Team 4

Air-Traffic Data Set Analyzer
Software Requirements Specification

Version 1.1

11/8/20175

Document Control

Approval

The Guidance Team and the customer shall approve this document.

Document Change Control

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Distribution List

This following list of people shall receive a copy of this document every time a new version of this document becomes available:

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Change Summary

The following table details changes made between versions of this document

Version	Date	Modifier	Description
0.1	4/12/2015	Angel Ortega	Created initial document (template)
0.2	4/14/2015	Jesus Tellez	Added content to section 2
0.3	4/14/2015	Michael Rivera	Completed about 60% of Section 1.
0.4	4/15/2015	Matthew Melendez	Added draft of Non-Behavioral Requirements
0.5	4/19/2015	Michael Rivera	Completed Section 1.
0.6	4/19/2015	Jesus Tellez	Changed content in section 2, added level 2 use case diagram
0.7	4/19/2015	Angel Ortega	Modified section 3.2 and added DFD Diagrams
0.8	4/19/2015	John Delgado	Modified section 3.1
0.9	4/19/2015	Angel Ortega	Merged all documents and corrected format throughout the document
1.0	5/3/2015	Angel Ortega	Updated section 3.2. Created Appendix A for Diagrams

1.1	5/3/2015	Angel Ortega	Finished section 3.2. Moved all models to Appendix A.
1.2	5/7/2015	John Delgado	Modified Section 3.1 and fixed the errors of my section from the returned SRS
1.3	5/8/2015	COMCORP	Final Review and Release

Table of Contents

1. Introduction

This gives as scope description and a brief overview of the items in this document. This section will also provide the purpose of the document as well as a list of defined abbreviated and glossary words.

1.1. Purpose and Intended Audience

The purpose of this document is to give a highly detailed description of the Flight Data Analysis System (FDAT). It will illustrate purpose and complete description for the development of the system. The document will also detail constraints within the system, interfaces, and the interactions involved with it. External interactions of the system will also be explained as well as the purposes of these interactions. The audience targeted by this document is any stakeholder that has word in the requirements of the system or has any influence in the direction of the design. This document is intended to be presented to a representative of the Next-Generation Embry-Riddle Aeronautical University {ERAU} Advanced Research (NEAR) Lab representative as a contract that the requirements and specifications listed on this document are what the client wants and what is to be developed.

1.2. Scope of Product

FDAT is a web-based system retrieves compressed air traffic data and presents an interface for creating meaningful reports and visuals to assist research of flights and interacting factors. The system will be hosted in a remote server. The system will parse and store flight related messages into a database. The user will be able to query and retrieve data in manners that will serve useful for the stakeholders at the NEAR Lab. In addition, the system will provide security features to avoid disclosing classified data to filtered users.

The information used by the system will be based on Aircraft Situation Display to Industry (ASDI) Messages received via a live feed or data from a predefined time frame. The users utilizing the system will provide information that constitutes a specific query, which the system will take in and generate a report in the web-portal that will also be available as a download as a Portable Document Format (PDF), or an Excel spreadsheet. The system provides a method of authentication to serve as a filter when it comes to special information that cannot be disclosed. The amount of information received exceeds the Terabyte mark, so an automatic management system is required to store these amounts of data and to be able to analyze chunks of it. The information is located in the web-server itself, and the system will be able to freely query the data to provide an attractive and clear view of the data. The system will ultimately be used to create readable data reports to be used in research. Information regarding airports and aircrafts will be also accessible through the web, such as names, locations, associations with flight plans, or amendment relationships, and included in the reports that the user specifies.

1.3. Definitions, Acronyms, and Abbreviations

The following sections have detailed information regarding keywords and abbreviations utilized across the Software Requirements Specification (SRS).

1.3.1. Definitions

Table 1 – Keywords & Definitions

KEYWORD	**DEFINITION**
Administrator	Someone who will have full access to user management tools aside from regular access tools
Airspace	Managed air area
Amendments	Changes in the current flight regarding the proposed flight plan
Analytic Data	Filtered information regarding specific data

Boundary Crossing	Movement from two separate and different air spaces
Capacity	Regarding an airspace. Max number of allowed flights
Checkbox	GUI selectable square object, used for selections in the interface
Congestion	High amounts of planned flights within a specific airspace
Database	Abstract depiction of where the data is stored and extracted
Departure	Includes all information from origin of plane, more importantly time
F-Layout	• Follows natural motion of eye • Easier to learn • Helps user find what they need
Feed/Live Feed	Flow of information into the system
Flight Cancellation	Invalidation and indefinite amendment of the involved flight plan
Flight Plan	Written details of a proposed flight
Management	Ability to edit and change aspects of the context in turn
Oceanic Reports	Information regarding crossed identifiable bodies of water
Parse	Separate data or text based on its parts
Query	Inquire a system regarding data
Restricted User	Regular User with exceptions to the data he/she may access
Schema	Representation
Stakeholder	Any individual who interacts with the system and is NOT a developer
Super User	Individual with access to all of the data received by the system and is the only party to be able to accept requests of access for the system.
Track Reports	Information regarding current and past flight locations.
Use-Case Diagram	Graphic depiction of interactions among elements of the system
User	Someone who interacts with the Web Interface
Web-Portal	Web application that hosts and manages the tools of the FDAT

1.3.2. Acronyms

Table 2 – Acronyms & Meaning

TERM	**DEFINITION**
ASDI	Aircraft Situation Display to Industry
ERAU	Embry-Riddle Aeronautical University
FAA	Federal Aviation Administration
FDAT	Flight Data Analysis Tool
GUI	Graphical User Interface
NAS	National Airspace System
NEAR	Next-Generation ERAU Advanced Research
SRS	Software Requirements Specification
XML	Extensible Markup Language

1.3.3. Abbreviations

Table 3 – Acronyms & Meaning

TERM	MEANING
Admin	Administrator
FR	Feasibility Report
IR	Interview Report
PR	Prototype

1.4. Overview

Section 2 will describe the purpose of the system and the interactions it has with the various stakeholders & users. This section goes hand in hand with the META information of the FDAT such as its location, regular users and the assumptions being portrayed. This section will also describe possible constraints that the team may have run into.

Section 3 will cover all of the requirements that the system will be portraying. This part of the document will also go over the various actions of the system and present models based on those topics. More importantly this section goes over the actions that the user will be able to do and it will also identify those who will be using the system. Information of the GUI will be presented under this section in the form of requirements.

1.5. References

[1] Embry-Riddle Aeronautical University. (2015, 01 01). *NEAR Lab | About*. (ERAU) Retrieved 04 12, 2015, from http://www.near.aero/current/about.html#

[2] Gates, A. (2015, February 09). *CS 4310 Software Engineering I: Requirements Engineering Spring 2015.* Retrieved from https://apps.na.collabserv.com/communities/service/html/communityview?communityUuid=9230921d-fea2-4ac8-991a-54239a3b68db#fullpageWidgetId=...

[3] Volpe Center. (2015, February 09). *CS 4310 Software Engineering I: Requirements Engineering Spring 2015.* Retrieved from https://apps.na.collabserv.com/communities/service/html/communityview?communityUuid=...

2. General Description

2.1. Product Perspective

The FDAT will be a web based application. The system will provide analysis on flight data that has been aggregated from the ASDI feed. The users will be able to query data from the database at the NEAR lab and have the system return analytics based on the flight data. The user will be able to enter a query by using an interface that contains check boxes, calendars, and text boxes. Any potential clients, such as commercial airlines or travel agencies, can use the system to better understand how air traffic is affected by weather phenomena and to better predict delays in flights. Airports may also be interested in learning about trends in delays in their flights. Users may visualize the data through graphs and other means, as well as download or print a report of the data. The system will work with the NEAR Database, located in the NEAR lab that contains ASDI feed, to obtain the data. The NEAR Lab is a research lab that gives consultation in several areas of aviation, including air traffic management.

Table 4 - External Sources of Data – details the external data we will utilize

Source	Data	Function
ASDI Feed	Updates of aircraft as it flies	Live flight data
NEAR Database	Stored XML files from ASDI	Stored flight data to feed into system

2.2. Product Features

A Use Case Diagram (Fig. 1) depicts all the uses and users of the system, both human and machine alike. A "use case" is defined as a functionality of the system and is represented by an oval. "Actors" are those that interact with the system in any capacity, and are represented as stick figures.
The actors in this model are:

- Restricted User- an individual that will be using the system to obtain flight data that they are allowed to view.
- Administrator- an individual that manages all restricted user accounts. They set their permissions and processes their requests.
- Super User- an individual that is allowed to see all data, including restricted/barred flights. They also approve new user requests.
- NEAR Database- a data store that contains all recorded ASDI data, which will provide the flight data the system will mine and analyze.

