visualization requirement was discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-1: Verify if a user can select one or more data sets and if the DOD displays a corresponding visualization.</li></ul>

##### *REQ-VI-2*

Description	A user must be able to play the videos collected by Daintree.
Associated Feature	F-3: Visualization
Priority	Medium
Rationale (Backwards Traceability)	A user must be able to play the videos collected by Daintree as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-2: Verify if a user can select a video and if the DOD plays the selected video.</li></ul>

*REQ-VI-3*

Description	A user must be able to display the images collected by Daintree.
Associated Feature	F-3: Visualization
Priority	Medium
Rationale (Backwards Traceability)	A user must be able to display the images collected by Daintree as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-3: Verify if a user can select an image and if the DOD displays the selected image.</li></ul>

*REQ-VI-4*

Description	A user must have the option to visualize up to fifty data sets on the same visualization.
Associated Feature	F-3: Visualization
Priority	Medium
Rationale (Backwards Traceability)	A user must have the option to visualize up to fifty data sets on the same visualization in order to compare different data sets in a visual manner. The upper bound of fifty data sets was determined in the RD1.1 client designer meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-4a: Verify if a user can select 1 data set and if the DOD displays a visualization containing the selected data set.</li><li>• TC-VI-4b: Verify if a user can select 25 different data sets and if the DOD displays a visualization containing all of the selected data sets.</li><li>• TC-VI-4c: Verify if a user can select 50 different data sets and if the DOD displays a visualization containing all of the selected data sets.</li></ul>

*REQ-VI-5*

Description	A user must have the option to view multiple visualizations on the same page.
Associated Feature	F-3: Visualization
Priority	Medium
Rationale (Backwards Traceability)	A user must have the option to view multiple visualizations on the same page in order to compare different visualizations as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-5: Verify if a user can view more than one visualization at a time.</li></ul>

*REQ-VI-6*

Description	A user must be able to search for sensors based on location, sensor type, and/or time range.
Associated Feature	F-3: Visualization
Priority	High
Rationale (Backwards Traceability)	A user must be able to search for sensors based on location, sensor type, and/or time range in order to allow users to find one or more data sets that they are interested in as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-6: Verify if a user can enter a search query and if the DOD returns a list of sensors that match the user's search query.</li></ul>

*REQ-VI-7*

Description	A user must be able to filter sensors based on location, sensor type, and/or time range.
Associated Feature	F-3: Visualization
Priority	High
Rationale (Backwards Traceability)	A user must be able to filter sensors based on location, sensor type, and/or time range in order to allow users to find one or more data sets that they are interested in as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-7: Verify if a user can select a set of filter criteria and if the DOD displays a list of sensors that match the user's filter criteria.</li></ul>

*REQ-VI-8*

Description	A user must be able to save a visualization that they create.
Associated Feature	F-3: Visualization
Priority	Low
Rationale (Backwards Traceability)	A user must be able to save a visualization that they create in order to allow the user to return to a visualization of interest at a later time as discussed during the RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-VI-8: Verify if a user can save a visualization that is being displayed.</li></ul>

*REQ-VI-9*

Description	A user must be able to load their saved visualizations.
Associated Feature	F-3: Visualization
Priority	Low
Rationale (Backwards Traceability)	A user must be able to load their saved visualizations in order to allow the user to return to a visualization of interest. The load saved visualization requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-VI-9: Verify if a user can load a visualization that they have previously saved and if the DOD displays the loaded visualization.</li> </ul>

*REQ-VI-10*

Description	A user must be able to delete their saved visualizations.
Associated Feature	F-3: Visualization
Priority	Low
Rationale (Backwards Traceability)	A user must be able to delete their saved visualizations in order to allow the user to remove visualizations which are no longer of interest to the user. The delete saved visualization requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-VI-10: Verify if a user can delete a visualization from their saved visualizations.</li> </ul>

*Traceability Matrix – F3: Visualization*

Functional Requirement ID#	Associated Use Case	Priority	Test Case ID#
REQ-VI-1	Use Case 13	High	TC-VI-1
REQ-VI-2	Use Case 13	Medium	TC-VI-2
REQ-VI-3	Use Case 13	Medium	TC-VI-3
REQ-VI-4	Use Case 13	Medium	TC-VI-4a TC-VI-4b TC-VI-4c
REQ-VI-5	Use Case 13	Medium	TC-VI-5
REQ-VI-6	Use Case 11	High	TC-VI-6
REQ-VI-7	Use Case 12	High	TC-VI-7
REQ-VI-8	Use Case 14	Low	TC-VI-8
REQ-VI-9	Use Case 15	Low	TC-VI-9
REQ-VI-10	Use Case 16	Low	TC-VI-10

Requirements	TC-VI-1	TC-VI-2	TC-VI-3	TC-VI-4a	TC-VI-4b	TC-VI-4c	TC-VI-5	TC-VI-6	TC-VI-7	TC-VI-8	TC-VI-9	TC-VI-10
REQ-VI-1	X											
REQ-VI-2		X										
REQ-VI-3			X									
REQ-VI-4				X	X	X						
REQ-VI-5							X					
REQ-VI-6								X				
REQ-VI-7									X			
REQ-VI-8										X		
REQ-VI-9											X	
REQ-VI-10												X

### 3.3.3 Models

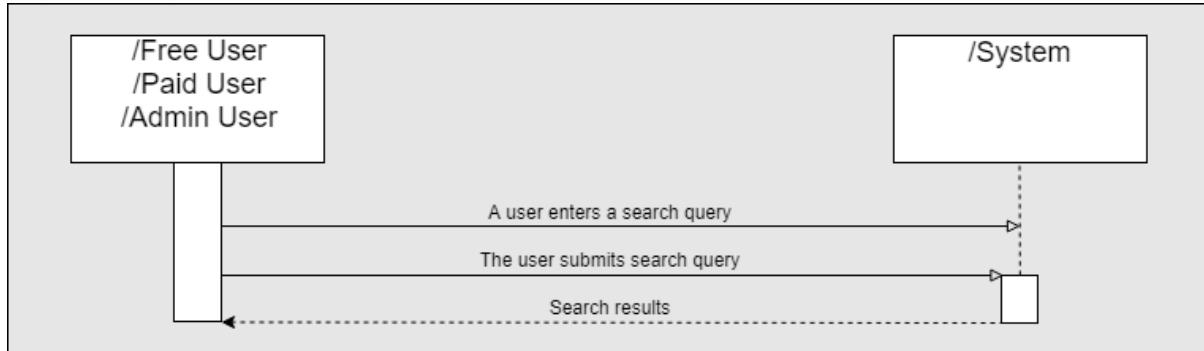
#### *Use Case 11 - Search Data Sets*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the dashboard page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user enters a search query of keyword(s)</li> <li>The user submits the search query</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>Filter criteria is updated to match the keyword(s) in the user's search query</li> <li>The user is presented with a list of sensors with location(s), sensor type(s), and time range that match the filter criteria</li> </ul>
Alternate Paths	<p>2a.i No available sensors have a data set that match the search query</p> <p>2a.ii The user is notified that no data sets match their search query</p>

Use Case 11 corresponds to the following requirement:

- REQ-VI-6

*Sequence Diagram 11 - Search Data Sets*



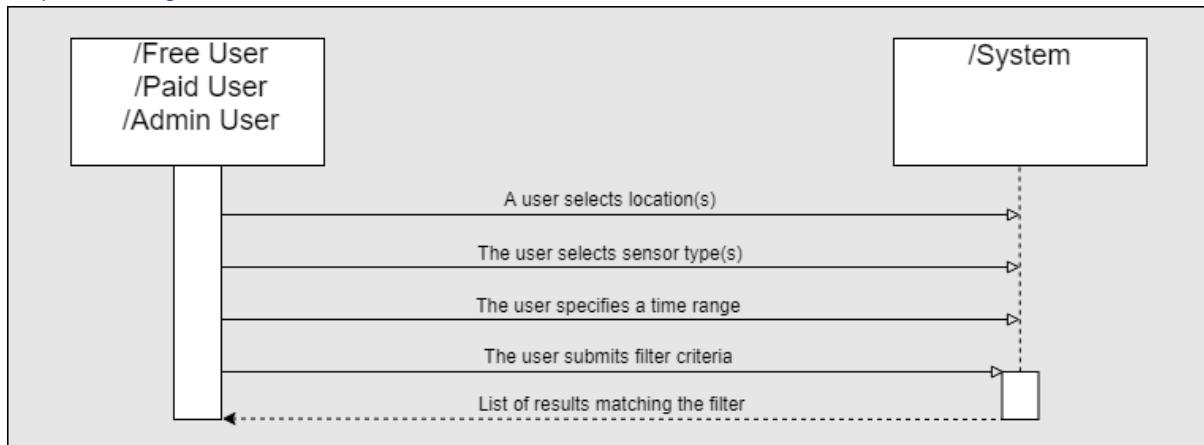
*Use Case 12 - Filter Data Sets*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the dashboard page</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user selects location(s)</li> <li>The user selects sensor type(s)</li> <li>The user specifies a time range by selecting a start date and end date</li> <li>The user submits the filter criteria</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user is presented with a list of sensors with location(s), sensor type(s), and time range that match the filter criteria</li> </ul>
Alternate Paths	4a.i No available sensors have a data set that match the filter criteria 4a.ii The user is notified that no data set matches their filter criteria

Use Case 12 corresponds to the following requirement:

- REQ-VI-7

*Sequence Diagram 12 - Filter Data Sets*



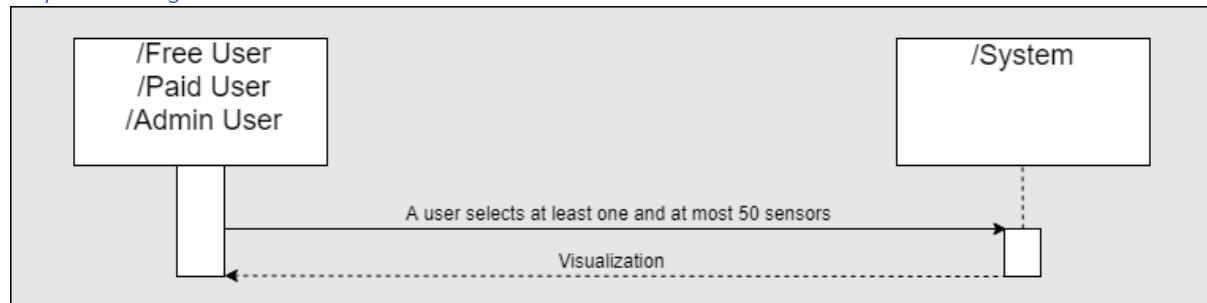
#### *Use Case 13 – Create Visualization*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	N/A
Steps	<ol style="list-style-type: none"> <li>1. Extends Use Case 11 and/or Use Case 12</li> <li>2. The user selects at least one and at most fifty sensors from the presented list of sensors.</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>• The user is presented with a visualization</li> </ul>
Alternate Paths	<p>2a.i The sensor type is photo or video      2a.ii The user is prevented from selecting more than one sensor</p> <p>2b.i The user removes one or more sensors from the visualization      2b.ii The visualization is updated to no longer display data from the removed sensor(s)</p>

Use Case 13 corresponds to the following requirements:

- REQ-VI-1
- REQ-VI-2
- REQ-VI-3
- REQ-VI-4
- REQ-VI-5

#### *Sequence Diagram 13 – Create Visualization*



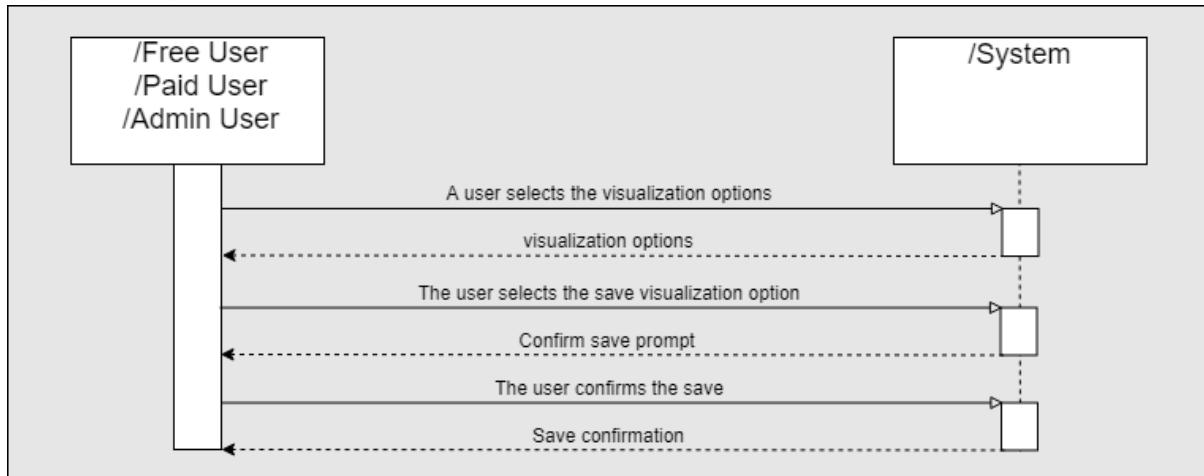
#### *Use Case 14 – Save Visualization*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	N/A
Steps	<ol style="list-style-type: none"> <li>1. Extends Use Case 13</li> <li>2. The user selects the visualization options</li> <li>3. The user enters an optional name for the visualization</li> <li>4. The user selects the save visualization option</li> <li>5. The user is prompted to confirm visualization save</li> <li>6. The user confirms visualization save</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>• A visualization is saved and named</li> <li>• The user is notified that the save was successful</li> </ul>
Alternate Paths	<p>6a.i The user cancels visualization save      6a.ii The visualization is not saved</p>

Use Case 14 corresponds to the following requirement:

- REQ-VI-8

*Sequence Diagram 14 – Save Visualization*



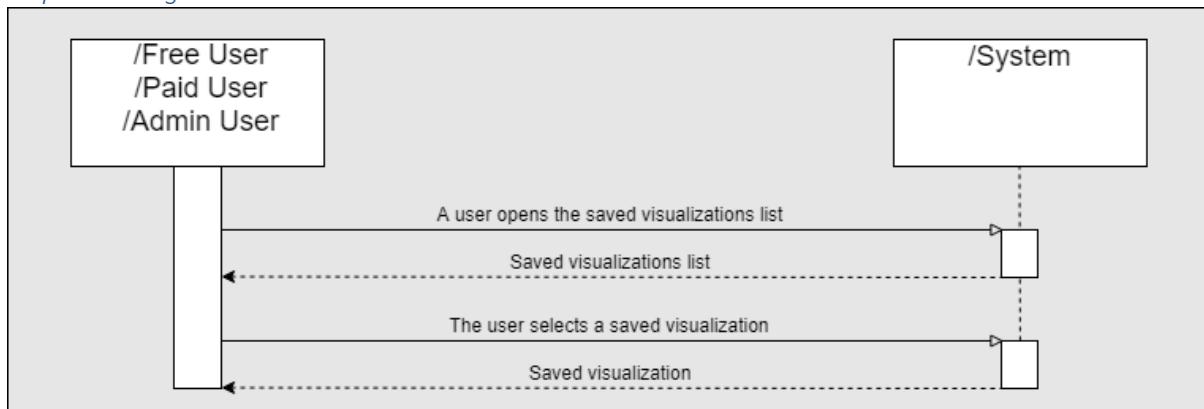
*Use Case 15 – Load Visualization*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the saved visualizations list</li> <li>The user has at least one saved visualization</li> </ul>
Steps	<ol style="list-style-type: none"> <li>The user opens the saved visualizations list</li> <li>The user selects a saved visualization</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The user is presented with the saved visualization</li> </ul>
Alternate Paths	2a.i The visualization cannot be generated as the user's account type does not match the data classification for one or more sensors 2a.ii The user is notified that they do not have permission to view the visualization

Use Case 15 corresponds to the following requirement:

- REQ-VI-9

*Sequence Diagram 15 – Load Visualization*



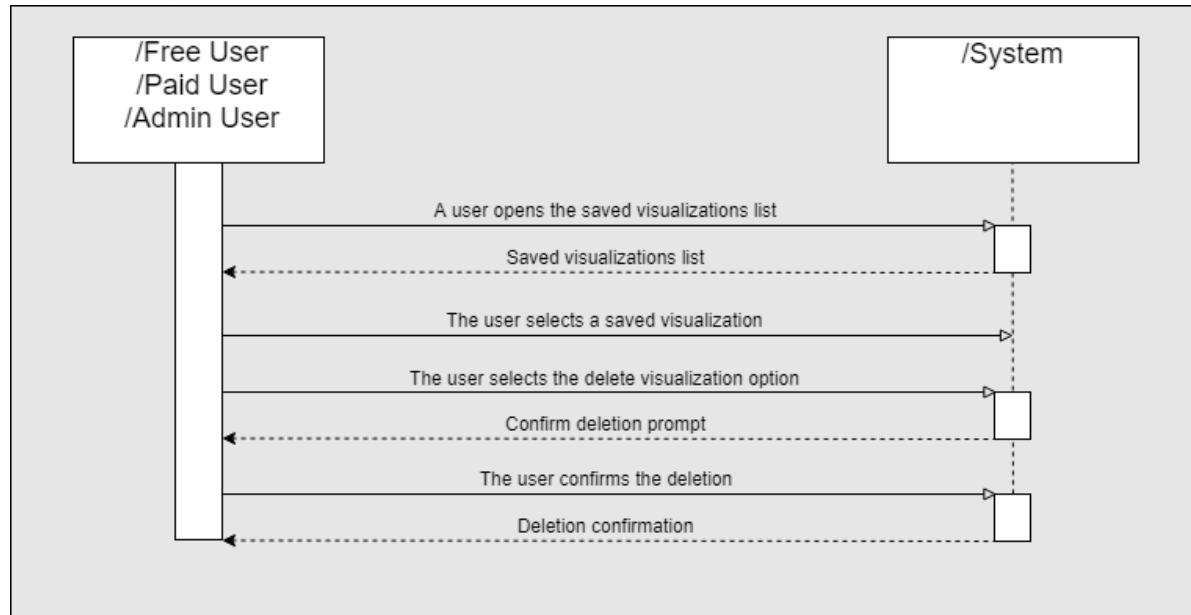
#### *Use Case 16 – Delete Saved Visualization*

Actors	A user (Free User, Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user has a valid account</li> <li>The user is logged in</li> <li>The user has navigated to the saved visualizations list</li> <li>The user has at least one saved visualization</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. The user opens the saved visualizations list</li> <li>2. The user selects a saved visualization</li> <li>3. The user selects delete visualization</li> <li>4. The user is prompted to confirm visualization deletion</li> <li>5. The user confirms visualization deletion</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The selected visualization is removed from the user's saved visualizations</li> <li>The user is notified that the deletion was successful</li> </ul>
Alternate Paths	5a.i The user cancels visualization deletion 5a.ii The selected visualization is not removed from the user's saved visualizations

Use Case 16 corresponds to the following requirement:

- REQ-VI-10

#### *Sequence Diagram 16 – Delete Saved Visualization*



### 3.4 F-4 Annotations

#### 3.4.1 Description and Priority

Paid or Admin User must be able to annotate data points, images and videos. Annotations are important as they allow a Paid or Admin User to indicate anomalies or points of interest. In order to maintain a high level of information quality throughout the DOD, a Paid or Admin user must also be able to edit or delete annotations.