The use cases in this model are:

- Request Account- a user who does not have an account and wishes to use the system may request one. They will complete a request form that is then sent to the administrators.
- View Analytic Data- the users may submit a query to the system. The system will return the appropriate data and provide some trend analysis on it, and return it to the user.
- Generate Report- an extension of the View Analytic Data use case. The user will be able to download a report of the analysis in several ways, e.g. as an excel file, PDF file, or a proprietary format that will be accepted as input to another system/machine.
- Manage Users- the administrator can view a list of users on the system. They may change the permissions of each individual user or group of users to alter what data they will be allowed to see. The superuser is to approve of any new user requests.
- Log In- a use case included in Manage Users and View Analytic Data use cases. The users must first log in to the system before they can perform the aforementioned use cases.
- Upload ASDI Data – the NEAR Database will supply the data set which will be queried by the FDAT.

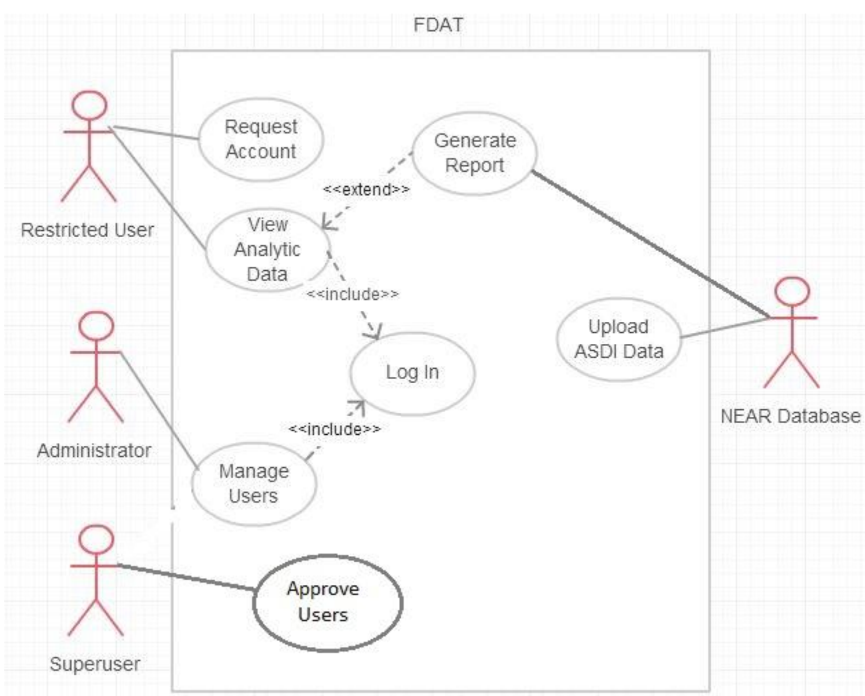

Fig. 1: Use Case Diagram – models the uses and actors of the system

2.3. User Characteristics

Our typical users are going to be from NEAR, plus any companies that may be contracted to the system such as Fed-Ex or Expedia. They are assumed to be utilizing the system to view trends in delays and reroutes in their flights. They are also assumed to have a technical background in utilizing systems and in avionic terminology. The administrator will be expected to have knowledge in managing a website and user accounts. The superuser will be expected to have the proper clearance to view any sensitive data, meaning that the superuser would be a director or supervisor at NEAR.

2.4. General Constraints

General constraints of the system are as followed:

1. The system will only be able to obtain data from the NEAR Database where the ASDI data set is stored.
2. The system cannot update queries automatically if information changes.

2.5. Assumptions and Dependencies

The development team should assume the following:

- All ASDI data utilizes the XML schema.
- All XML Data is tagged.
- Development team will understand XML schema.
- The system will have access to the NEAR Database at all times.
- The NEAR Database will be updated regularly with new data.
- The development team will design for change, allowing for the implementation different types of queries and new report output formats, including but not limited to,
    - Input to other systems not specified here
    - Visualization of other data not specified here

3. Specific Requirements

<< Provides detail that is sufficient to allow the design of a system that will satisfy the requirements. >>

3.1. External Interface Requirements

3.1.1. User Interfaces

3.1.1.1 General

[Req 1] There shall be three different types of users for the system that include an Administrator, Super User, and a Restricted/Filtered User, each with different characteristics of how and what they are able to do within the system which will be described in more detail in the sections below.(IR P.9)

[Req 2] The System shall be a web-based System (IR P.8)

[Req 3] The System shall display only the Air Traffic Data and information that the user was assigned to view by the super user. (IR P.6)

[Req 4] The System shall utilize the F-Layout Design. See definition on page 8 for more information.

[Req 5] The System shall display a Navigation Bar that will give the user access to their account, queries, and privilege specific options. See Figure 1.

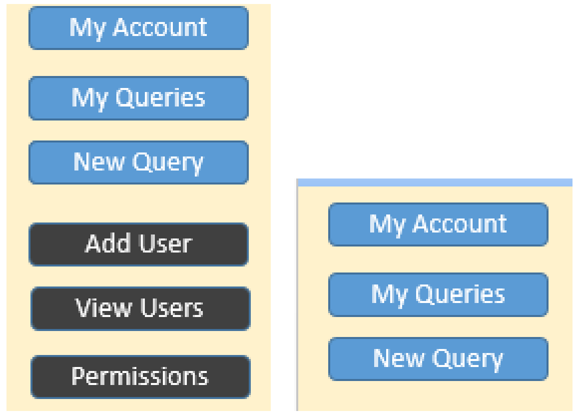

Figure 1: Navigation bar for an administrator (left) and the Navigation bar for a restricted User (right)

3.1.1.2 Login Screen

[Req 6] The Login Screen shall display the name of the system which is: "Air Data Traffic Analysis Tool" in the left corner of the screen that will be present on every web page in the system.(PR S.1)

[Req 7] The Login Screen shall display the Graphic User Interface (GUI) elements listed in table 1.

Table 1: GUI elements for the login screen.

Label	**Element Type**	**Comment**
Username	Textbox	This is where the user would enter the user name associated with their account
Password	Textbox	This is where the user would enter the password for the associated account/Username
Request Account	Hyperlink	This will forward the user to a form that is needed in order to create an account
Forgot Password	Hyperlink	This will forward the user to a form that is needed in order to reset the password on a particular account
Login	Submit Button	This will query the database of users to ensure the corresponding user credentials that are entered are valid and forward the user to the "home" screen of the system.

[Req 8] The Login Screen shall allow for a user to recover their password in the event that they forget their password. (PR S.1)

[Req 9] The Login Screen shall allow for a person to request an account if they are not a user of the system. (PR S.1)

3.1.1.3 Forgot Password Form

[Req 10] The form that is displayed when a user clicks the "forgot password" hyperlink on the Login Screen should contain the Graphic User Interface Elements (GUI) listed in table 2.

Table 2: GUI elements for the Forgot Password Form.

Label	Element Type	Comment
E-Mail	Textbox	This is where the user will enter the e-mail address for their corresponding account
Submit	Submit Button	This will send an e-mail that was entered with instructions on

		how to reset their password

[Req 11] The Forgot Password form shall display an error message when an invalid email address is entered.

[Req 12] The Forgot Password form shall display a confirmation message when a valid e-mail address is entered.

[Req 13] The System shall send an e-mail to the user when a valid e-mail address is entered containing the instructions that must be followed for their password to be reset.(PR S.5)

3.1.1.4 Request User Account Form

[Req 14] The Request User form that is displayed when a user clicks the “Request account” hyperlink on the Login Screen shall display the Graphic User Interface (GUI) elements listed in table 3.

Table 3: GUI elements for the Request User Account form.

Label	Element Type	Comment
First Name	Textbox	Input text where the new User will enter their first name
Last Name	Textbox	Input textbox where the new User will enter their last name
E-mail	Textbox	Input textbox for the new User’s email address
Title	Textbox	Input textbox for the User’s title in the company they work for
Company Name	Textbox	Input textbox for the User’s company
Company Address	Textbox	Input textbox for the User’s company address
Supervisors’ Name	Textbox	Input textbox for the Users supervisor that will be used to contact to verify that the person requesting the account is a legit request.
Supervisors’ Phone Number	Textbox	Input textbox for the User’s supervisor’s phone number that will be used to contact to verify that the person requesting the account is a legit request.
Password	Textbox	Input textbox for User’s Password
Confirm Password	Textbox	Input textbox for the User to re-enter the password that was typed in the Password textbox
Submit	Submit Button	Sends the form to an administrator of the system for review, verification, and follow-up.