**Priority: Low**

### 3.4.2 Functional Requirements

#### *REQ-AN-1*

Description	A Paid or Admin User must be able to create annotations on videos, images and data points.
Associated Feature	F-4: Annotations
Priority	Low
Rationale (Backwards Traceability)	A Paid or Admin User must be able to create annotations on videos, images, and data points in order to share insights about Daintree's collection of data. The annotation feature was discussed during the initial client designer meeting [3] and the RD 1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AN-1a: Verify if a Paid/Admin User can create an annotation on a video</li> <li>• TC-AN-2: Verify if a Paid/Admin User can create an annotation on an image</li> <li>• TC-AN-3: Verify if a Paid/Admin User can create an annotation on a data point in a visualization</li> </ul>

#### *REQ-AN-2*

Description	A Paid or Admin User must be able to toggle annotations on or off.
Associated Feature	F-4: Annotations
Priority	Low
Rationale (Backwards Traceability)	A Paid or Admin User must be able to toggle annotations on or off in order to display annotations when they want to see them and to not display annotations when they do not want to see them. When annotations are toggled on, annotations from all users are displayed. The toggle annotations requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AN-2a: Verify if a Paid or Admin User can toggle annotations on and if the DOD updates any applicable visualizations to display annotations.</li> <li>• TC-AN-2b: Verify if a Paid or Admin User can toggle annotations off and if the DOD updates any applicable visualizations to not display annotations.</li> </ul>

#### *REQ-AN-3*

Description	A Paid User must be able to delete their own annotations.
Associated Feature	F-4: Annotations
Priority	Low
Rationale (Backwards Traceability)	A Paid User must be able to delete their own annotations in order to remove annotations that are no longer relevant. The delete annotation requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AN-3: Verify if a Paid User can delete an annotation that they created.</li> </ul>

#### *REQ-AN-4*

Description	An Admin User must be able to delete any annotation.
Associated Feature	F-4: Annotations
Priority	Low
Rationale (Backwards Traceability)	An Admin User must be able to delete any annotation in order to remove any annotations that they feel are irrelevant or inappropriate as discussed during the RSD 0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AN-4a: Verify if an Admin User can delete their own annotation.</li> <li>• TC-AN-4b: Verify if an Admin User can delete a different user's annotation.</li> </ul>

#### *REQ-AN-5*

Description	A Paid or Admin User must be able to modify their own annotations.
Associated Feature	F-4: Annotations
Priority	Low
Rationale (Backwards Traceability)	A Paid or Admin User must be able to modify their own annotations in order to correct or update the information contained in the annotation. The edit annotation requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-AN-5: Verify if a Paid or Admin User can modify an annotation they created.</li> </ul>

*Traceability Matrix – F4: Annotations*

<b>Functional Requirement ID#</b>	<b>Associated Use Case</b>	<b>Priority</b>	<b>Test Case ID#</b>
REQ-AN-1	Use Case 17	Low	TC-AN-1a TC-AN-1b TC-AN-1c
REQ-AN-2	Use Case 18	Low	TC-AN-2a TC-AN-2b
REQ-AN-3	Use Case 19	Low	TC-AN-3
REQ-AN-4	Use Case 19	Low	TC-AN-4a TC-AN-4b
REQ-AN-5	Use Case 20	Low	TC-AN-5

<b>Requirements</b>	TC-AN-1a	TC-AN-1b	TC-AN-1c	TC-AN-2a	TC-AN-2b	TC-AN-3	TC-AN-4a	TC-AN-4b	TC-AN-5
REQ-AN-1	X	X	X						
REQ-AN-2				X	X				
REQ-AN-3						X			
REQ-AN-4							X	X	
REQ-AN-5									X

### 3.4.3 Models

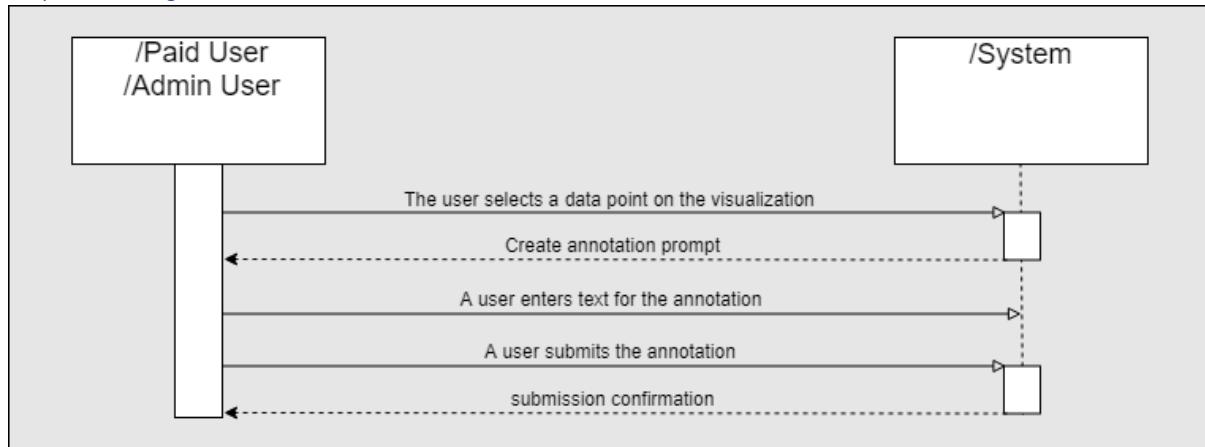
*Use Case 17 - Create Annotation*

Actors	A user (Paid User, Admin User)
Preconditions	N/A
Steps	<ol style="list-style-type: none"> <li>1. Extends Use Case 13 or Use Case 15</li> <li>2. The user selects a data point on the visualization</li> <li>3. The user enters the text for the annotation</li> <li>4. The user submits the annotation</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>• The annotation is saved and linked to the selected data point</li> <li>• The user is notified that the annotation was created successfully</li> </ul>
Alternate Paths	4a.i The user cancels creating the annotation 4a.ii The annotation is not saved

Use Case 17 corresponds to the following requirement:

- REQ-AN-1

*Sequence Diagram 17 - Create Annotation*



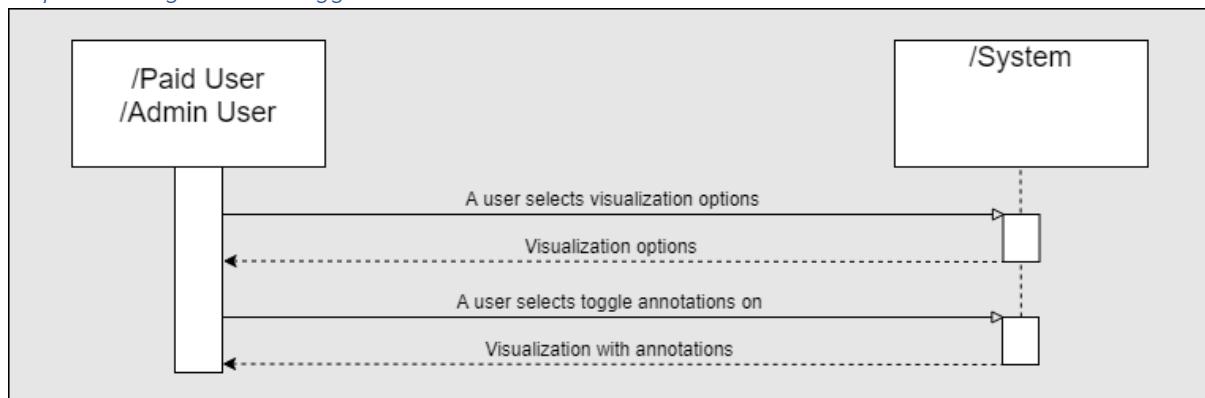
*Use Case 18 - Toggle Annotations*

Actors	A user (Paid User, Admin User)
Preconditions	N/A
Steps	<ol style="list-style-type: none"> <li>Extends Use Case 13 or Use Case 15</li> <li>The user selects toggle annotations on</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>Visualization is updated to display any existing annotations on the data points</li> </ul>
Alternate Paths	<ul style="list-style-type: none"> <li>2a.i The user selects toggle annotations off</li> <li>2a.ii The visualization is updated to not display annotations</li> </ul>

Use Case 18 corresponds to the following requirement:

- REQ-AN-2

*Sequence Diagram 18 - Toggle Annotations*



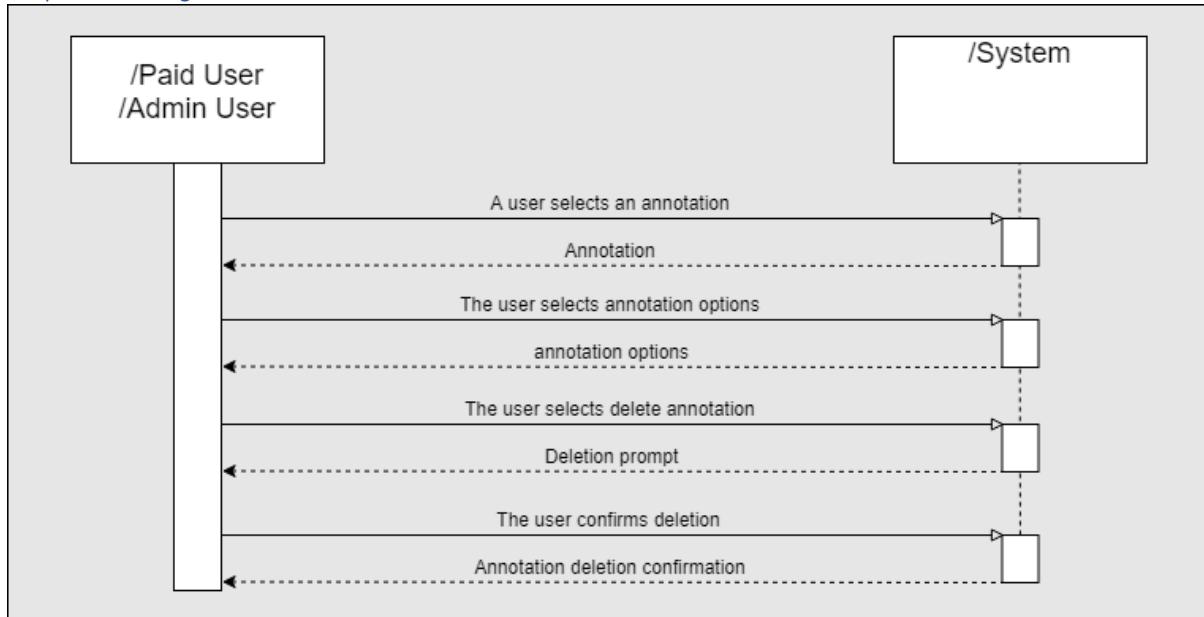
*Use Case 19 - Delete Annotation*

Actors	A user (Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>If the user is a Paid User, then they must be the author of the selected annotation in order to delete it</li> </ul>
Steps	<ol style="list-style-type: none"> <li>Extends Use Case 18</li> <li>The user selects an annotation</li> <li>The user selects annotation settings</li> <li>The user selects delete annotation</li> <li>The user is prompted to confirm annotation deletion</li> <li>The user confirms annotation deletion</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The selected annotation is deleted</li> <li>The user is notified that the deletion was successful</li> </ul>
Alternate Paths	<ol style="list-style-type: none"> <li>The user cancels annotation deletion</li> <li>The selected annotation is not deleted</li> </ol>

Use Case 19 corresponds to the following requirements:

- REQ-AN-3
- REQ-AN-4

*Sequence Diagram 19 - Delete Annotation*



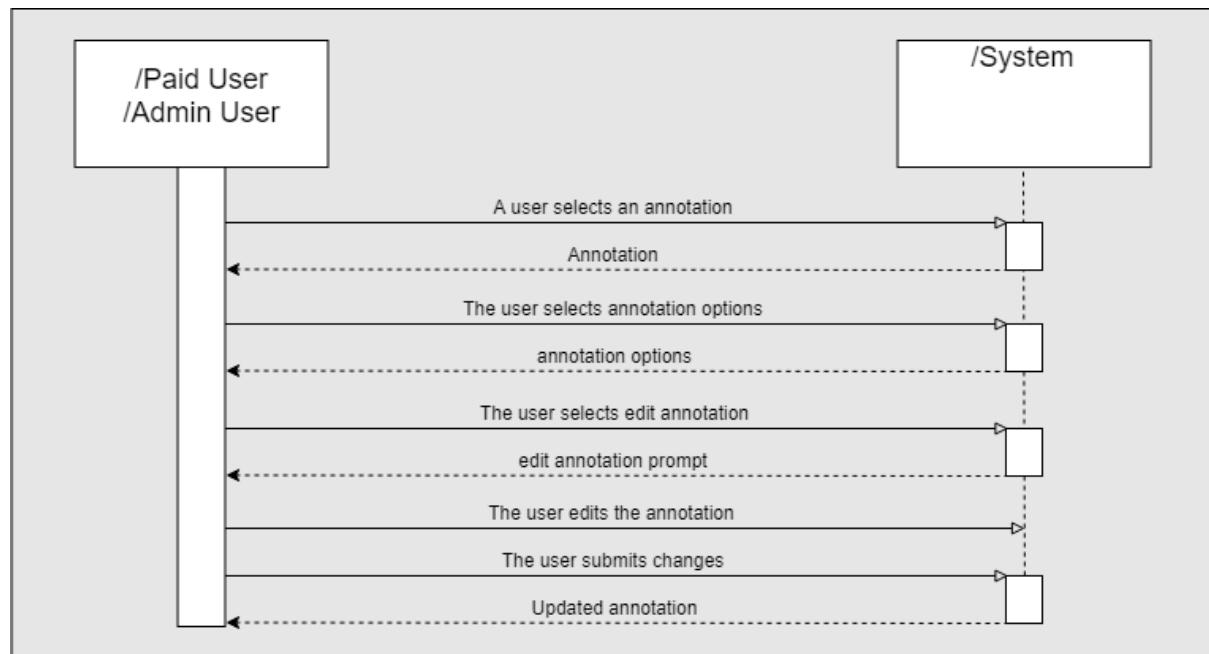
### Use Case 20 - Edit Annotation

Actors	A user (Paid User, Admin User)
Preconditions	<ul style="list-style-type: none"> <li>The user must be the author of the selected annotation in order to edit it</li> </ul>
Steps	<ol style="list-style-type: none"> <li>Extends Use Case 18</li> <li>The user selects an annotation</li> <li>The user selects annotation settings</li> <li>The user selects edit annotation</li> <li>The user changes the annotation</li> <li>The user submits their changes</li> </ol>
Success Conditions	<ul style="list-style-type: none"> <li>The selected annotation is updated</li> <li>The user is notified that the update was successful</li> </ul>
Alternate Paths	<p>6a.i The user cancels editing the annotation</p> <p>6a.ii The selected annotation is not updated</p>

Use Case 20 corresponds to the following requirements:

- REQ-AN-5

### Sequence Diagram 20 - Edit Annotation



## 4 External Interface Requirements

### 4.1 Communication Interfaces

The Daintree Ocean Dashboard (DOD) will communicate with the API in order to request data sets for visualization.

*REQ-CI-1*

Description	The DOD will access the functions of the existing API to request Daintree's collection of data.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	In order to create visualizations, the DOD needs a means of accessing Daintree's collection of data. The communication interface requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-CI-1: Verify if the DOD is able to access Daintree's collection of data through their API.</li></ul>

## 4.2 Software Interfaces

The DOD must integrate with Stripe, an external payment service provider.

*REQ-SI-1*

Description	Paid User payment information will be stored in Stripe.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	A Paid User wants their payment information to be stored in a secure location. The Stripe payment requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-SI-1: Verify if the DOD stores payment information in Stripe.</li></ul>

*REQ-SI-2*

Description	Paid Users will be charged by Stripe.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	A Paid User must be charged when paying for their subscription so that they are not accessing Paid User features free of charge. The Stripe payment requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-SI-2: Verify if the DOD is able to charge a Paid User using Stripe.</li></ul>

*REQ-SI-3*

Description	Stripe must provide the DOD with a StripeID token associated with a particular Paid User.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	After a Paid User has submitted their payment information, the DOD should have some way of tracking that Paid User in Stripe. The Stripe payment requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-SI-3: Verify if the StripeID token associated with a Paid User's account matches the Paid User in Stripe.</li> </ul>

*Traceability Matrix – F5: External Interface Requirements*

Functional Requirement ID#	Priority	Test Case ID#
REQ-CI-1	High	TC-CI-1
REQ-SI-1	Medium	TC-SI-1
REQ-SI-2	Medium	TC-SI-2
REQ-SI-3	Medium	TC-SI-3

Requirements	TC-CI-1	TC-SI-1	TC-SI-2	TC-SI-3
REQ-CI-1	X			
REQ-SI-1		X		
REQ-SI-2			X	
REQ-SI-3				X

## 5 Non-Functional Requirements

### 5.1 Performance Requirements

The following section specifies the efficiency requirements that the Daintree Ocean Dashboard (DOD) must meet.

### 5.1.1 Efficiency

*REQ-EF-1*

Description	The DOD must be capable of creating a visualization within 3 seconds of receiving the one or more data sets from the API.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	The DOD must be capable of creating a visualization within 3 seconds of receiving the one or more data sets from the API in order to present a visualization in an efficient, timely manner. As discussed by Daintree in section 2.3 of the RFP [1].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-EF-1: Verify if the DOD is capable of generating and displaying a visualization within 3 seconds of receiving one or more data sets from the API.</li> </ul>

*REQ-EF-2*

Description	The DOD must be capable of handling up to 1 GB of data requested from the API.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	The DOD must be capable of handling up to 1 GB of data requested from the API in order to allow a user to request large data sets. The data capacity efficiency requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-EF-2: Verify if the DOD is able to handle 1GB data responses from the API.</li> </ul>

## 5.2 Security Requirements

User data security is important for all user types. A Free User must have access to only a limited subset of data provided by Daintree. A user only ever views a visualization of the data set and not the data set itself. Payment transactions must be secure so that the Paid User is comfortable using the DOD. Storage of a user's account credentials must be secure. A user must enter correct account credentials to access their account.

#### *REQ-AS-1*

Description	A Free User can only access data sets from a limited subset of sensors.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	A Free User can only access data sets from a limited subset of sensors in order to satisfy Daintree's request in section 6.0 of the RFP [1].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AS-1: Verify if a Free User is unable to view or select a data set from sensors with data classification set to Paid/Admin Users.</li> </ul>

#### *REQ-AS-2*

Description	A user must not be able to view a data set used to create a visualization directly.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	A user must not be able to view a data set used to create a visualization directly in order to satisfy Daintree's demands in Daintree Elicitation Notes [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AS-2: Verify if data sets cannot be viewed directly in the DOD.</li> </ul>

#### *REQ-AS-3*

Description	Payment transactions must be secure between a Paid User and the DOD.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	Payment transactions must be secure between a Paid User and the DOD in order to keep a Paid user's payment information from being compromised. The secure transaction requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AS-3: Verify if data flows and transactions between the DOD and Stripe are secure.</li> </ul>

#### *REQ-AS-4*

Description	Storage of a user's account credentials must be secure.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	Storage of a user's account credentials must be secure in order to ensure users do not lose access to or control over their account. The secure account requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>TC-AS-4: Verify if account credentials stored within the DOD database are secure.</li> </ul>

*REQ-AS-5*

Description	A user must provide a correct set of account credentials to access an account.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	A user must provide a correct set of account credentials to access an account in order to prevent unauthorized access to their account. The account authentication requirement was created by Horizon Software and accepted by Daintree during RSD0.9 meeting [7].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-AS-5: Verify if a user who enters an incorrect set of account credentials cannot access the DOD.</li></ul>

### 5.3 Software Quality Attributes

The following sections outline the quality attributes the DOD must meet including: adaptability, portability, usability, and reliability.

#### 5.3.1 Adaptability

If Daintree starts collecting data from a new sensor, the DOD must adapt to accommodate the data from the new sensor. It is essential that a Paid and Admin User has access to the new data. It is important that new sensors added by Daintree do not disrupt the DOD.

*REQ-ADPT-1*

Description	The DOD must require few to no changes when new sensors are added by Daintree.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	The DOD must require few to no changes when new sensors are added by Daintree in order to reduce maintenance when adding new sensors as discussed in section 3.0 of the RFP [1].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"><li>• TC-ADPT-1: Verify if the DOD incorporates new sensor data from the API when a new sensor is added.</li></ul>

*REQ-ADPT-2*

Description	The DOD must be able to use data collected by new sensors as soon as the new sensor data is available from the API.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	The DOD must be able to use data collected by new sensors as soon as the new sensor data is available from the API in order to allow a user to visualize new data sets as soon as they are available as discussed during the initial client designer meeting [3].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-ADPT-2: Verify that DOD is able to immediately access new sensor data when it is made available by the API.</li> </ul>

### 5.3.2 Usability

The DOD needs to provide a level of usability such that a user with limited technical knowledge is able to use the DOD.

*REQ-US-1*

Description	A new user to the DOD must be able to find one or more data sets they are interested in within 3 minutes.
Associated Feature	Non-Functional Requirement
Priority	Medium
Rationale (Backwards Traceability)	A new user to the DOD must be able to find one or more data sets they are interested in within 3 minutes in order to find desired visualizations in an efficient and timely manner. As discussed by Daintree in section 2.3 of the RFP [1].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-US-1: Verify if a new user can find data sets they are interested in within 3 minutes.</li> </ul>

### 5.3.3 Reliability

*REQ-RE-1*

Description	For specific filter criteria, the DOD must always return the same data sets unless a sensor has been added or removed.
Associated Feature	Non-Functional Requirement
Priority	High
Rationale (Backwards Traceability)	For specific filter criteria, the DOD must always return the same data sets unless a sensor has been added or removed in order to only present data sets specified by the filter criteria. The filter reliability requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)	<ul style="list-style-type: none"> <li>• TC-RE-1: Verify if a user is only presented with data sets that are relevant to the filter criteria.</li> </ul>

### 5.3.4 Integrity

*REQ-IN-1*

Description		The DOD must not modify Daintree's collection of data when generating visualizations.
Associated Feature		Non-Functional Requirement
Priority		High
Rationale (Backwards Traceability)		The DOD must not modify Daintree's collection of data when generating visualizations in order to ensure the DOD is not affecting Daintree's databases. The data integrity requirement was created by Horizon Software and accepted by Daintree during RD1.1 meeting [6].
Test Cases (Forwards Traceability)		<ul style="list-style-type: none"> <li>TC-IN-1: Verify if the DOD never sends a write request to the API.</li> </ul>

*Traceability Matrix – F6: Non-Functional Requirements*

Functional Requirement ID#	Priority	Test Case ID#
REQ-EF-1	Medium	TC-EF-1
REQ-EF-2	Medium	TC-EF-2
REQ-AS-1	Medium	TC-AS-1
REQ-AS-2	Medium	TC-AS-2
REQ-AS-3	High	TC-AS-3
REQ-AS-4	High	TC-AS-4
REQ-AS-5	High	TC-AS-5
REQ-ADPT-1	Medium	TC-ADPT-1
REQ-ADPT-2	High	TC-ADPT-2
REQ-US-1	Medium	TC-US-1
REQ-RE-1	High	TC-RE-1
REQ-IN-1	High	TC-IN-1

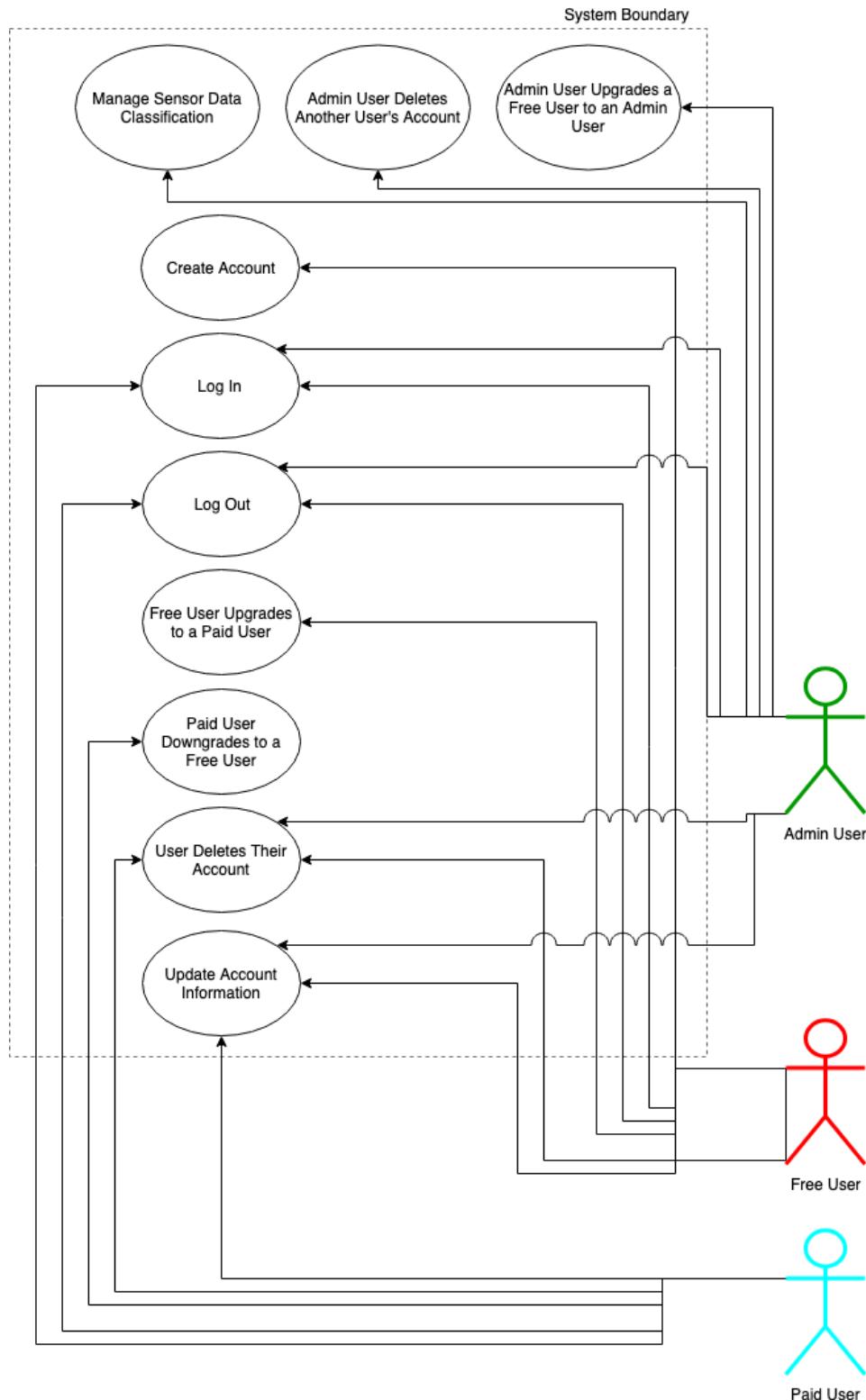
Requirements	TC-EF-1	TC-EF-2	TC-AS-1	TC-AS-2	TC-AS-3	TC-AS-4	TC-AS-5	TC-ADPT-1	TC-ADPT-2	TC-US-1	TC-RE-1	TC-IN-1
REQ-EF-1	X											
REQ-EF-2		X										
REQ-AS-1			X									
REQ-AS-2				X								
REQ-AS-3					X							
REQ-AS-4						X						
REQ-AS-5							X					
REQ-ADPT-1								X				
REQ-ADPT-2									X			
REQ-US-1										X		
REQ-RE-1											X	
REQ-IN-1												X

## 6 Analysis Model

### 6.1 Use Case Models

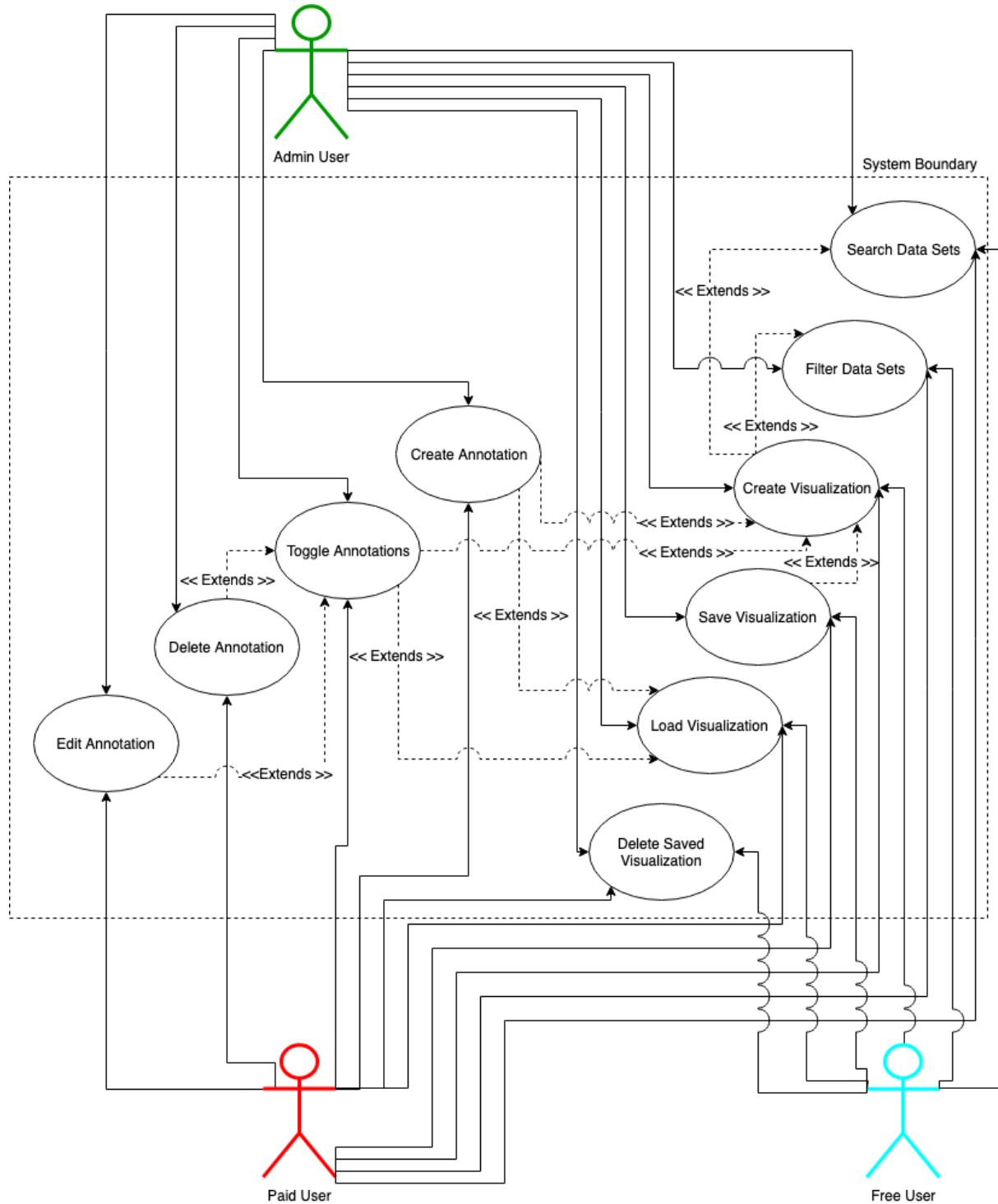
The following diagram, the Use Case Model part 1, shows the relationships between the users and the use cases regarding account management and administration.

*Use Case Model Part 1*



The following diagram, the Use Case Model part 2, shows the relationships between the users and the use cases regarding visualization and annotations.

## *Use Case Model Part 2*



## 6.2 Data Flow Assumptions

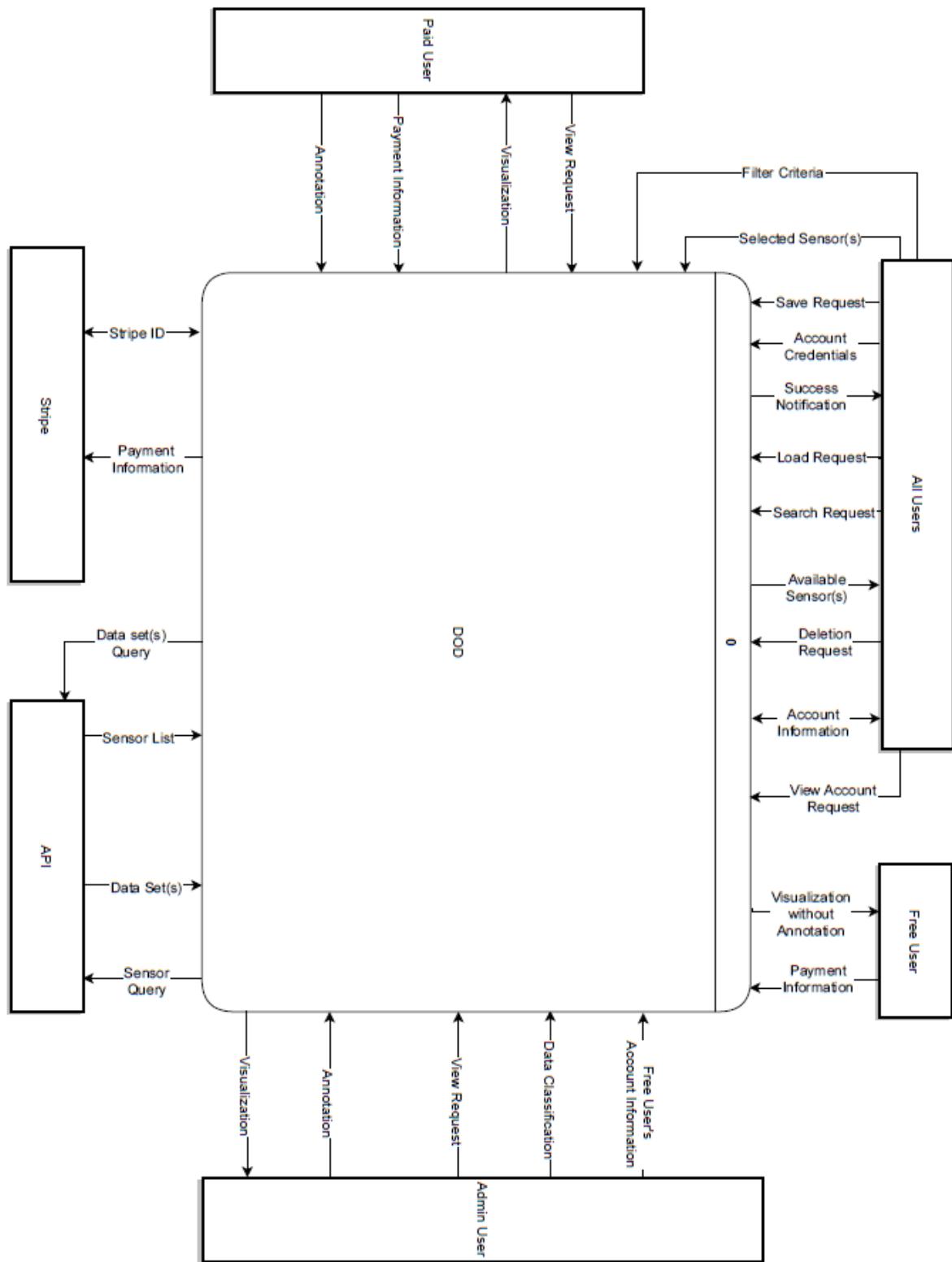
The assumptions below were made with the intention to increase clarity and focus on the fundamental data flows through the DOD. To properly understand the data flow diagram, the following assumptions must be understood:

- When Paid User removes payment information from the DOD, the DOD downgrades them to a Free User.
- When a Paid User removes payment information from the DOD, the DOD downgrades them to a Free User.
- When a Free User adds payment information to the DOD, the DOD upgrades them to Paid User.
- The DOD keeps track of user information. In other words, the DOD is aware of which user is logged in and which user is making what request.
- Each data flow starts from the precondition(s) of the corresponding use case.
- In relevance to process 2.2 (Delete Account), an Admin User can delete a Free, Paid or Admin User's account.
- “All users” consists of Free Users, Paid Users and Admin Users.
- “API” represents Daintree’s existing API
- When a View or Delete Request goes into Process 6, the DOD keeps track of the associated Annotation to be viewed or deleted.
- When a Load, Delete or Save Request goes into Process 5, the DOD keeps track of the associated Visualization.
- When a View or Delete Request goes into Process 2, the DOD keeps track of the associated Account.
- When a Search Request goes into Process 3, the DOD keeps track of the search keyword(s).

## 6.3 Context Diagram

This diagram is a high-level representation of the DOD. The context diagram for the DOD contains one process, which is representative of the DOD as a whole. The context diagram contains all data flows required for the features outlined in sections 2 and 3. The diagram below has the Free User, Paid User and Admin User actors. The DOD interacts with the API and Stripe external entities.