[Req 15] The System shall display a message when an E-mail that is entered already has account prompting the User to select one of the options that are shown in table 4.

Table 4: GUI elements that are shown when an E-mail that is entered already has an account

Label	Element Type	Comment
Forgot Password	Button	Will take the user to the forgot password form
Login Screen	Button	Will take the user to the Login Screen
E-mail	Button	Will take the user back to the previous Screen to re-enter their e-mail

[Req 16] A confirmation message shall be displayed after the submit button is pressed and no errors are present in the initial form that is submitted. (PR S.8)

3.1.1.5 Homepage for Users with administrative privileges

[Req 17] The administrator home page shall display the Graphic User Interface (GUI) elements listed in table 4.

Table 4: GUI elements for the administrator home page.

Label	**Element Type**	**Comment**
Add New User	Hyperlink	This will take to the user to the add new user page
Edit User	Hyperlink	This will take the user to the edit user page
Remove User	Hyperlink	This will take the user to the remove user page
Saved Queries	Table	This will hold the saved queries for the user
Logout	Button	This will end the User's session with the system and take them to the login screen again

[Req 18] The administer home page shall contain hyperlinks that are exclusive to the administrator for the following pages:

- Add New User
- Edit User
- Remove User

[Req 19] The Administrator home page shall contain a table that will have any saved searches or queries that the user wishes to save.

[Req 20] The Administrator shall be allowed to do the following on the queries/searches have been saved to the table that is mentioned in the previous requirement:

- Modify Query/search
- Delete Query/ Search
- View Query/ Search
- Edit the name that appears in the Query/Search table
- Duplicate the Query/ Search

3.1.1.6 Add New User Page

[Req 21] The add new user page shall contain a table that displays the current pending applications.

[Req 22] The rows in this table shall be clickable, that when clicked, will display the information that is associated with the pending account. See Figure 2.

[Req 23] The information that is associated with a particular account shall be generated dynamically based on the information that the User has supplied when filling out the Request New User Form. See Section 3.1.1.4 for more information.

[Req 24] The information for the particular account shall be represented with the Graphic User Interface (GUI) elements shown in Table 5.

Table 5: List of GUI elements for the information that is displayed when a pending application is clicked.

Label	Element Type	Comment
First Name	Textbox	Input text where the new User will enter their first name
Last Name	Textbox	Input textbox where the new User will enter their last name
E-mail	Textbox	Input textbox for the new User's email address
Password	Textbox	Input textbox for User's Password

Title	Textbox	Input textbox for the User's title in the company they work for
Company Name	Textbox	Input textbox for the User's company
Company Address	Textbox	Input textbox for the User's company address
Supervisors' Name	Textbox	Input textbox for the Users supervisor that will be used to contact to verify that the person requesting the account is a legit request.
Supervisors' Phone Number	Textbox	Input textbox for the User's supervisor's phone number that will be used to contact to verify that the person requesting the account is a legit request.
Account type	Drop down menu	With the options: 1. Administrator 2. Super User 3. Restricted User
Restrictions	Hyperlink	This will allow a popup window to be displayed that the administrator can select the restrictions on the information that the pending account can view. The popup window can be seen in figure 6.
Submit	Submit Button	Sends the form to an administrator of the system for review, verification, and follow-up.

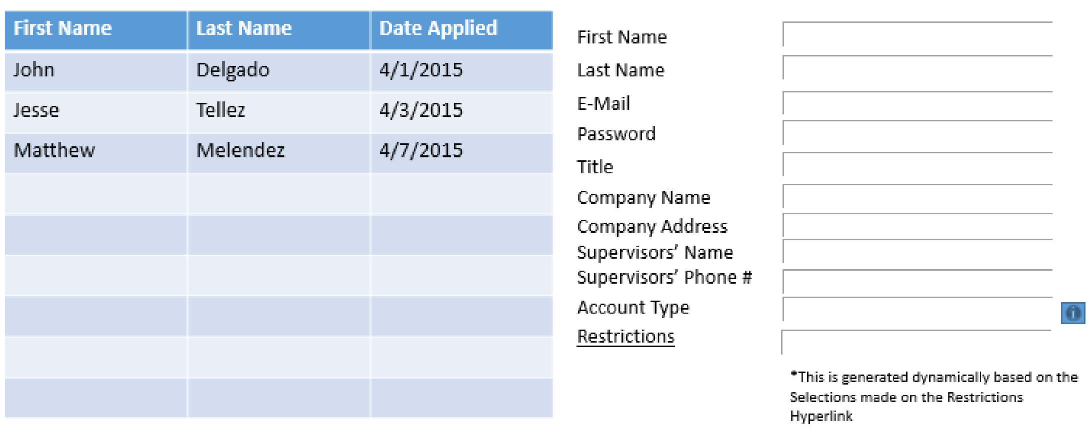

Figure 2: The pending requests table (left) and the information that is displayed after clicking a row in the table (right).

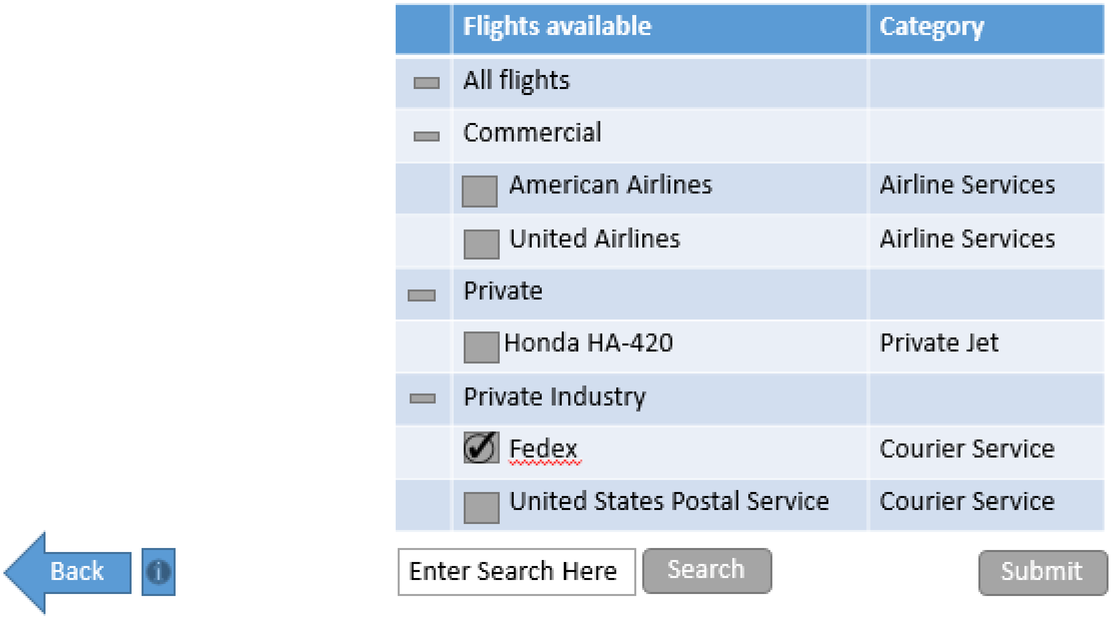

Figure 3: The popup window that would be displayed when the Restrictions hyperlink, that is shown in Figure 5 on the right image, is pressed when creating an account.

3.1.1.7 Edit User

[Req 25] After clicking the edit user hyperlink, the system shall display a Graphic User interface that is displayed as a table with each row in the table, being a clickable hyperlink to the corresponding account that is selected.

[Req 26] The initial table shall contain the GUI elements listed in table 6.

[Req 27] After a row is clicked in the table of available Users the system shall display the information of the corresponding account that includes GUI elements listed in table 7.

[Req 28] If the back button is pressed(shown in Figure 6) without the submit button being pressed, the System shall display a popup window asking the user if they are sure they want to navigate away from the page and lose any changes that have been made.

Table 6: GUI elements for the initial edit user screen

Label	**Element Type**	**Comment**
Table	Table	A table containing the following columns: • First Name • Last Name • Account type The rows in this table will be clickable and transition to the account information of the particular account that is selected.
Back	Button	Back button that will return to the homepage
Logout	Button	Logs the User out of the system

Table 7: GUI elements for the account information that is displayed after clicking the corresponding row in the table of Users.