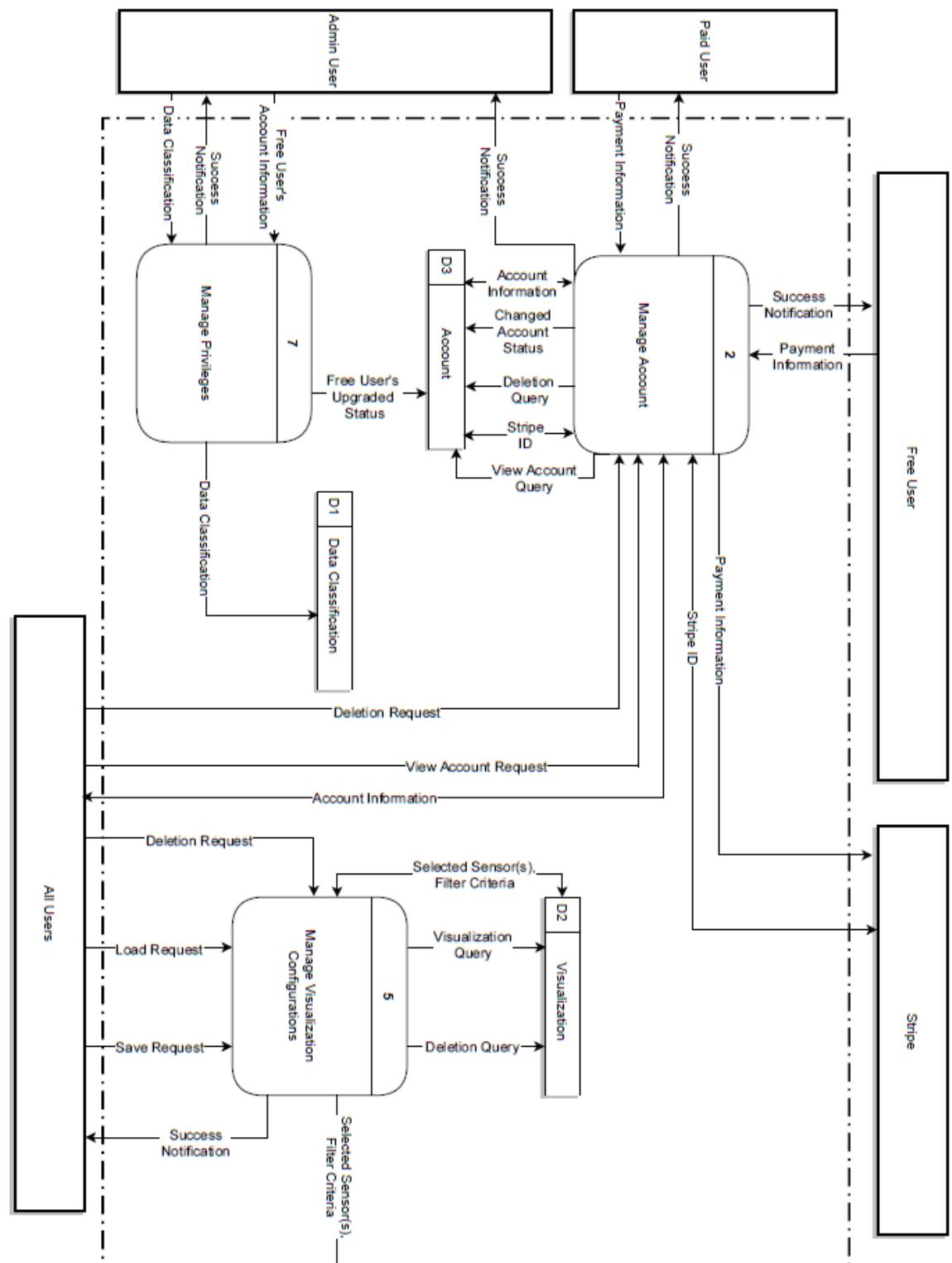
## Context Diagram

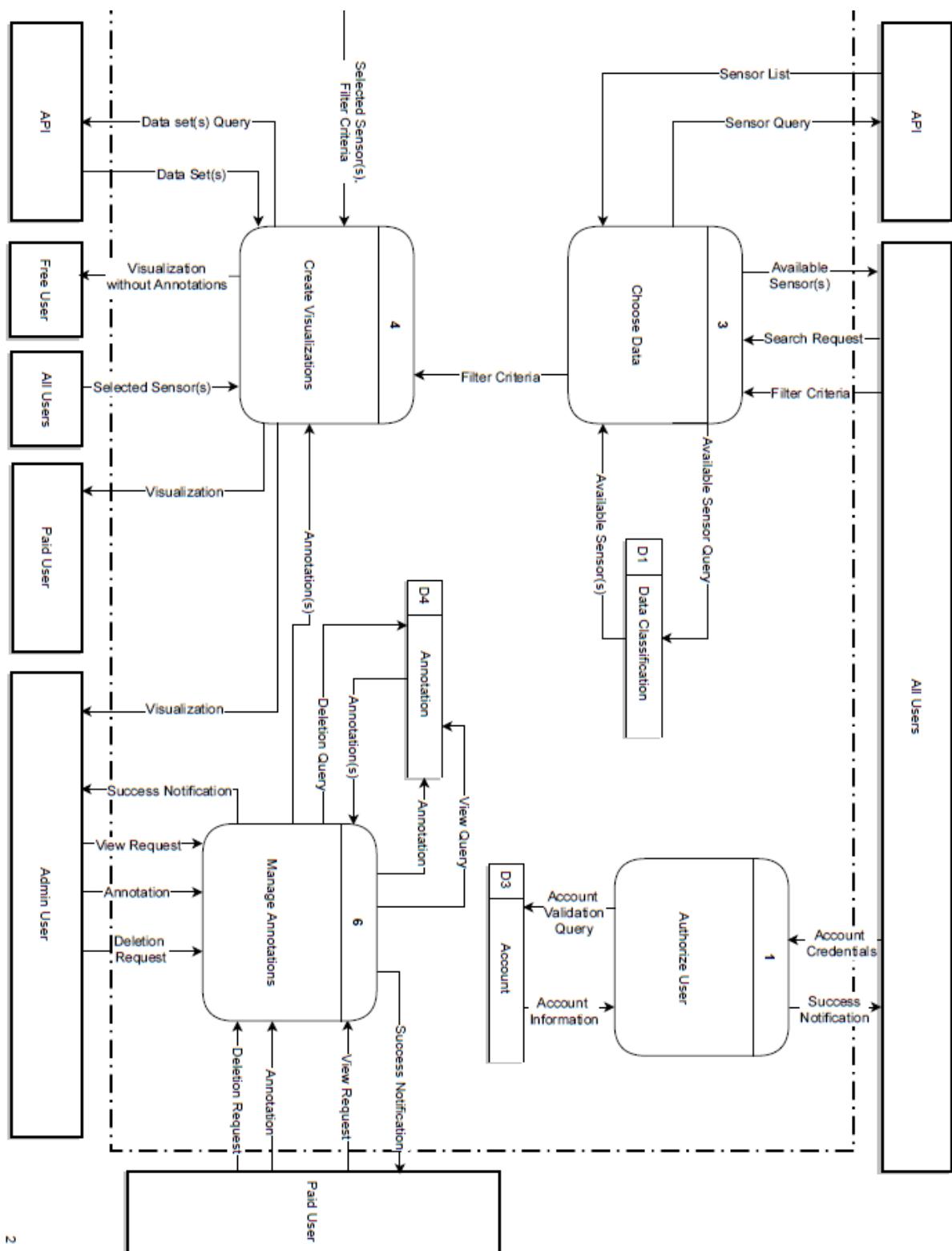


## 6.4 Data Flow Diagram Level 1

The diagram below shows the 7 processes that describe the DOD in more detail. The DOD system boundary is represented by the dotted line. External entities and actors are shown outside of the dotted line. Processes and the DOD's database are shown within the dotted line. Each datastore (labelled D#) represent a table in the DOD's database. Please view Appendix C – Data Flow Diagram Assembly for assembly instructions.

*Data Flow Diagram Level 1*

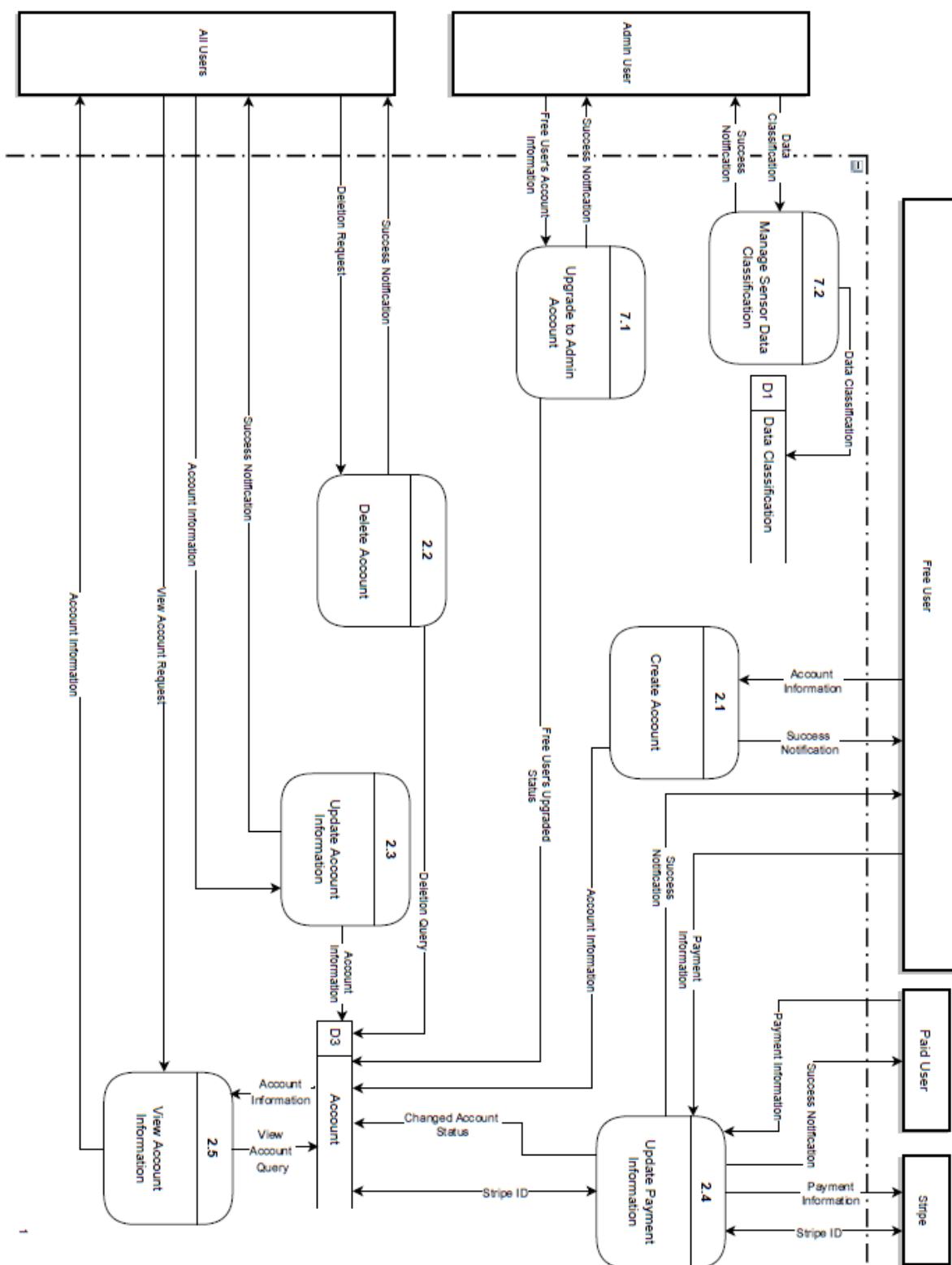


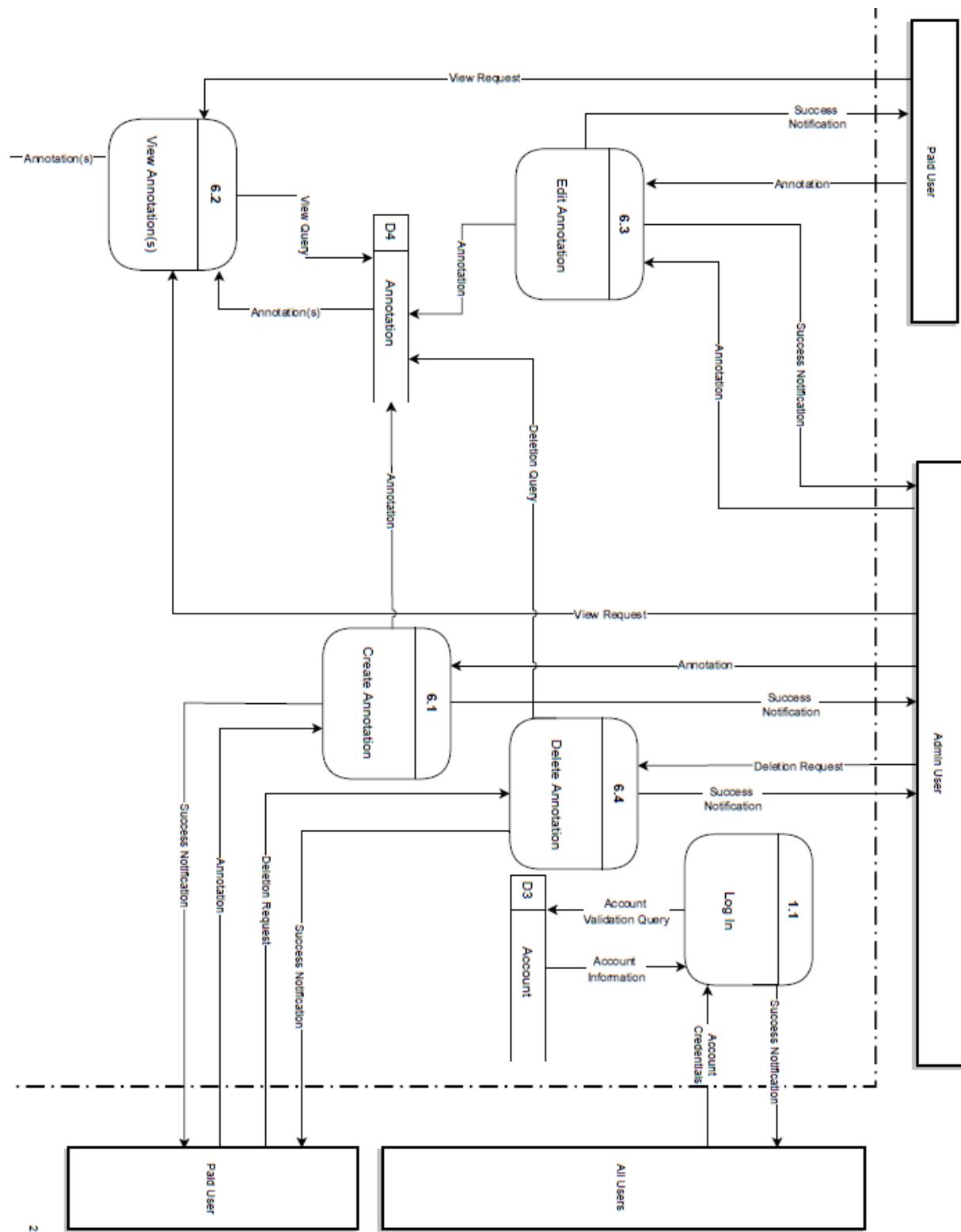


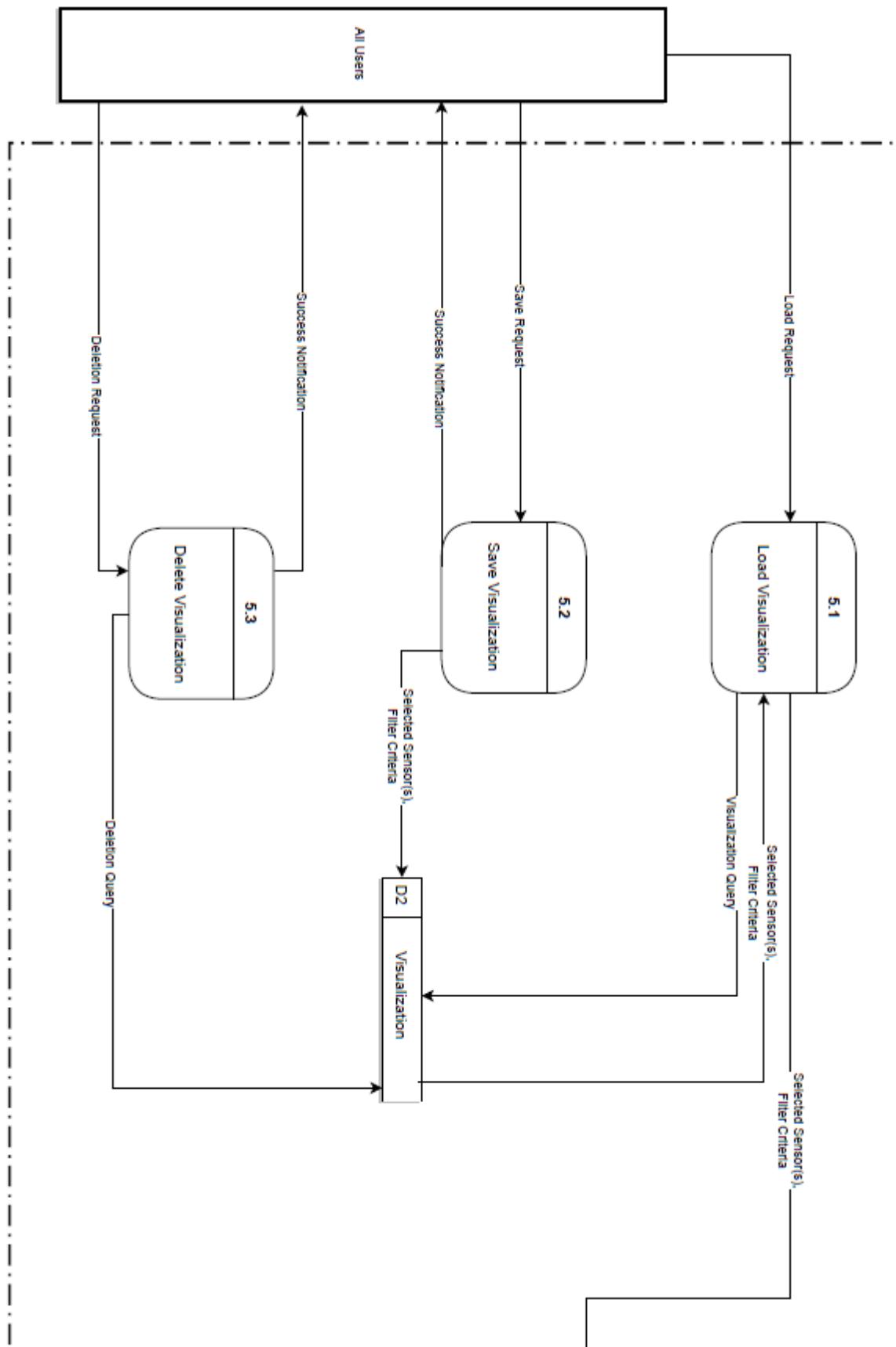
## 6.5 Data Flow Diagram Level 2

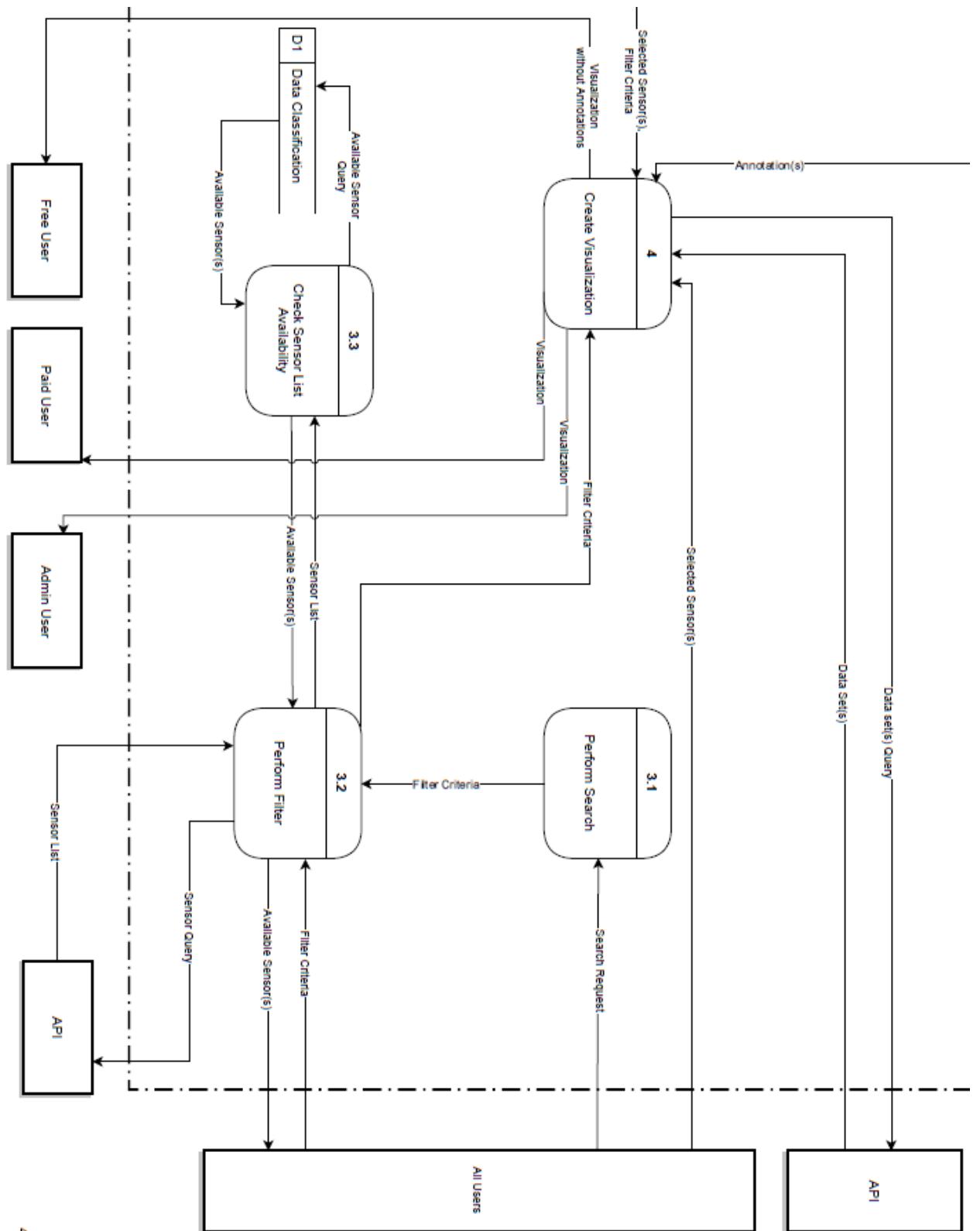
This diagram is a more detailed version of the one seen in section 6.4. The DOD system boundary is represented by the dotted line. External entities and actors are shown outside of the dotted line. Processes and the DOD's database are shown within the dotted line. Each datastore (labelled D#) represent a table in the DOD's database. The diagram breaks down the processes from the diagram seen in 6.4 into specific processes. It shows all the data flow between actors and these specific processes. Please view Appendix C – Data Flow Diagram Assembly for assembly instructions.

Data Flow Diagram Level 2







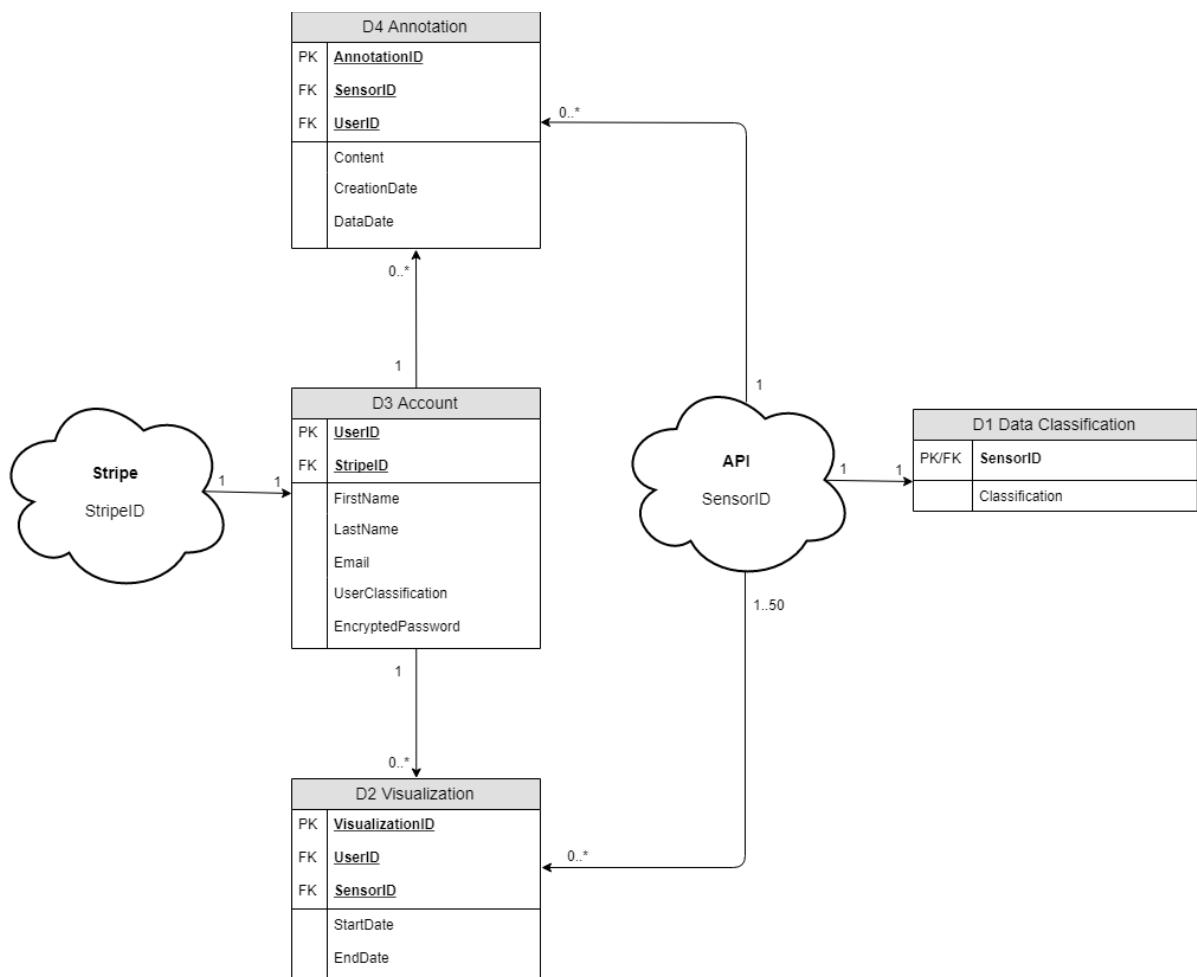


## 6.6 Entity Relationship Diagram

This entity-relationship diagram shows the four data entities within the DOD and their relationships with each other. The four entities are data classification, visualization, account and annotation. Within each entity are its attributes, such as UserID for the D3 Account entity.

The diagram follows standard modelling notation with the following modifications: The cloud-shaped entities represent external entities, and the direction of the arrows represents the flow of primary keys within the system. The two external entities are Daintree's existing API, from which the DOD accesses sensor data for the purpose of generating visualizations, and Stripe, which the DOD uses to process payments. For each arrow, the destination entity contains the source entity's primary key as a foreign key.

### *Entity Relationship Diagram*



The following tables outline the attributes within each entity. For each attribute the table shows its name, data type, data format, size, and a short description.

#### *D1 - Data Classification*

<b>Field Name</b>	<b>Data Type</b>	<b>Data Format</b>	<b>Field Size</b>	<b>Description</b>
SensorID	Integer	NNNNNNNN	8	Unique number ID that identifies each sensor in Daintree's database.
Classification	String		5	Identifies which user types are able to include each sensor in a visualization. Must be one of: All users or Paid/Admin users.

#### *D2 - Visualization*

<b>Field Name</b>	<b>Data Type</b>	<b>Data Format</b>	<b>Field Size</b>	<b>Description</b>
VisualizationID	Integer	NNNNNNNN	8	Unique number ID for each Visualization.
UserID	Integer	NNNNNNNN	8	Unique number ID for each user.
SensorID	Integer	NNNNNNNN	8	Unique number ID that identifies each sensor in Daintree's database. Each Visualization contains at least one and at most fifty sensor IDs.
StartDate	DateTime	YYYY/MM/DD HH:MM:SS	20	Timestamp containing the start date & time of sensor data that will be used to generate the visualization.
EndDate	DateTime	YYYY/MM/DD HH:MM:SS	20	Timestamp containing the end date & time of sensor data that will be used to generate the visualization.

#### *D3 - Account*

<b>Field Name</b>	<b>Data Type</b>	<b>Data Format</b>	<b>Field Size</b>	<b>Description</b>
UserID	Integer	NNNNNNNN	8	Unique number ID for each user.
StripeID	String		14	Unique text ID that identifies each user's payment information.
FirstName	Varchar		30	The user's first name.
LastName	Varchar		30	The user's last name.
Email	Varchar		30	The user's email address.
UserClassification	String		5	The user's account type. Must be one of: "Free", "Paid", "Admin".
EncryptedPassword	String		30	The user's password for account credentials.

#### D4 - Annotation

Field Name	Data Type	Data Format	Field Size	Description
AnnotationID	Integer	NNNNNNNN	8	Unique number ID for each annotation.
SensorID	Integer	NNNNNNNN	8	Unique number ID that identifies each sensor in Daintree's database.
UserID	Integer	NNNNNNNN	8	Unique number ID for each user.
Content	Varchar		500	The text content of the annotation.
CreationDate	DateTime	YYYY/MM/DD HH:MM:SS	20	Timestamp containing the annotation's creation date & time.
DataDate	DateTime	YYYY/MM/DD HH:MM:SS	20	Timestamp referencing the specific data point in the sensor's data set to which the annotation is attached.

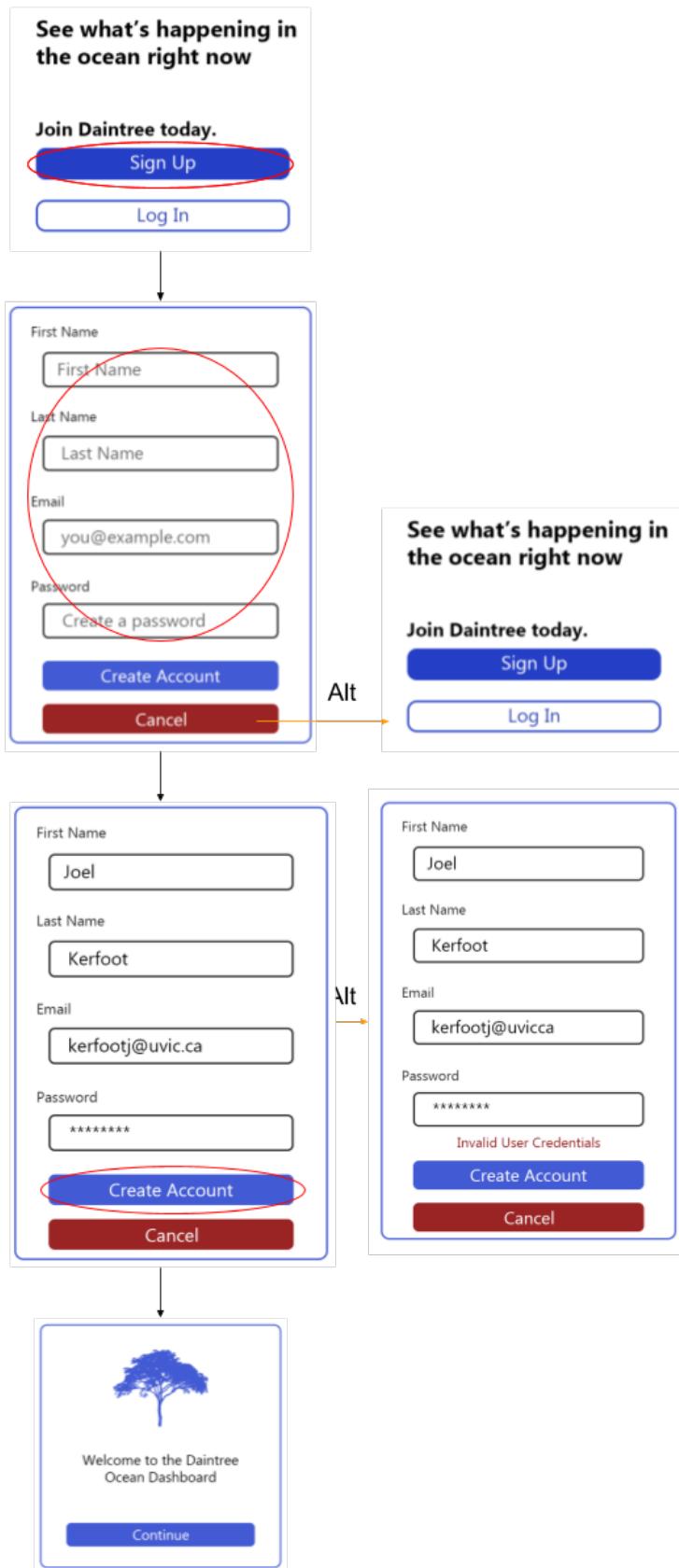
## 7 Solution

### 7.1 Account Management

This section provides an example of how the Account Management features described in section 3.1 could be implemented in the DOD. To view digital versions of the UI mock-ups please visit <https://drive.google.com/open?id=1MuJkzAaMRaqf9cHIYTqu3dCbGvWMfawT>. To view an interactive interface please visit <https://invis.io/ERQZZ8I4YM5>.

### 7.1.1 – Create Account

#### UI Mock-Up 1 – Create Account



*Scenario 1 – Create Account*

A new user has navigated to the account creation page from the DOD landing page. The user enters their account information. The user submits their account information. The DOD then creates a new account that has Free User status and notifies the user that their account has been created. The DOD then logs the user into the new account.

*Scenario 1a – User Cancels Account Creation*

A new user has navigated to the account creation page from the DOD landing page. The user enters their account information. The user cancels the account creation process without submitting their account information. The DOD returns the user to the landing page and no new account is created.

*Scenario 1b – Invalid Account Information*

A new user has navigated to the account creation page from the DOD landing page. The user then enters their account information. The user submits their account information. However, one or more pieces of account information do not match the required format. The DOD notifies the user that their account information is invalid.

### 7.1.2 – Log In

#### UI Mock-Up 2 – Log In

**See what's happening in  
the ocean right now**

**Join Daintree today.**

**Sign Up**

**Log In**



Email

Password

**Log In**



Email

Password

**Log In**

**Alt**



Email

Password

**Invalid Email or Password**

**Log In**

*Scenario 2 – Log In*

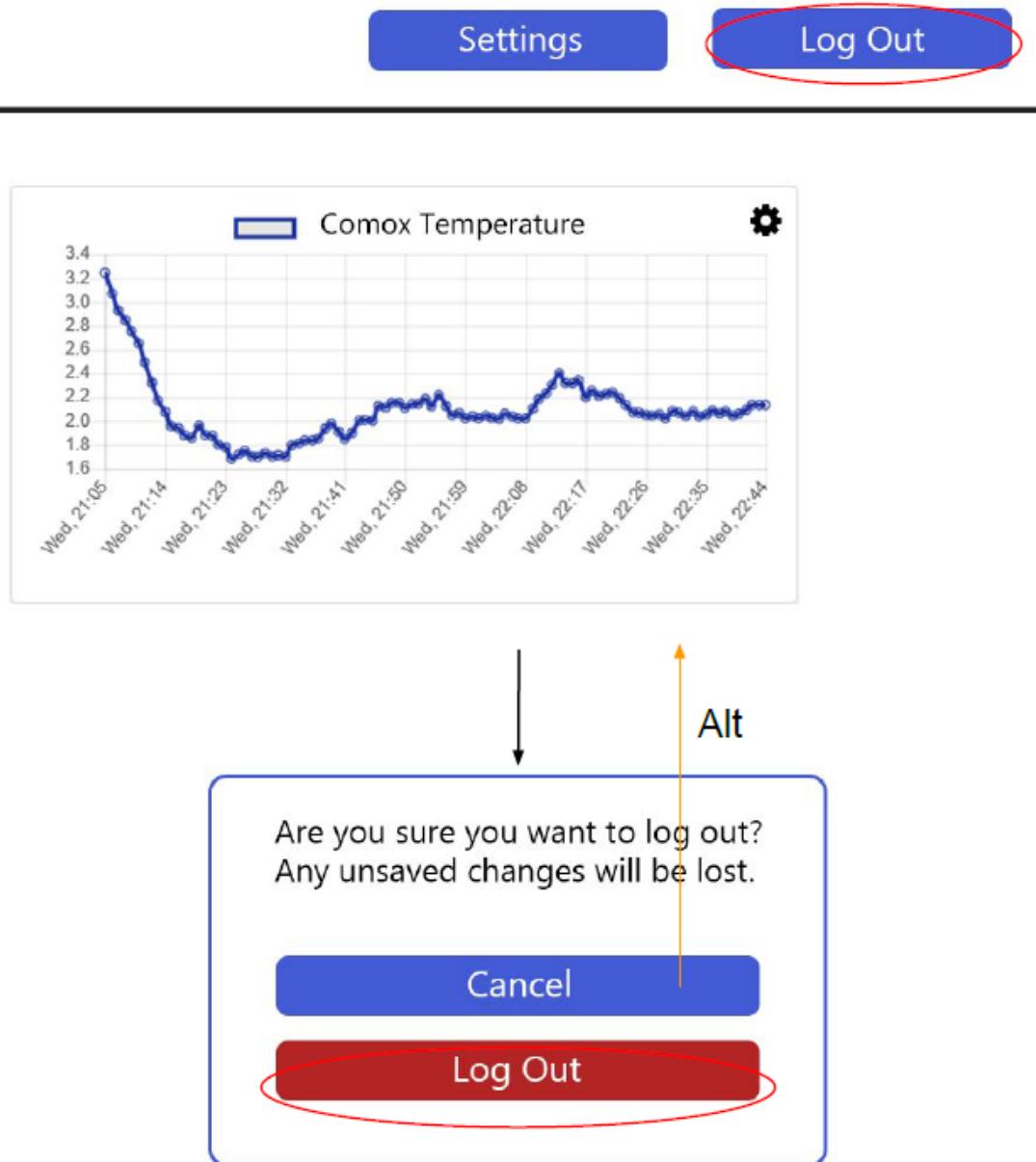
A Free User, Paid User or Admin User has navigated to the login page of the DOD. The user enters their account credentials and submits their account credentials. The DOD logs the user into their account.

*Scenario 2a – Invalid Account Credentials*

A Free User, Paid User or Admin User has navigated to the login page of the DOD. The user enters their account credentials and submits their account credentials. However, either the email address the user entered is not associated with an account, or the password is incorrect. The DOD notifies the user that their account credentials are invalid.