Label	Element Type	Comment
First Name	Textbox	Input text where the new User will enter their first name
Last Name	Textbox	Input textbox where the new User will enter their last name
E-mail	Textbox	Input textbox for the new User's email address
Password	Textbox	Input textbox for User's Password
Title	Textbox	Input textbox for the User's title in the company they work for
Company Name	Textbox	Input textbox for the User's company
Company Address	Textbox	Input textbox for the User's company address
Supervisors' Name	Textbox	Input textbox for the Users supervisor that will be used to contact to verify that the person requesting the account is a legit request.
Supervisors' Phone Number	Textbox	Input textbox for the User's supervisor's phone number that will be used to contact to verify that the person requesting the account is a legit request.
Account type	Drop down menu	With the options: 4. Administrator 5. Super User 6. Restricted User
Restrictions	Hyperlink	This will allow a popup window to be displayed that the administrator can select the restrictions on the information that the pending account can view. The popup window can be seen in figure 6.
Submit	Submit Button	Sends the form to an administrator of the system for review, verification, and follow-up.

3.1.1.8 Removing a User

[Req 29] After clicking the "Remove user" hyperlink that is shown on the homepage, the administrator shall be redirected to a page that contains a table containing all the Users that are active on the system.

3.1.1.9 Home Page for a User with Super User privileges

[Req 30] The Super User home page shall display the Graphic User Interface (GUI) elements listed in table 8.

Table 8: GUI elements for the Super User home page.

Label	**Element Type**	**Comment**
View Information	Hyperlink	This will take to the user to view the Users that have access to the system. From here they can view account information for the corresponding account
Approve Pending request	Hyperlink	This will take the user to view accounts that need to be approved to have access to the system that the administrator has created accounts for.
Edit Information	Hyperlink	This will take the user to the page where they can edit

		information about their account.
Saved Queries	Table	This will hold the saved queries for the user
Logout	Button	This will end the User's session with the system and take them to the login screen again

[Req 31] The Super User home page shall display any saved searches or queries that the user wishes to save in a table format.

[Req 32] The Super User shall be allowed to do the following on the queries/searches that appear in this table:

- Modify Query/search
- Delete Query/ Search
- View Query/ Search
- Edit the name that appears in the Query/Search table
- Duplicate the Query/ Search

3.1.1.10 View Information

[Req 33] After clicking the view information hyperlink from the Super User homepage, the system shall display the Graphic User Interface (GUI) elements listed in table 9

Table 9: The GUI elements for the Super Users view to view user information

Label	**Element Type**	**Comment**
View information	Table	This table will have columns for the following fields: • First Name • Last Name • Account Type • Approved by • Active Since Each of these rows will clickable hyperlinks that will be linked to the account information for the corresponding account.
Back	Button	This will take the User to the previous page, because no information can be changed here there is no need to generate a pop up that changes will be discarded.
Logout	Button	This will end the User's session with the system and take them to the login screen again

[Req 34] The system shall display account information for the users that are displayed as unmodifiable text-boxes in the list of users for the system and the account information will contain:

- First Name
- Last Name
- E-Mail
- Password (This will be a blank field for security purposes)
- Title
- Company Name

- Company Address
- Supervisors Name
- Supervisors Phone Number
- Account type
- Restrictions

[Req 35] The system shall display the account information in view only mode and not allow any changes to be made to this information.

[Req 36] The System shall display the Graphic User Interface (GUI) elements for the account information shown in table 10.

Table 10: GUI elements for the account information that is displayed after clicking the corresponding row in the table of Users.

Label	Element Type	Comment
First Name	Unmodifiable Textbox	textbox where the Users first name will be displayed
Last Name	Unmodifiable Textbox	Textbox where the users last name will be displayed
E-mal	Unmodifiable Textbox	Textbox where the User's email address will be displayes
Password	Unmodifiable Textbox	Empty field that the super user can not view
Title	Unmodifiable Textbox	Textbox to display the Users title with their company
Company Name	Unmodifiable Textbox	Textbox to display the User's company
Company Address	Unmodifiable Textbox	Textbox to display the User's company address
Supervisors' Name	Unmodifiable Textbox	Textbox to view the name of the users supervisor
Supervisors' Phone Number	Unmodifiable Textbox	Textbox to display the Users supervisors phone number
Account type	Unmodifiable Textbox	With either of these options displayed in the box: 7. Administrator 8. Super User 9. Restricted User
Restrictions	Hyperlink	This will allow a popup window to be displayed that the Super User can view the restrictions on the account. The popup window can be seen in figure 6.

3.1.1.11 Pending Requests page

[Req 37] After clicking the Approve Pending requests hyperlink on the Super Users home page the system shall display the pending requests page with the graphic user interface (GUI) elements shown in table 11.

Table 11: The GUI elements for the pending requests page.

Label	**Element Type**	**Comment**
Table	Table	This table will have columns for the following fields: • First Name • Last Name • Date applied • Created by Each of these rows will clickable hyperlinks that will be linked to the account information for the corresponding account.
Back	Button	This will take the User to the previous page, because no information can be changed here there is no need to generate a pop up that changes will be discarded.
Logout	Button	This will end the User's session with the system and take them to the login screen again

[Req 38] The system shall display a table that shows the list of users that have pending accounts. Each row in this table will be a hyperlink that will direct the user to the approve user screen.

[Req 39] The approve user screen will have the graphic user interface (GUI) elements listed in figure 14.

Table:12: The GUI elements for the approve user page.

Label	Element Type	Comment
First Name	Unmodifiable Textbox	textbox where the Users first name will be displayed
Last Name	Unmodifiable Textbox	Textbox where the users last name will be displayed
E-mail	Unmodifiable Textbox	Textbox where the User's email address will be displayes
Password	Unmodifiable Textbox	Empty field that the super user can not view
Title	Unmodifiable Textbox	Textbox to display the Users title with their company
Company Name	Unmodifiable Textbox	Textbox to display the User's company
Company Address	Unmodifiable Textbox	Textbox to display the User's company address
Supervisors' Name	Unmodifiable Textbox	Textbox to view the name of the users supervisor
Supervisors' Phone Number	Unmodifiable Textbox	Textbox to display the Users supervisors phone number
Account type	Unmodifiable Textbox	With either of these options displayed in the box: 10. Administrator 11. Super User 12. Restricted User

Restrictions	Hyperlink	This will allow a popup window to be displayed that the Super User can view the restrictions on the account.
Send E-mail	Button	This will generate a window that allows the Super user to send an e-mail to the person with the pending account.
Deny	Button	The account will be denied. A confirmation box will be generated along with the reason why the account was not approved
Approve	Button	The account will be approved. A confirmation e-mail will be sent to the account

[Req 40] If the deny button is pressed on a pending account, a pop up window shall be generated as seen in Figure 4.

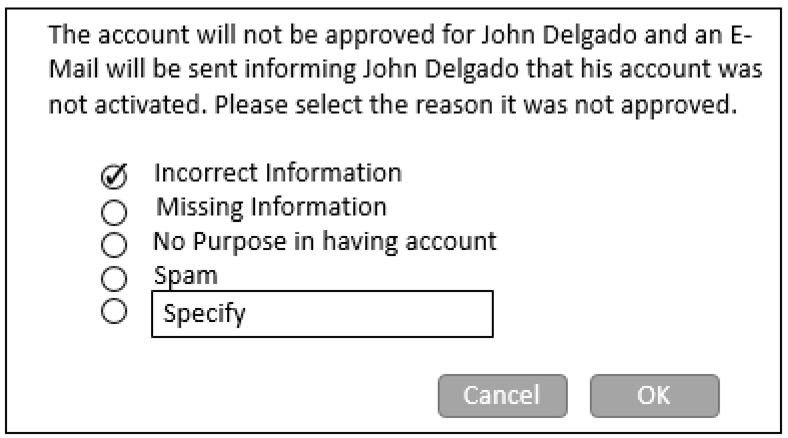

Figure 4: A sample pop up window for when a pending account is denied.

[Req 41] If the approve button is pressed the system shall generate a pop up window that is requesting confirmation that an account will be created. As shown in figure 5 and described in table 12.

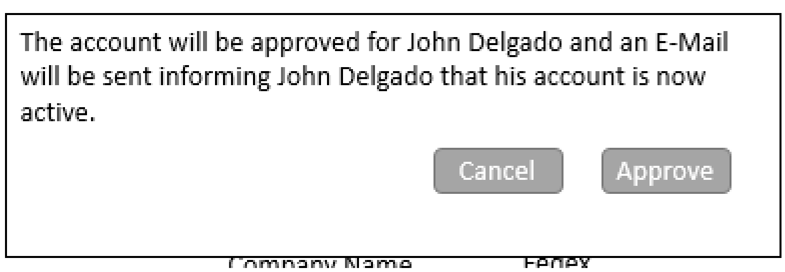

Figure 5: the pop up that is confirming that an account will be created.