### 7.1.3 – Log Out

*UI Mock-Up 3 – Log Out*



#### *Scenario 3 Log Out*

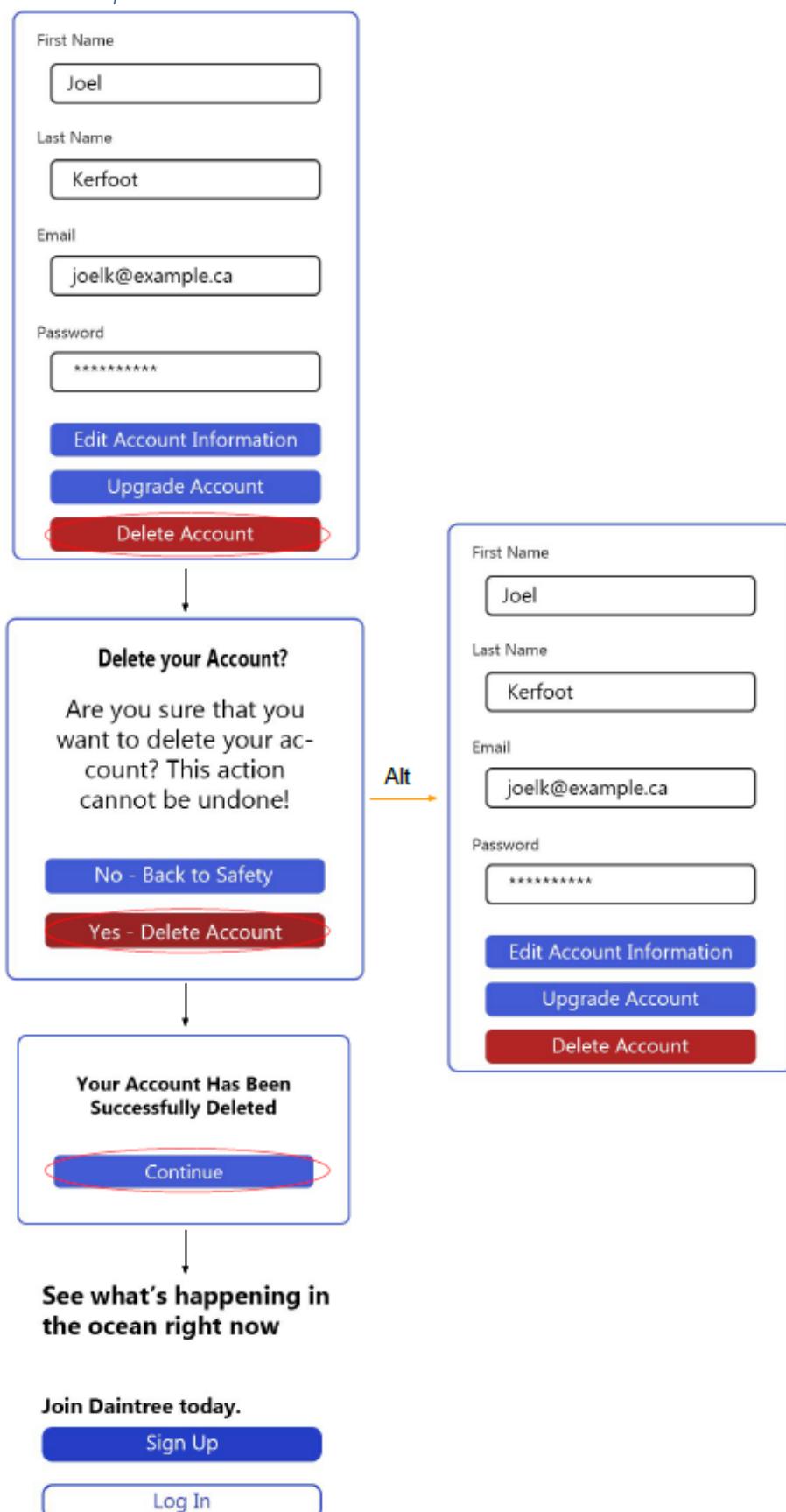
A Free User, Paid User or Admin User is logged into the DOD. The user selects log out. The user is prompted to confirm the log out. The user confirms the log out. The DOD logs the user out of their account and returns the user to the landing page.

#### *Scenario 3a Cancel Log out*

A Free User, Paid User, or Admin User is logged into the DOD. The user selects log out. The user is prompted to confirm the log out. The user cancels the log out. The DOD does not log the user out of their account and returns the user to the page they were on.

#### 7.1.4 – User Deletes Their Account

##### UI Mock-Up 4 – User Deletes Their Account



*Scenario 4 – User Deletes Their Account*

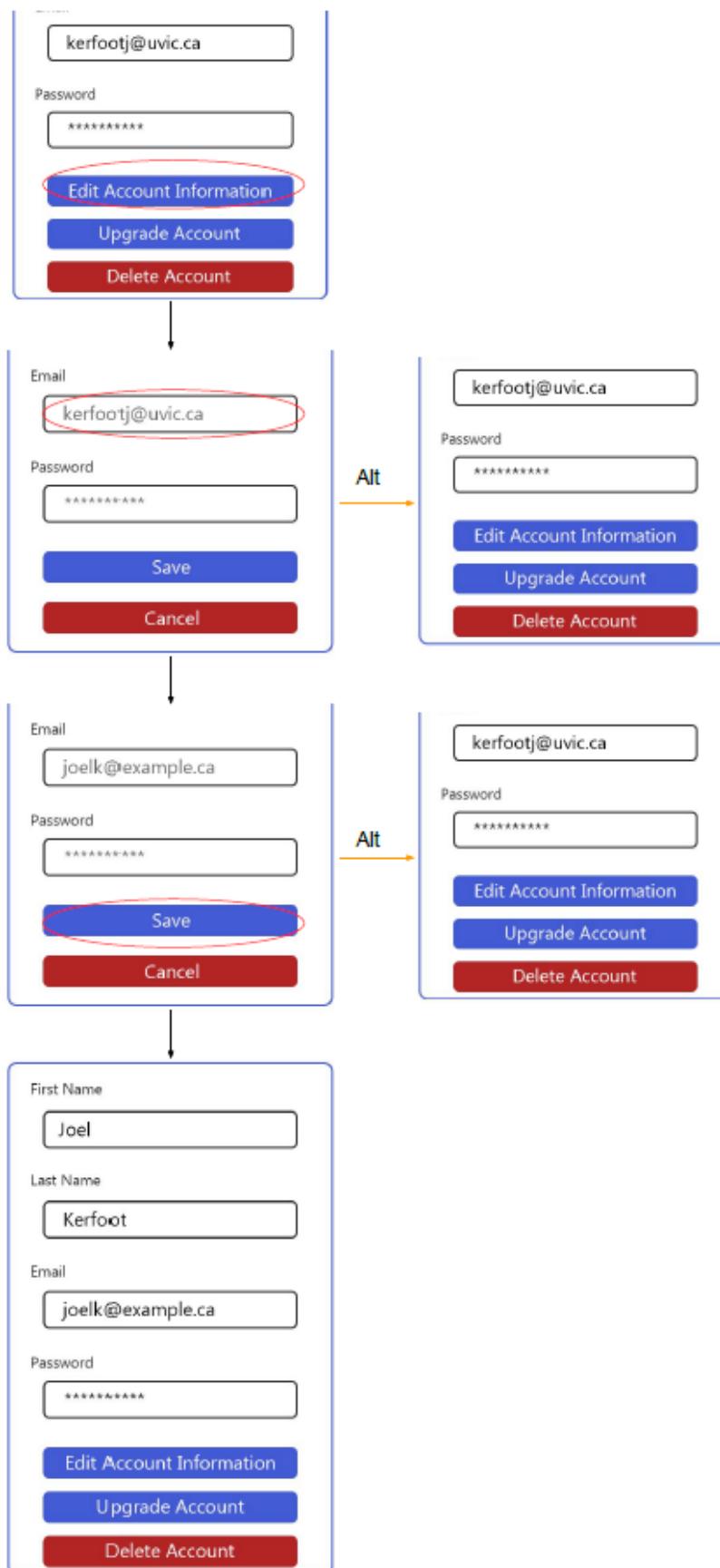
A Free User, Paid User or Admin User is logged into the DOD and has navigated to the account information page. The user selects delete account and confirms that they wish to delete their account. The DOD deletes the user's account, notifies the user that their account was deleted, and returns the user to the landing page.

*Scenario 4a – User Cancels Account Deletion*

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the account information page. The user selects delete account but cancels the account deletion. The DOD does not delete the user's account.

### 7.1.5 – Update Account Information

UI Mock-Up 5 – Update Account Information



*Scenario 5 – Update Account Information*

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the account information page. The user selects edit account information. The user enters changes to their account information and saves the changes. The system updates the user's account information and notifies the user that the update was successful.

*Scenario 5a – User Cancels Account Information Update*

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the account information page. The user selects edit account information. The user cancels the account information update without saving changes. The DOD discards any account information changes that were entered by the user.

## 7.1.6 – Free User Upgrades to a Paid User

### UI Mock-Up 6 – Free User Upgrades to a Paid User



*Scenario 6 – Free User Upgrades to a Paid User*

A Free User is logged into the DOD and has navigated to the account information page. The user selects upgrade account and enters their payment information. The user submits their payment information. The DOD changes the user's account type to Paid User and notifies the user that the upgrade was successful.

*Scenario 6a – User Cancels Account Upgrade*

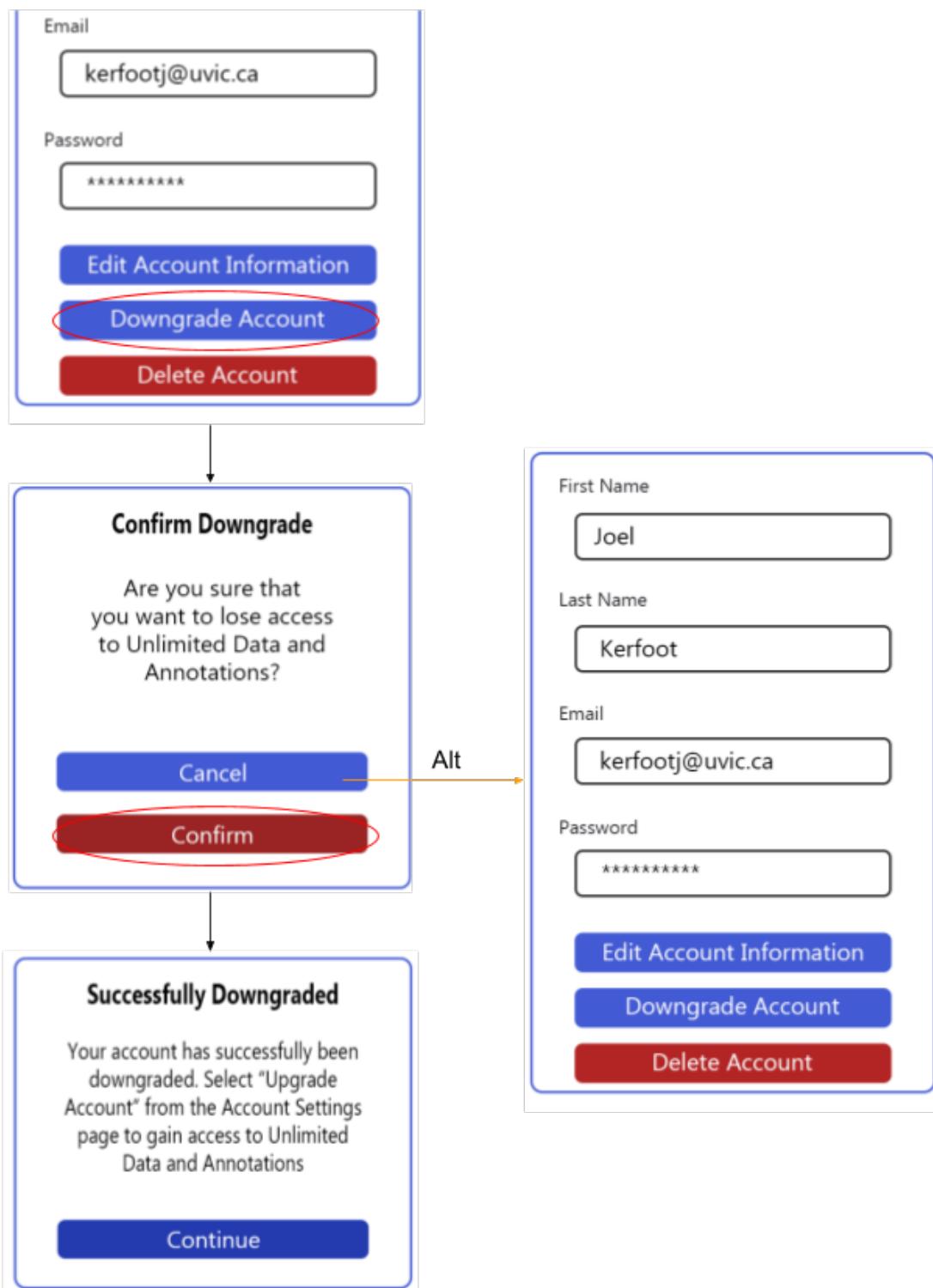
A Free User is logged into the DOD and has navigated to the account information page. The user selects upgrade account but cancels the process before submitting their payment information. The DOD does not upgrade the user's account type to Paid User.

*Scenario 6b – Invalid Payment Information*

A Free User is logged into the DOD and has navigated to the account information page. The user selects upgrade account and enters their payment information. The user submits their payment information. However, the payment information is invalid. The system notifies the user that the payment information they entered is invalid.

### 7.1.7 – Paid User Downgrades to a Free User

UI Mock-Up 7 – Paid User Downgrades to a Free User



*Scenario 7 – Paid User Downgrades to a Free User*

A Paid User is logged into the DOD and has navigated to the account information page. The user selects downgrade account and confirms that they wish to downgrade their account type. The DOD downgrades the user's account type to Free User and notifies the user that the downgrade was successful.

*Scenario 7a – User Cancels Account Downgrade*

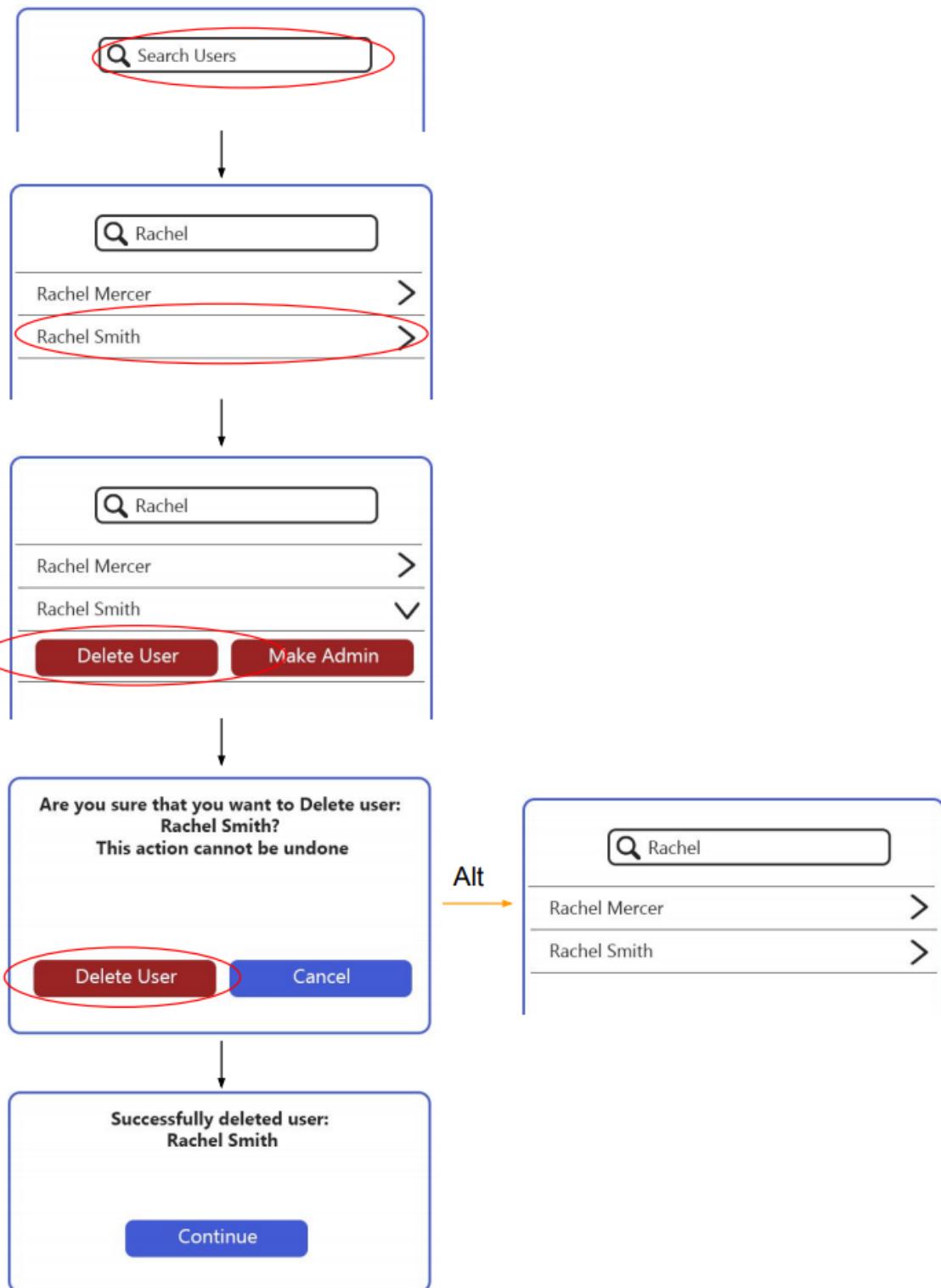
A Paid User is logged into the DOD and has navigated to the account information page. The user selects downgrade account but cancels the downgrade process. The DOD does not downgrade the user's account type to Free User.

## 7.2 Administration

This section provides an example of how the Administration features described in section 3.2 could be implemented in the DOD.