3.1.1.12 Edit information for Super User

[Req 42] The “Edit information” hyperlink on the Super User home page the system shall display a new page with the Graphic User Interface (GUI) elements listed in figure 16.

Table 13: the GUI elements for the Edit information page.

Label	Element Type	Comment
First Name	Textbox	Input text where the User can edit their first name
Last Name	Textbox	Input textbox where the User will edit their last name
E-mail	Textbox	Input textbox for the User to edit their email address
Password	Textbox	Input textbox to change the User's Password
Title	Textbox	Input textbox for the User's to change their title in the company they work for
Company Name	Textbox	Input textbox for the User's to edit their company
Company Address	Textbox	Input textbox for the User's to change their company address
Supervisors' Name	Textbox	Input textbox for the Users to change the supervisor that will be used to contact to verify that the person requesting the account is a legit request.
Supervisors' Phone Number	Textbox	Input textbox for the User's to change their supervisor's phone number that will be used to contact to verify that the person requesting the account is a legit request.
Submit	Submit Button	Submits the form and a notification is sent to the administrator and the super user notifying them that modifications have been made.

[Req 43] The system shall allow the user that is logged into the system to be able to change their information associated with their account. If a change, is made a notification will be sent to the administrators and super users informing them of the changes that have been made to their account.

3.1.1.13 Homepage for a Restricted User

[Req 44] The Restricted User home page shall display the Graphic User Interface (GUI) elements listed in figure 18.

Table 14: GUI elements for the Restricted User home page.

Label	**Element Type**	**Comment**
Edit Information	Hyperlink	This will take the user to the page where they can edit information about their account.
Saved Queries	Table	This will hold the saved queries for the user
Logout	Button	This will end the User's session with the system and take them to the login screen again

[Req 45] The Restricted User home page shall display any saved searches or queries that the user wishes to save in a table format.

[Req 46] The Restricted User shall be allowed to do the following on the queries/searches that appear in this table:

- Modify Query/search
- Delete Query/ Search
- View Query/ Search

- Edit the name that appears in the Query/Search table
- Duplicate the Query/ Search

3.1.1.14 Editing information for a restricted user

[Req 47] After the Edit information hyperlink located on the Restricted User home page the system shall display a new page with the Graphic User Interface (GUI) elements listed in figure 16.

Table 15: the GUI elements for the Edit information page.

Label	Element Type	Comment
First Name	Textbox	Input text where the User can edit their first name
Last Name	Textbox	Input textbox where the User will edit their last name
E-mal	Textbox	Input textbox for the User to edit their email address
Password	Textbox	Input textbox to change the User's Password
Title	Textbox	Input textbox for the User's to change their title in the company they work for
Company Name	Textbox	Input textbox for the User's to edit their company
Company Address	Textbox	Input textbox for the User's to change their company address
Supervisors' Name	Textbox	Input textbox for the Users to change the supervisor that will be used to contact to verify that the person requesting the account is a legit request.
Supervisors' Phone Number	Textbox	Input textbox for the User's to change their supervisor's phone number that will be used to contact to verify that the person requesting the account is a legit request.
Submit	Submit Button	Submits the form and a notification is sent to the administrator and the super user notifying them that modifications have been made.

3.1.1.15 Queries

[Req 48] The query screen will have the graphic user interface (GUI) elements listed in table 16.

Table 16: the GUI elements for the query page

Label	Element Type	Comment
Query Type	Drop down menu	Drop down menu with the options: • Flight Plan information by • Compare Flight Plans • Flights by Airspace • Flights by Airport
Query Name	Textbox	This is the name that this particular query will be saved as
Aircraft ID	Textbox	The aircraft that the user would want information on. The User privilege is checked at the time of the query to ensure

		that the user has access to this information. If they don't an error message will be displayed.
Timeframe	Interactive Element	This will allow the user to select the time frame that they want the information from. See figure 6 for a visual representation.
Altitude (only shown when flights by Airspace is selected as the query type)	Textbox	This is where the altitude for the airspace will be entered.
Airport (only shown when Flights by airport is selected as the query type)	Drop down menu	This is generated by the airports that the user has access to.
Airspace Selection	Interactive element	This is where the user can select the airspace. See figure 21 for a visual representation.
Show Flight amendments	Checkbox	This will allow the flight amendments to either be displayed or not in the query being performed.
Produce Totals and Count Deviations	Checkbox	This will allow the query to include the time totals and deviations totals in the query
Show Weather conditions	Checkbox	This will allow the query to include the weather conditions
Save and Submit	Button	This will save the query and submit it. This button will be greyed out and not allow it to be clicked if any of the information entered is invalid.

Figure 6: The interactive time frame element

Figure 7: The interactive Airspace element

[Req 49] After a query has taken place the system shall present the query to the user that displays the information that they wanted in a convenient way. Reference figures 22-25 below for a visual representation on how this information would be presented.

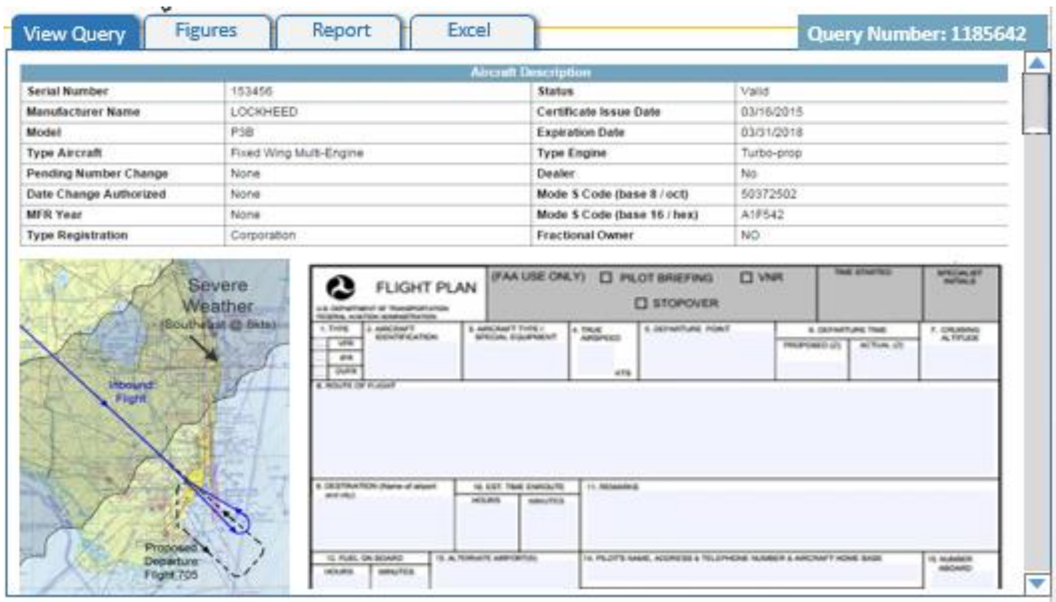

Figure 22: This is how the query would be presented.

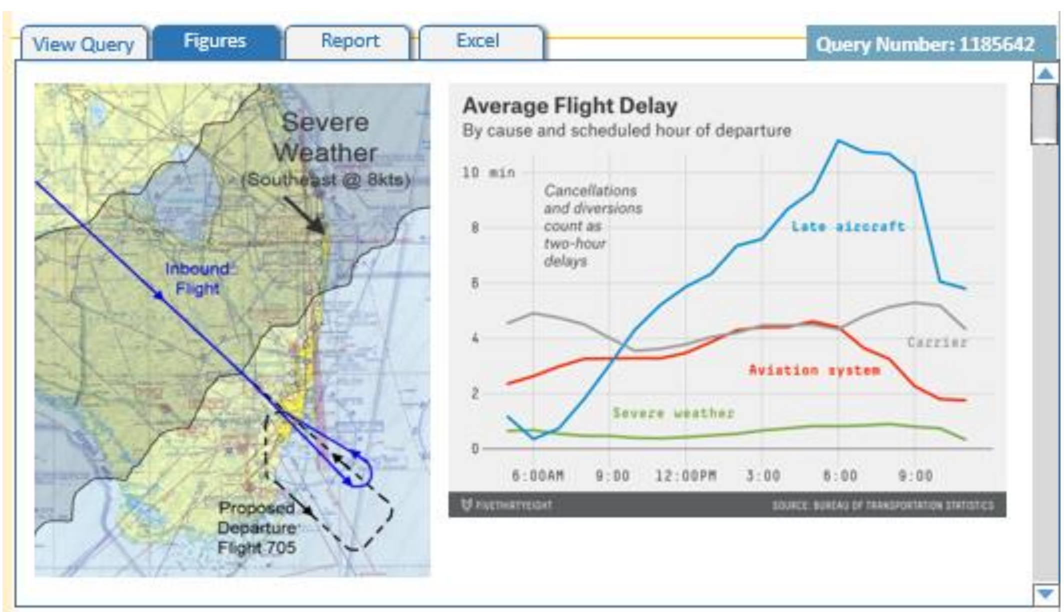

Figure 23: The figures tab after the query was performed.