### 7.2.1 – Admin User Deletes Another User’s Account

#### UI Mock-Up 8 – Admin User Deletes Another User’s Account



*Scenario 8 – Admin User Deletes Another User’s Account*

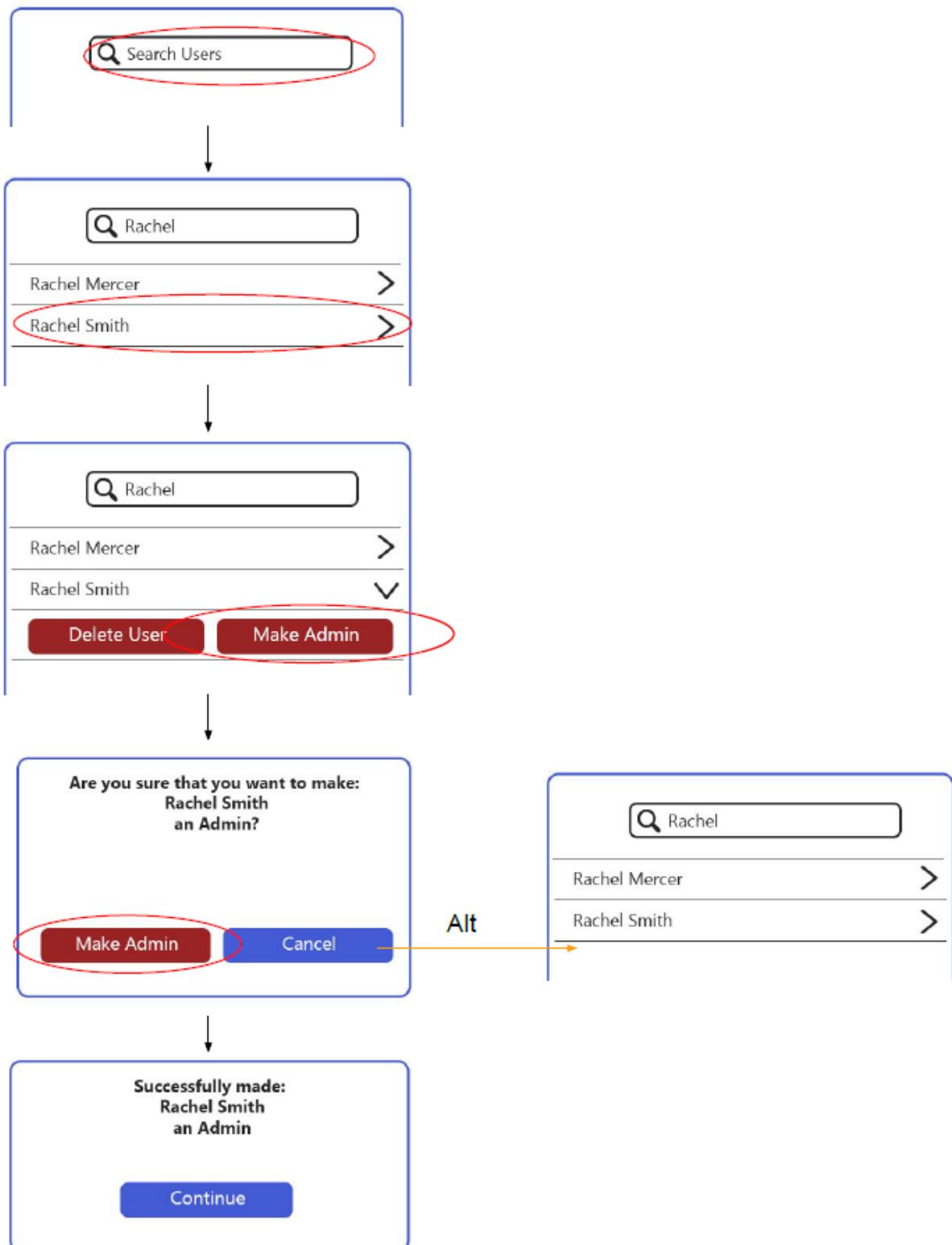
An Admin User is logged into the DOD and has navigated to the admin page. The Admin User enters another Free, Paid or Admin User’s account information and selects the desired account. The Admin User selects delete account and confirms that they wish to delete the account. The DOD deletes the account and notifies the Admin User that the account deletion was successful.

*Scenario 8a – Admin User Cancels Account Deletion*

An Admin User is logged into the DOD and has navigated to the admin page. The Admin User enters another Free, Paid or Admin User’s account information and selects the desired account. The Admin User selects delete account. However, the Admin User cancels the account deletion. The DOD does not delete the account.

## 7.2.2 – Admin User Upgrades a Free User to an Admin User

### UI Mock-Up 9 – Admin User Upgrades a Free User to an Admin User



*Scenario 9 – Admin User Upgrades a Free User to an Admin User*

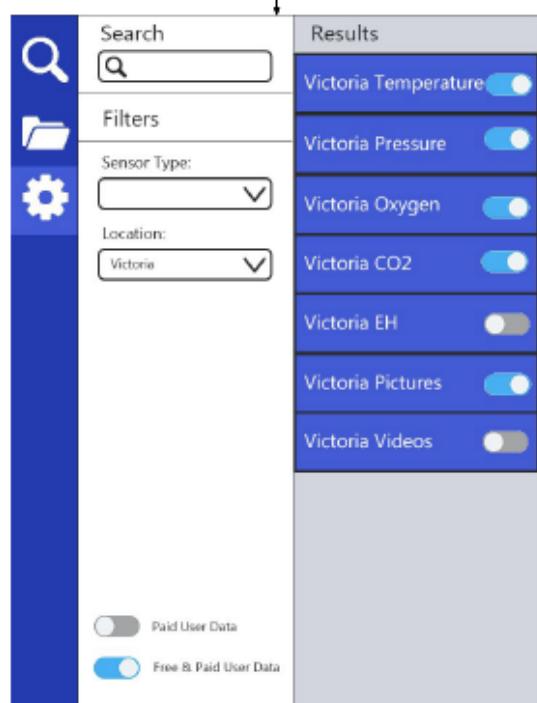
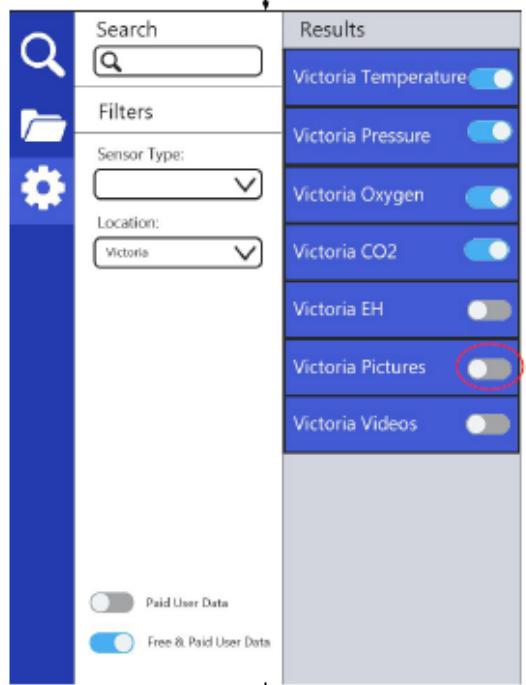
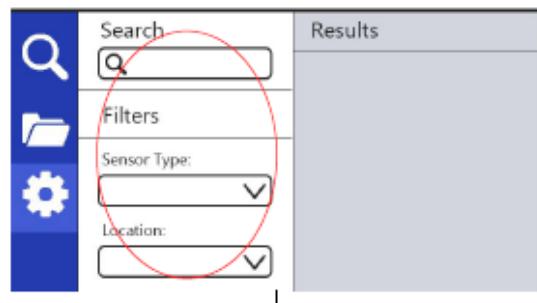
An Admin User is logged into the DOD and has navigated to the admin page. The Admin User enters another Free User's account information and selects the desired account. The Admin User selects make admin and confirms the account upgrade. The DOD upgrades the selected account to Admin User status and notifies the Admin User who requested the change that the upgrade was successful.

*Scenario 9a – Admin User Cancels Account Upgrade*

An Admin User is logged into the DOD and has navigated to the admin page. The Admin User enters another Free User's account information and selects the desired account. The Admin User selects make admin. However, the Admin User cancels the account upgrade. The DOD does not upgrade the selected account to Admin User status.

### 7.2.3 – Manage Sensor Data Classification

UI Mock-Up 10 – Manage Sensor Data Classification



#### *Scenario 10 – Manage Sensor Data Classification*

An Admin User is logged into the DOD and has navigated to the admin page. The user selects 0 or more locations and 0 or more sensor types. The user submits their filter criteria. The DOD displays a filtered list of sensors. The user toggles the data classification for a selected sensor between available to all users and available to only Paid Users and Admin Users. The DOD updates the data classification.

### [7.3 Visualization](#)

This section provides an example of how the visualization features described in section 3.3 could be implemented in the DOD.

### 7.3.1 – Search Data Sets

UI Mock-Up 11 – Search Data Sets

The interface consists of two main sections: a left sidebar with icons for search (magnifying glass) and filters (file folder), and a right panel for displaying results.

**Search Bar:** Contains a text input field with a placeholder icon.

**Filters:** Includes dropdown menus for Date From, Date To, Sensor Type, and Location.

**Results:**

- Top Left Screenshot:** Search bar is empty. Results panel is blank.
- Top Right Screenshot:** Search bar contains "Kamloops". Results panel displays the message: "Sorry but we couldn't find any data that matches your search". A red arrow labeled "Alt" points from the search bar to the results message.
- Bottom Screenshot:** Search bar contains "Vic Comox Temp Pres Cam". Results panel lists the following items:
  - Victoria Temperature
  - Victoria Pressure
  - Comox Temperature
  - Comox Pressure
  - Comox Picture DD/MM:MM
  - Comox Picture DD/MM:MM
  - Comox Video DD/MM:MM

## *Scenario 11 – Search Data Sets*

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user enters a search query of one or more keywords and submits the search query. The DOD updates the filter criteria to match the keyword(s) in the user's search query. The DOD displays a list of one or more sensors with location(s), sensor type(s), and time range that match the filter criteria.

Scenario 11a – Search Query Matched No Data Sets

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user enters a search query of one or more keywords and submits the search query. The DOD updates the filter criteria to match the keyword(s) in the user's search query. However, none of the sensors available to the user have a data set that match the filter criteria. The DOD notifies the user that no data set matched their search query.

### 7.3.2 – Filter Data Sets

#### UI Mock-Up 12 – Filter Data Sets

Search	Results
<input type="text"/>	
<input type="button"/>	
<input type="button"/>	
Date From: <input type="text"/>	
Date To: <input type="text"/>	
Sensor Type: <input type="button"/>	
Location: <input type="button"/>	

Search	Results
<input type="text"/>	Sorry but we couldn't find any data that matches your search
<input type="button"/>	
<input type="button"/>	
Date From: <input type="text"/>	
Date To: <input type="text"/>	
Sensor Type: <input type="button"/>	
Location: <input type="button"/>	

Search	Results
<input type="text"/>	Victoria Temperature
<input type="button"/>	Victoria Pressure
Date From: <input type="text"/>	Comox Temperature
Date To: <input type="text"/>	Comox Pressure
Sensor Type: <input type="button"/>	Comox Picture DD/MM:MM
Location: <input type="button"/>	Comox Picture DD/MM:MM
	Comox Video DD/MM:MM

#### Scenario 12 – Filter Data Sets

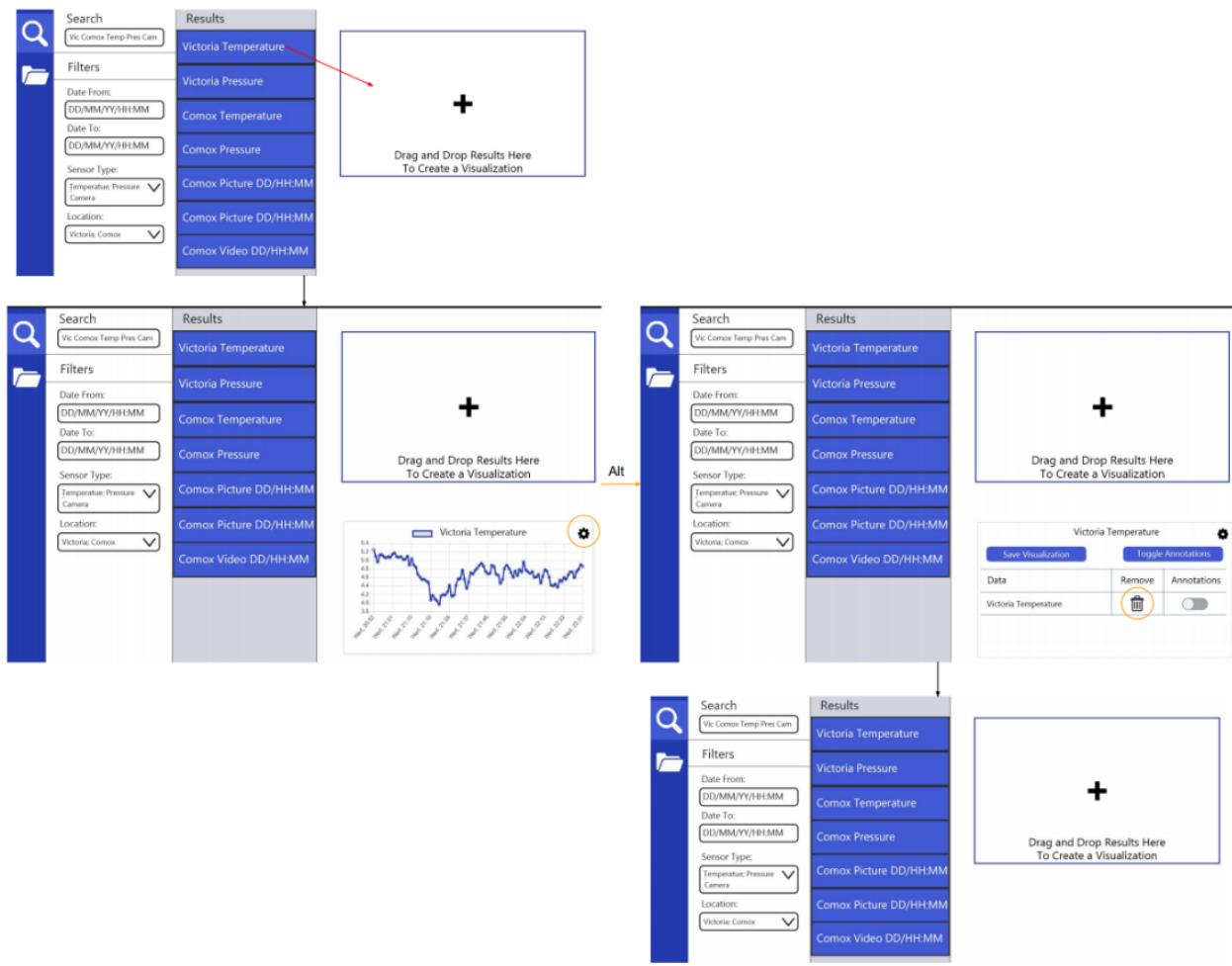
A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user selects zero or more locations, zero or more sensor types, and enters a start date and end date for which to filter data. The user submits the filter criteria. The DOD displays a list of one or more sensors with location(s), sensor type(s) and time range that match the filter criteria.

#### Scenario 12a – Filter Criteria Matched No Data Sets

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user selects zero or more locations, zero or more sensor types, and enters a start date and end date for which to find data. The user submits the filter criteria. However, none of the sensors available to the user have a data set that match the filter criteria. The DOD notifies the user that no data set matched their filter criteria.

### 7.3.3 – Create Visualization

UI Mock-Up 13 – Create Visualization



*Scenario 13 – Create Visualization*

A Free User, Paid User or Admin User is logged into the DOD and has successfully searched or filtered the list of sensors. The user selects at least one and at most fifty sensors from the filtered list of sensors. The DOD displays a visualization that includes the sensors that were selected by the user.

*Scenario 13a – Photo or Video Sensor Selected*

A Free User, Paid User or Admin User is logged into the DOD and has successfully searched or filtered the list of sensors. The user selects exactly one photo or video sensor from the filtered list of sensors. The DOD displays a visualization that includes the sensor that was selected by the user.

*Scenario 13b – Remove Sensor from Visualization*

A Free User, Paid User or Admin User is logged into the DOD and has successfully searched or filtered the list of sensors. The user removes a sensor from the visualization. The DOD updates the visualization to reflect the change.

### 7.3.4 – Save Visualization

UI Mock-Up 14 – Save Visualization



*Scenario 14 – Save Visualization*

A Free User, Paid User or Admin User is logged into the DOD and has created a visualization. The user expands the visualization options and selects save. The user optionally enters a custom name and confirms the save. The DOD saves the visualization along with the name the user entered or a default name if the user did not enter a custom name. The DOD notifies the user that the save was successful.

*Scenario 14a – User Cancels Save*

A Free User, Paid User or Admin User is logged into the DOD and has successfully created a visualization. The user expands the visualization options and selects save. However, the user cancels the save process. The DOD does not save the visualization.

### 7.3.5 – Load Visualization

UI Mock-Up 15 – Load Visualization



*Scenario 15 – Load Visualization*

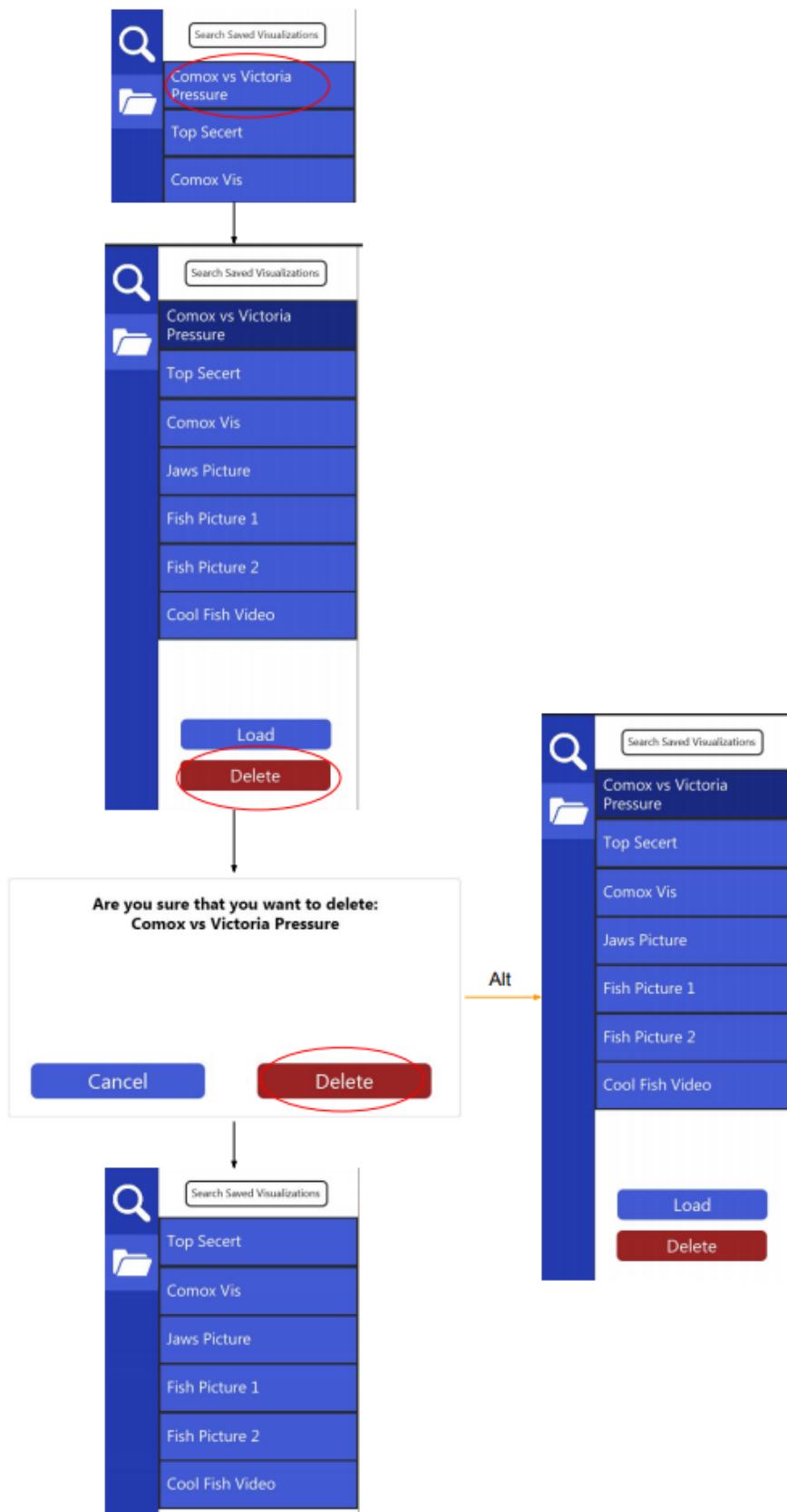
A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user opens the saved visualizations list. The user selects the visualization they wish to load. The DOD loads the selected visualization and displays it to the user.