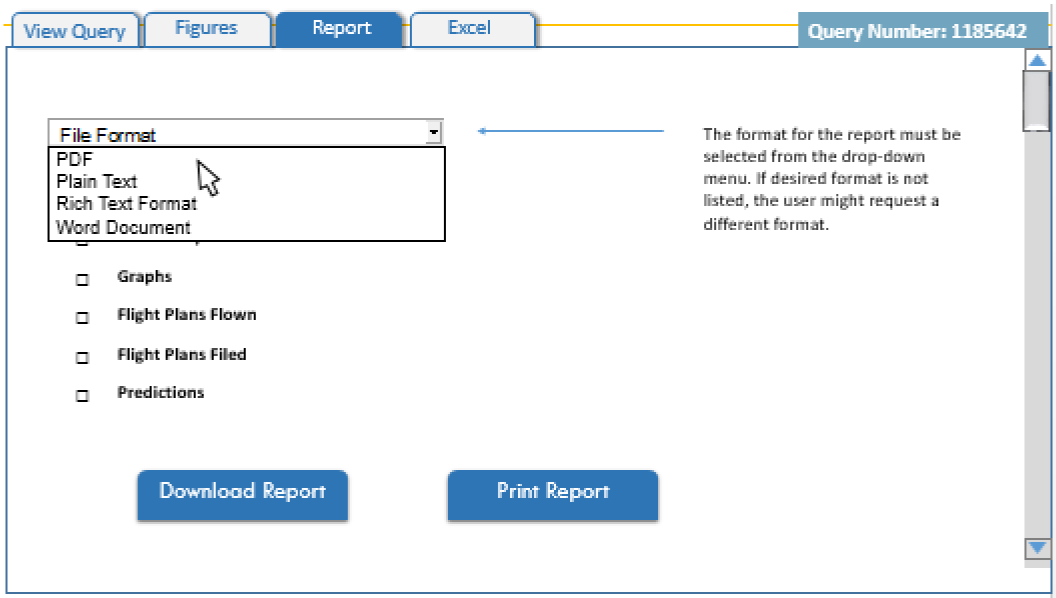

Figure 24: The reports tab after the query was performed.

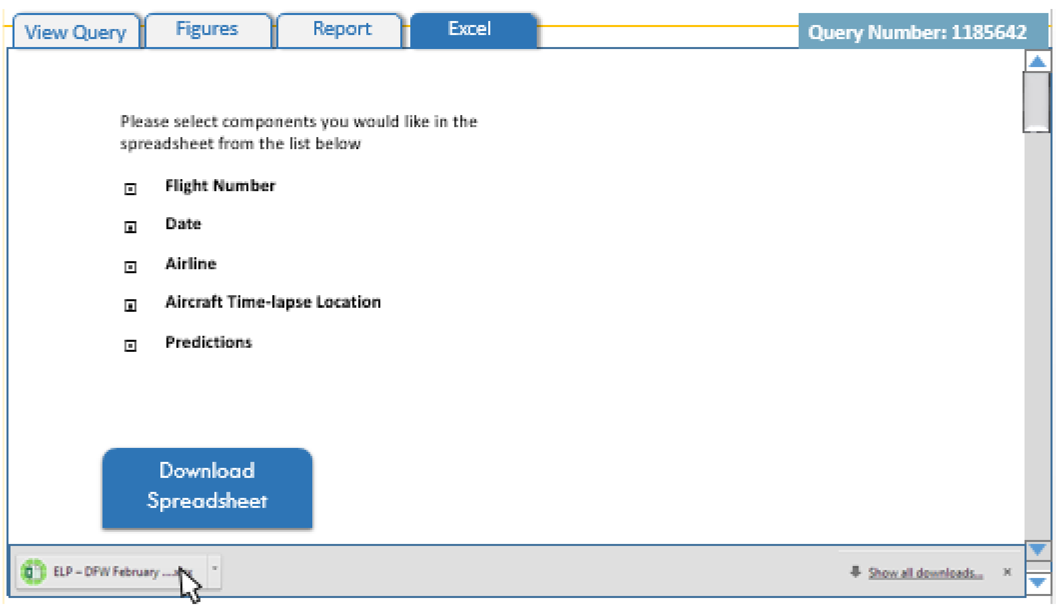

Figure 25: The Excel tab after the query was performed.

[Req 50] The System shall be able to generate a report based on the query that was performed containing the information that the user wishes to have in the document that can be selected from checkboxes.

[Req 51] The system shall allow this report to be saved in a variety of file formats and if the file format that is needed is not a selection, the user shall be able to request a new file format offering that the development team can implement in a future firmware update.

[Req 52] The system shall allow the report to be sent to a printer.

3.1.2. Hardware Interfaces

There are no considerations at this time.

3.1.3. Software Interfaces

- MySQL Version 5.6
- PHP
- Html 5
- CSS

3.1.4. Communications Interfaces

There are no considerations at this time.

3.2. Behavioral Requirements

3.2.1. Class of User

[Req 53] The system shall have three levels of access privileges: Regular User, Super User, and Admin.
[Req 54] User access privilege level shall be stored in the Access Table using the following codes:

- 1: RUser
- 2: SUser
- 3: Admin

[Req 55] The regular user shall have restricted access to data.
[Req 56] The super user shall have access to all data, regardless of provenance or type.
[Req 57] The super user shall monitor access to the system and approve creation, edition, and deletion of existing accounts within the system.
[Req 58] The administrator shall manage the system.
[Req 59] The administrator shall require approval from super user to create, modify, or delete accounts.

3.2.2. Related Real-world Objects

3.2.2.1. Report

[Req 60] The report shall include all data requested by the user when query was created.
[Req 61] The report shall be available to print and to download as a text, word, or PDF file.
[Req 62] The report shall be created when query is run.

3.2.2.2. Flight

[Req 63] Flight information shall be retrieved from XML Packet
[Req 64] Flight class shall include a list of flight plans.
[Req 65] Flight shall include a status of the flight (delayed, on time, re-routed, or cancelled).
[Req 66] Flight status shall be stored in the Status Table using the following codes:

- D – Delayed
- T – On Time

- R – Re-routed
- C - Cancelled

[Req 67] Flight shall have a Flight ID

3.2.2.3. Flight Plan

[Req 68] The flight plan shall include departure airport and time as well as arrival airport and time.

[Req 69] The flight plan shall include a route.

[Req 70] The system shall support both flight plans flown and flight plans not-flown.

3.2.3. Stimulus

[Req 71] When the user clicks the Home button from the sidebar on any screen, the system shall direct the user to the home page.

[Req 72] When the user clicks the My Account button from the sidebar on any screen, the system shall direct the user to My Account page.

[Req 73] When the user clicks Logout button on any screen, FDAT shall log the user out of the system.

3.2.3.1. Log In

[Req 74] When the user inputs an incorrect combination of username and password, the system shall notify the user with a warning.

[Req 75] When incorrect username and/or password are input, the system shall only warn of an incorrect combination, it should not warn which of the two or if both are incorrect.

[Req 76] When the user inputs a correct combination of log in credentials, the system shall direct the user to the Home Page.

[Req 77] When the user clicks on “forgot password?” button, the system shall redirect the user to the Request New Password page.

[Req 78] When the user inputs an invalid email in the Request New Password page, the system shall not warn the user if the email entered is correct.

[Req 79] When the user inputs a valid email in the Request New Password page, the system shall send an email with a link to create a new password.

[Req 80] When the user clicks link sent by the system to Request New Password, the system shall direct the user to the Reset Password page.

[Req 81] When the user inputs mismatching passwords in the Reset Password page, the system shall warn the user with a message: Passwords do not match.

[Req 82] When the user inputs matching passwords in the Reset Password page, the system shall reset old password with new password, and alert the user that password has been changed.

3.2.3.2. New Account

[Req 83] When the user requests a new account, the system shall check all required fields have content

[Req 84] If the required fields are given, the system shall send two emails as follows:

- Email to user requesting account as confirmation
- Email to Super User notifying of new account request

3.2.3.3. Manage Account

[Req 85] When the user clicks on My Account from the sidebar, the system shall direct the user to My Account page.

[Req 86] When the user clicks on Edit Account at the bottom of My Account page, the system shall direct the user to Edit Account page

[Req 87] When the user makes a change to the current information on file in Edit Account page, the system shall highlight that field which was changed.

[Req 88] When the user tries to make a change to a particular field that is restricted, the system shall inform the user through a message that that particular field cannot be modified with current credentials.

[Req 89] When the user clicks Submit Changes button at the bottom of Edit Account, the system shall submit these changes for approval by Super User and modification by Administrator.

3.2.3.4. Change Password

[Req 90] When the user clicks Change Password button at the bottom of My Account page, the system shall direct the user to the Change Password page.

[Req 91] When the user enters wrong old password, the system shall alert the user with a message: Old password is in correct.

[Req 92] When the user enters mismatching new passwords, the system shall alert the user with a message: New passwords do not match.

[Req 93] When the user enters correct old password and matching new passwords, the system shall reset old password with new password and alert the user the change has been made.

[Req 94] When the user incorrectly enters old or new passwords more than five times, the system shall log the user out of the account.

3.2.3.5. New Query

[Req 95] When the user clicks on New Query button on the sidebar, the system shall direct the user to the New Query page.

[Req 96] When the user chooses a query type from the dropdown menu, the system shall prompt the user to input necessary data for specific query type. (Necessary data for specific query type is presented in section 3.1.1.15).

[Req 97] When the user clicks Save and Submit button at the bottom of New Query page, the system shall create and save a query with the input of the user as parameters.

3.2.3.6. My Queries

[Req 98] When the user clicks on My Queries button in sidebar, the system shall direct the user the My Queries page.

[Req 99] When a user clicks on a particular query name in My Queries page, the system shall direct the user to that particular query's results in the View Query page.

[Req 100] When a user first arrives at the View Query page, the system shall display the View Query tab.

[Req 101] When a user clicks a particular tab, the system shall display the data corresponding to that tab. (Section 3.1.1.15 contains greater detail regarding content of the tabs).

[Req 102] When the user clicks Save Query button at the top of View Query page, the system shall open the pop-up window Save Query As so the user can save the query.

[Req 103] When the user clicks on Save Query button in the Save Query As window, the system shall save the query as the name the user gave it in the input box.

[Req 104] Once the system has saved the query, the system shall display a message letting the user know that the query was saved successfully.

[Req 105] When the user clicks on Cancel button in the Save Query As window, the system shall close the window and not make any changes to the query.

[Req 106] When the user clicks on Download Report button at the bottom of the Report tab in the View Query page, the system shall download the report in the format selected by the user.

[Req 107] When the user clicks on Print Report button at the bottom of the Report tab in the View Query page, the system shall open the printing assistant of the current operating system.

[Req 108] When the user clicks on Download Spreadsheet button at the bottom of the Excel tab in the View Query page, the system shall download the spreadsheet with the content selected by the user.

3.2.3.7. Request Report Form

[Req 109] When the user clicks on “Format not listed?” button in the Report tab in the View Query page, the system shall direct the user to the Request Report Format page.
[Req 110] When the user clicks on Submit button at the bottom on Request Report Format page, the system shall send this request for approval by Super User and modification by Administrator.

3.2.3.8. Approve Account (Super User and Administrator only)

[Req 111] When the Super User clicks on the Add User button in the sidebar, the system shall direct the Super User to the Add new User page.
[Req 112] When the Super User clicks on a pending account from the queue in the Add New User page, the system shall open the profile linked to the account in the Approve Account page.
[Req 113] When the Super User clicks on the Approve button below the new user profile in the Approve Account page, the system shall add the account to the Approved Accounts queue to be created by Administrator, the system shall also remove the account from the queue.
[Req 114] When the Super User clicks on the Send email button below the new user profile in the Approve Account page, the system shall open a new email window with the user requesting account as the recipient.
[Req 115] When the Super User clicks the Send button in the email window, the system shall send the email to the recipient and to an Administrator and the Super User as Carbon Copy recipients.
[Req 116] When the Super User clicks on the Deny button below the new user profile in the Approve Account page, the system shall open a window where the Super User can input reasons why the account was not approved.
[Req 117] When the Super User clicks on submit changes button in the Reason for Denial window, the system shall send an email to the user requesting account as recipient notifying him/her that their account was not approved and the reasons for the denial.
[Req 118] When the Administrator clicks on Add User button in the sidebar, the system shall direct the Administrator to the Pending Accounts page.
[Req 119] When the Administrator clicks on an account from the queue in the Add New User page, the system shall open the profile linked to the account in the Create Account page.
[Req 120] When the Administrator clicks on the Create Account button in the Create Account page, the system shall send an email to the user requesting account letting him/her know their account was approved and a link to the Reset Password page, the system shall also remove the account from the queue.

3.2.3.9. View Account (Super User and Administrator only)

[Req 121] When the Super User or Administrator clicks on the View User button in the sidebar, the system shall direct the Super User or Administrator to the View User page.

3.2.3.10. Manage Account (Super User and Administrator only)

[Req 122] When the Super User or Administrator clicks on Permissions button in the sidebar, the system shall direct the Super User or Administrator to the Permissions page.
[Req 123] When the Super User clicks on Submit button at the bottom of Permissions page, the system shall submit the changes to the Administrator for modification.
[Req 124] When the Administrator clicks on Submit button at the bottom of Permissions page, the system shall update the account with the modified fields.

3.2.4. Related Features

There are no external desired services provided by the system at this time, therefore there are no requirements specified at this time.

3.2.5. Functional

The functional requirements are integrated into other sections of the SRS.

3.3. Non-behavioral Requirements

3.3.1. Performance Requirements

3.3.1.1. Concurrent Users

[Req 125] The system shall allow at least 10 end users to access and use the system at any given time.

[Req 126] All end users shall be able to interact with the system independently from any other end user.

[Req 127] Administrators shall be able to access the system while end users are using the system.

[Req 128] Administrators shall be able to modify end user permissions while an end user is logged in.

3.3.2. Qualitative Requirements

There are no qualitative requirements to fulfill at this time.

3.3.2.1. Availability

[Req 129] A backup of non-flight related data shall be made to a secondary database located on a backup server.

[Req 130] User information shall be restored by the backup copy on the backup server.

[Req 131] Flight data shall be stored in a compressed xml file.

[Req 132] The compressed flight data shall be stored on the backup server.

[Req 133] The system's flight data shall be restorable by uncompressing the compressed flight data on the backup server.

3.3.2.2. Security

[Req 134] All online communication shall be encrypted using an SSL/TLS certificate.

[Req 135] Users shall only be allowed to view flights marked on the barred list if they have the appropriate permissions as granted by an administrator.

[Req 136] Users without the proper permissions to view the barred list shall not be granted access to any data marked as being on the barred list.

[Req 137] End users shall not have access to any administrator tools.

[Req 138] User passwords shall not be stored as plain text.

[Req 139] User passwords shall be protected by appending a random salt string.

[Req 140] All salted passwords shall be hashed using the SHA512 hashing algorithm.

[Req 141] The server that hosts the system shall have an encrypted hard drive using the operating system's built in encryption tool.

3.3.2.3. Maintainability

[Req 142] The system shall be divided into NodeJS modules.

[Req 143] Each NodeJS module shall have its own fully qualified package name and git repository.

[Req 144] NPM commands shall be created to allow the system to be built from the independent NodeJS modules.

3.3.2.4. Portability

There are no portability requirements to fulfill at this time.

3.3.3. Design and Implementation Constraints

[Req 145] The client end of the system shall be written in HTML, CSS, and JavaScript.

3.4. Other Requirements

3.4.1. Database

[Req 146] All database tables shall contain a dateCreated, dateModified, createdBy, and modifiedBy field.

[Req 147] All dateCreated fields shall be instantiated by the database to equal the system timestamp of when the record was created.

[Req 148] All dateModifed fields shall be set to the date of the most recent edit of the record.

[Req 149] All createdBy fields shall be set to the username of the user who created the record.

[Req 150] All modifiedBy fields shall be set to the username of the user who has most recently edited the record.

[Req 151] All changes and approvals made to user accounts shall be logged in a table named AccountHistroy.

[Req 152] The database shall be accessed every time a user's identity needs to be authenticated.

3.4.2. Operations

[Req 153] Users shall begin their session with the system by logging in through the login view.

[Req 154] Users shall end their session with the system by clicking the login button on any view.