*Scenario 15a – Incorrect Data Permission*

A Free User, Paid User or Admin User is logged into the DOD and has navigated to the dashboard page. The user opens the saved visualizations list. The user selects the visualization they wish to load. However, the visualization cannot be generated because the user's account type does not match the data classification for one or more of the sensors included in the visualization. The DOD notifies the user that they do not have permission to view the visualization.

### 7.3.6 – Delete Saved Visualization

UI Mock-Up 16 – Delete Saved Visualization



*Scenario 16 – Delete Saved Visualization*

A Free User, Paid User, or Admin User is logged into the DOD and has navigated to the dashboard page. The user opens the saved visualizations list and selects a visualization. The user selects delete visualization and confirms the deletion. The DOD removes the selected visualization from the user's list of saved visualizations and informs the user that the deletion was successful.

*Scenario 16a – User Cancels Visualization Deletion*

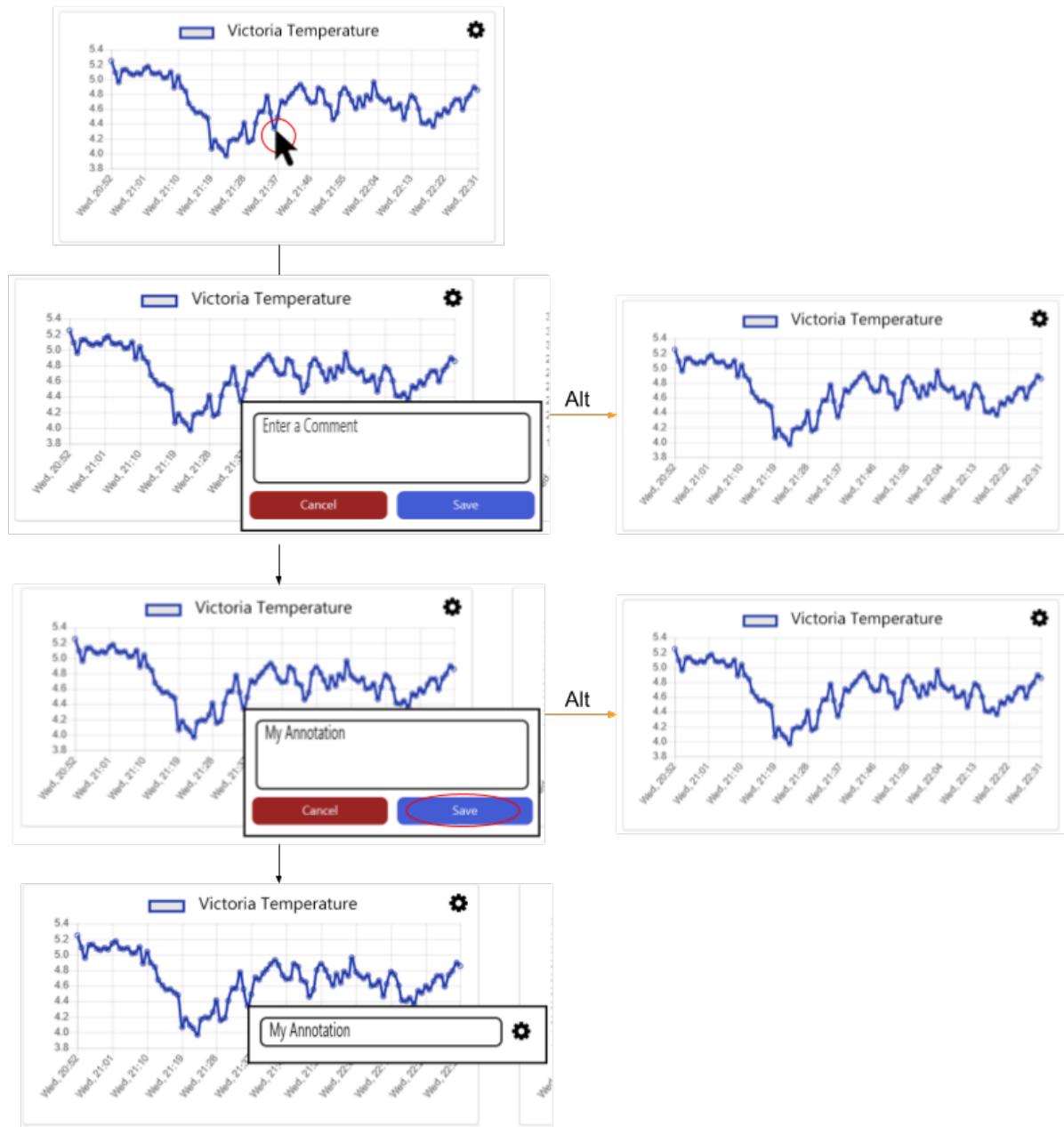
A Free User, Paid User, or Admin User is logged into the DOD and has navigated to the dashboard page. The user opens the saved visualization and selects a visualization. The user selects delete visualization but cancels the deletion. The DOD does not delete the selected visualization.

## 7.4 Annotation

This section provides an example of how the Annotation features described in section 3.4 could be implemented in the DOD.

#### 7.4.1 – Create Annotation

##### UI Mock-Up 17 – Create Annotations



##### Scenario 17 – Create Annotation

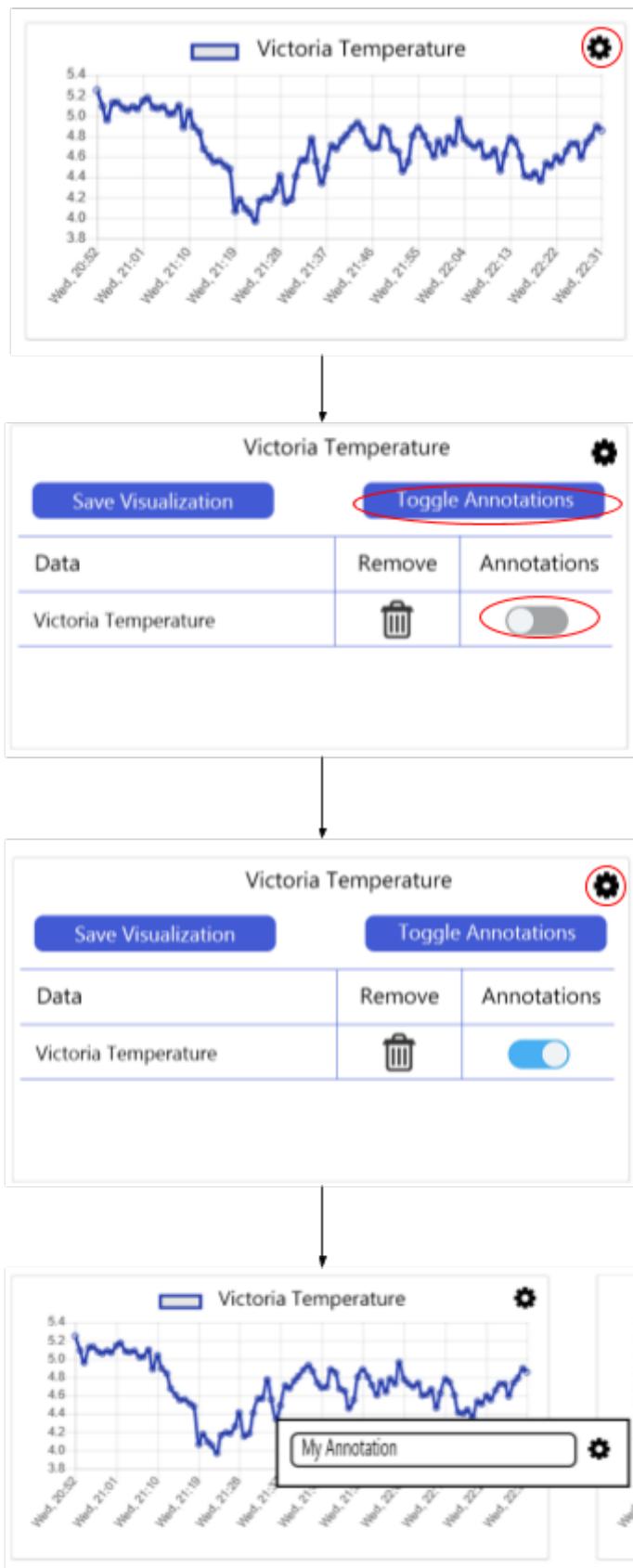
A Paid User or Admin User is logged into the DOD and has created or loaded a visualization. The user selects a data point on the visualization and enters the text content of their annotation. The user submits the annotation. The DOD saves the annotation and links it to the selected data point, and displays the new annotation.

##### Scenario 17a – User Cancels Annotation Creation

A Paid User or Admin User is logged into the DOD and has created or loaded a visualization. The user selects a data point on the visualization and enters the text content of their annotation. However, the user cancels the annotation process without submitting their annotation. The DOD does not create a new annotation.

#### 7.4.2 – Toggle Annotations

UI Mock-Up 18 – Toggle Annotations



*Scenario 18 – Toggle Annotations On*

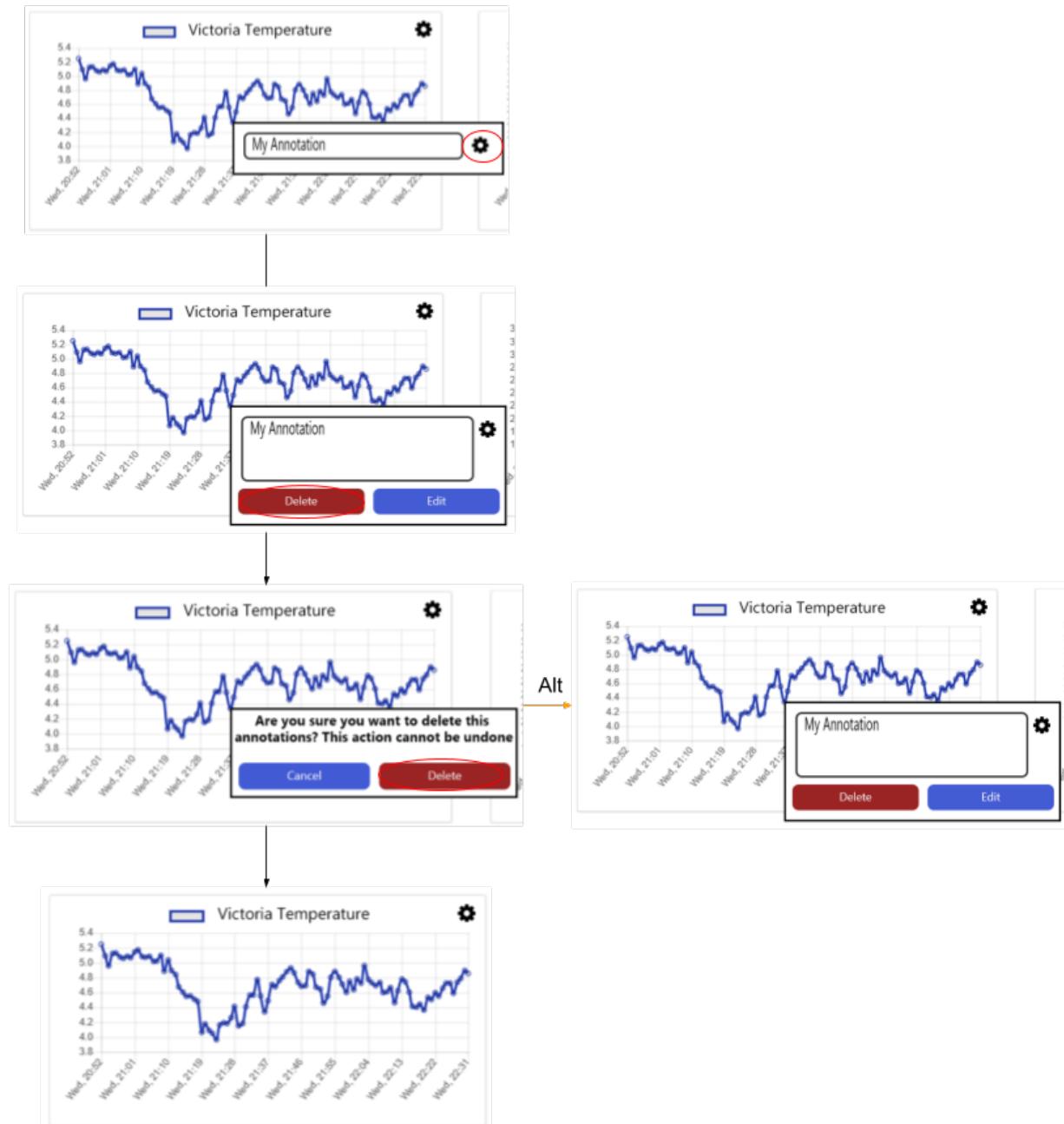
A Paid User or Admin User is logged into the DOD and has created or loaded a visualization. The user selects toggle annotations on. The DOD updates the visualization to display any annotations linked to data points which are included in the visualization.

*Scenario 18a – Toggle Annotations Off*

A Paid User or Admin User is logged into the DOD and has created or loaded a visualization. The user selects toggle annotations off. The DOD updates the visualization to not display annotations.

### 7.4.3 – Delete Annotation

*UI Mock-Up 19 – Delete Annotation*



*Scenario 19 – Delete Annotation*

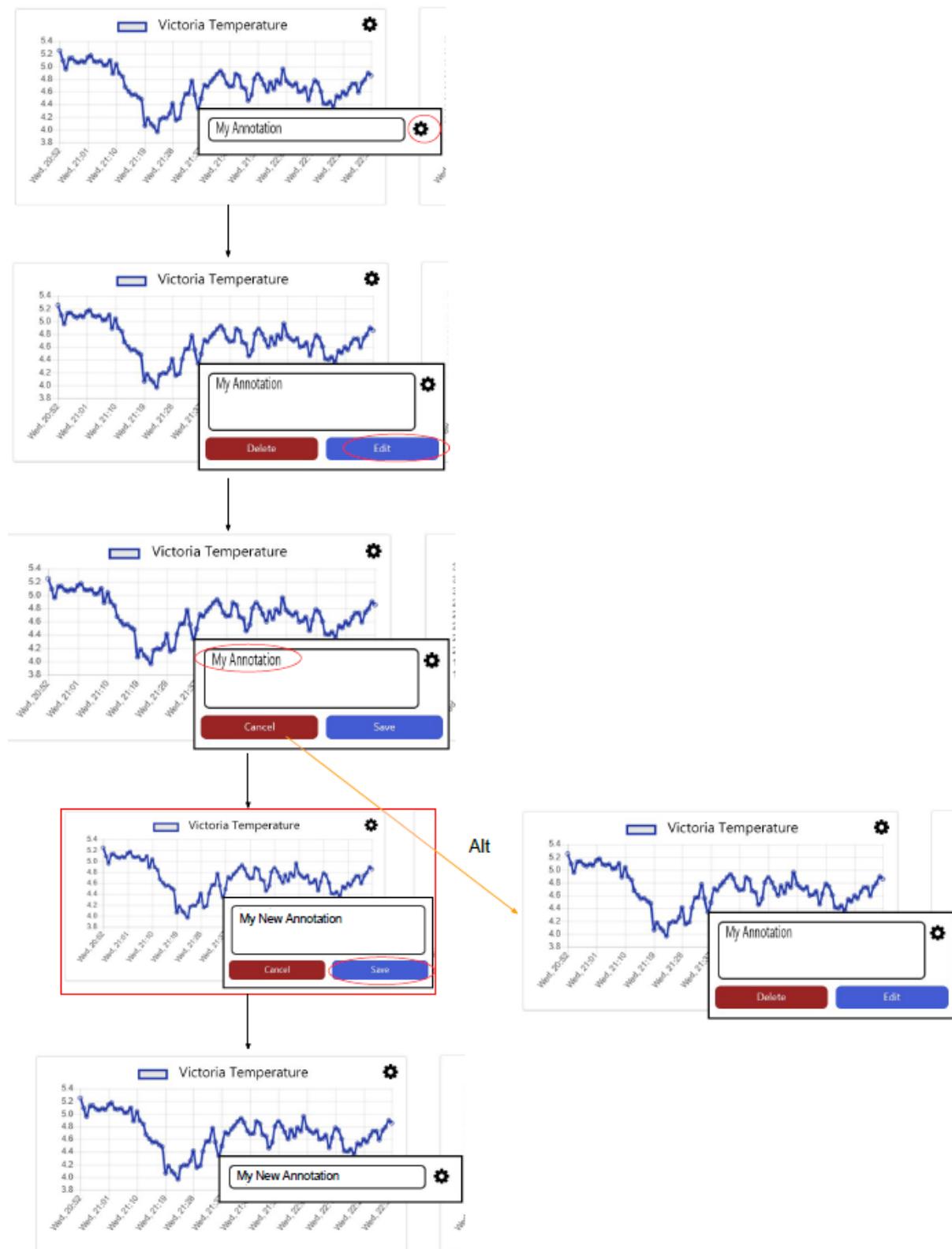
A Paid User or Admin User is logged into the DOD and has successfully toggled annotation on. The user selects an annotation. The user selects the annotation settings. The user selects delete annotation and confirms the deletion. The DOD deletes the selected annotation and notifies the user that the deletion was successful.

*Scenario 19a – User Cancels Annotation Deletion*

A Paid User or Admin User is logged into the DOD and has successfully toggled annotations on. The user selects an annotation. The user selects delete annotation but cancels the deletion. The DOD does not delete the selected annotation.

#### 7.4.4 – Edit Annotation

UI Mock-Up 20 – Edit Annotation



*Scenario 20 – Edit Annotation*

A Paid User or Admin User is logged into the DOD and has successfully toggled annotations on. The user selects an annotation that the user created. The user selects the annotation settings. The user selects edit annotation and edits the text content of the selected annotation. The user submits their changes. The DOD updates the selected annotation to reflect the user's changes and notifies the user that the update was successful.

*Scenario 20a – User Cancels Editing Annotation*

A Paid User or Admin User is logged into the DOD and has successfully toggled annotations on. The user selects an annotation that the user created. The user selects edit annotation and edits the text content of the selected annotation. However, the user cancels the update without submitting their changes. The DOD does not update the annotation.

## Appendix A – Document Revisions

Changes from RD 1.0:

- Requirement tags were changed
- Combined ‘search’ and ‘filter’ feature sections into ‘visualization’ feature section
- Added a new feature “Administration”
- Removed user interface requirements as they are now addressed in functional requirements section
- Changed ‘system’ / ‘new system’ to DOD
- Updated glossary to clarify problems such as data sets/sensors, name of API, etc.
- Removed diagram from 4.2 ‘Communication Interfaces’
- Added authentication requirements to section 5.2.1 (Security)
- Added integration with Stripe is now known as Admin User
- NFR – Portability removed after negotiations with Daintree

## Appendix B – Data Flow Diagram Assembly

### Data Flow Diagram 1

Below is the outline for assembling the Data Flow Diagram Level 1. Each number corresponds to the number labelled on each page (on the bottom right) of the Data Flow Diagram Level 1. Each cell in the table is representative of a page of the Data Flow Diagram Level 1.

Assembly for Data Flow Diagram Level 1

1	2
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### Data Flow Diagram 2

Below is the outline for assembling the Data Flow Diagram Level 2. Each number corresponds to the number labelled on each page (on the bottom right) of the Data Flow Diagram Level 2. Each cell in the table is representative of a page of the Data Flow Diagram Level 2.

Assembly for Data Flow Diagram Level 2

1	2
3	4