[Req 155] Users shall be automatically logged out if they do not interact with the system for more than 10 minutes.

3.4.3. Site Adaptation

[Req 156] The client end of the system shall support access from the following web browsers: Google Chrome (v31+), Mozilla Firefox (v31+). Opera (v27+), and Internet Explorer (v10+).

[Req 157] The server side of the system shall be executable on the following operating systems: Debian Linux, Microsoft Windows, and OS X.

4. Appendix A

Here will be all the diagrams for the system:

- Use Case Diagram
- Class Diagram
- Data Flow Diagram (Context Diagram, Level 1 DFD, and Level 2 DFD)
- State Transition Diagram

4.1. Use Case Diagram

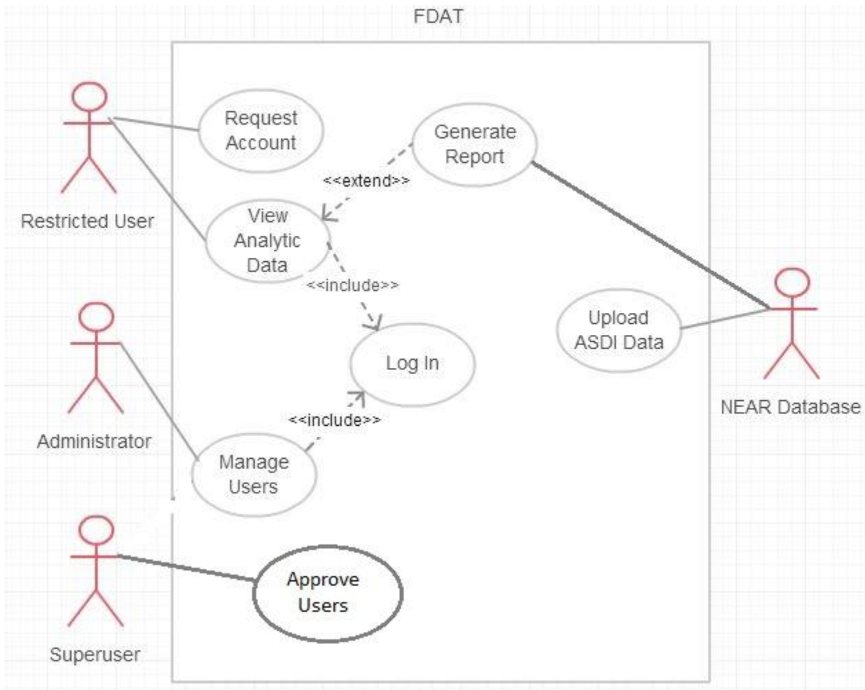

Figure A-1: Use Case Diagram – models the uses and actors of the system

4.2. Class Diagram

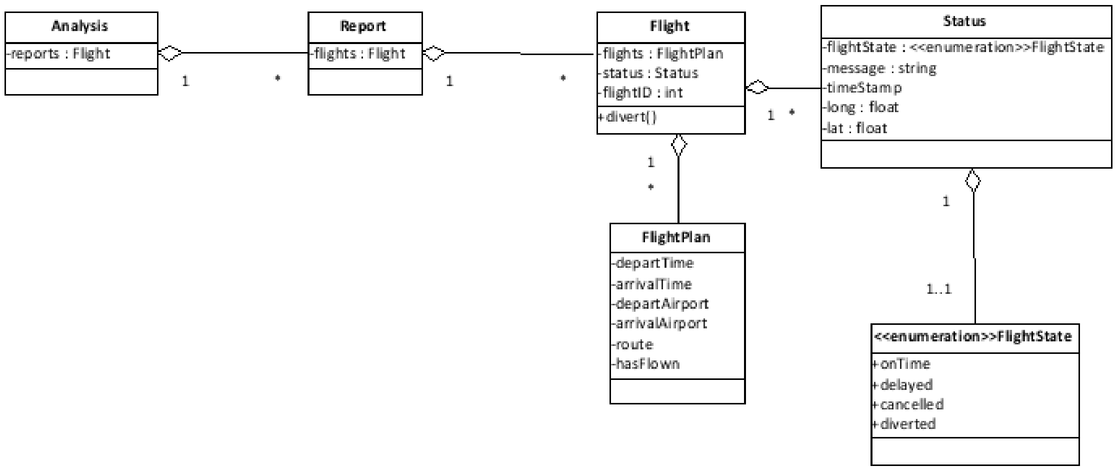

Figure A-2: Class Diagram – models the classes of the system

4.3. Data Flow Diagram (Context Diagram, Level 1 DFD, and Level 2 DFD)

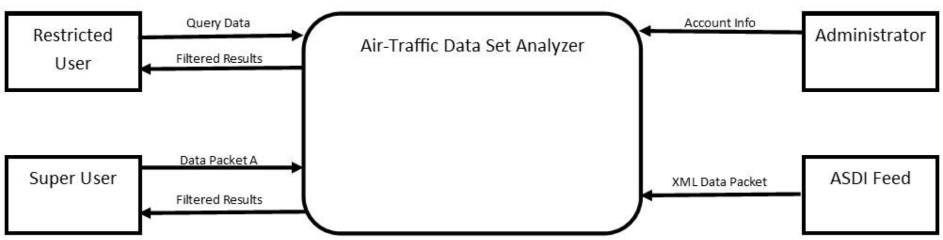

Figure A-3: Level 0 DFD – Context Diagram – models sources, sinks, and data flows in and out of the system

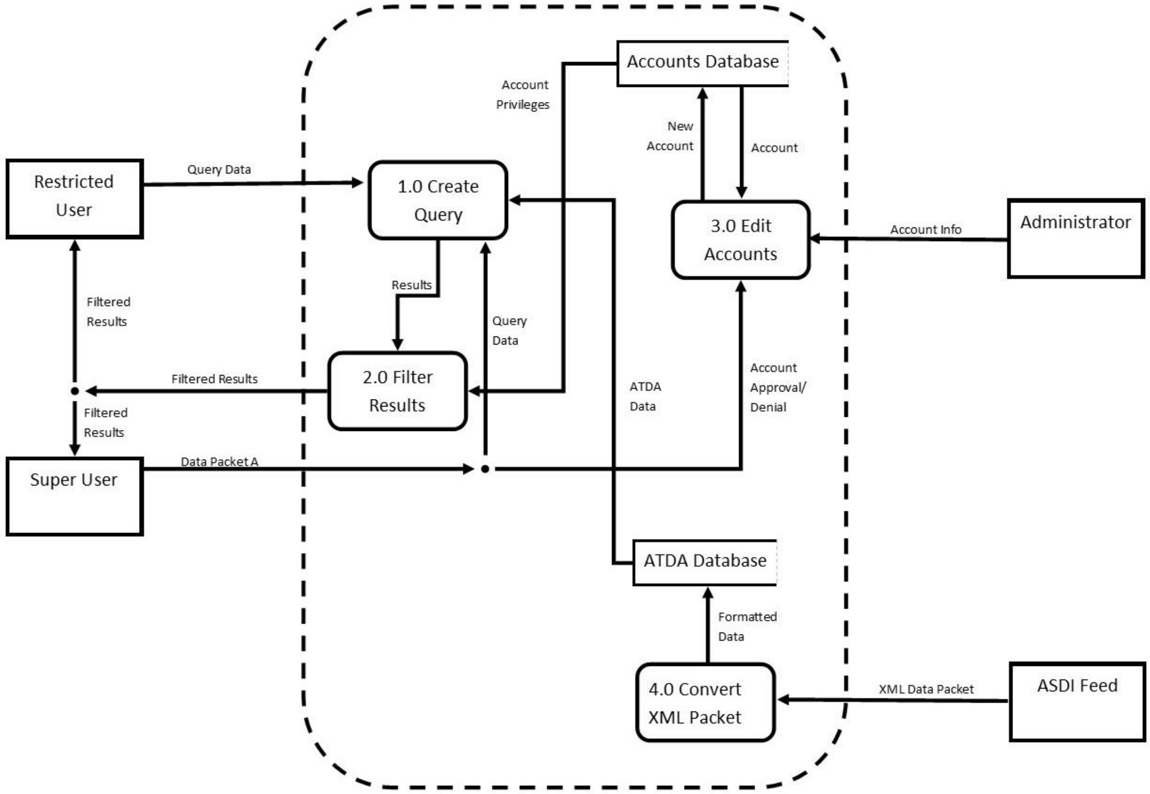

Figure A-4: Level 1 DFD – models sources, sinks, processes, data stores, and data flows inside, in, and out of the system

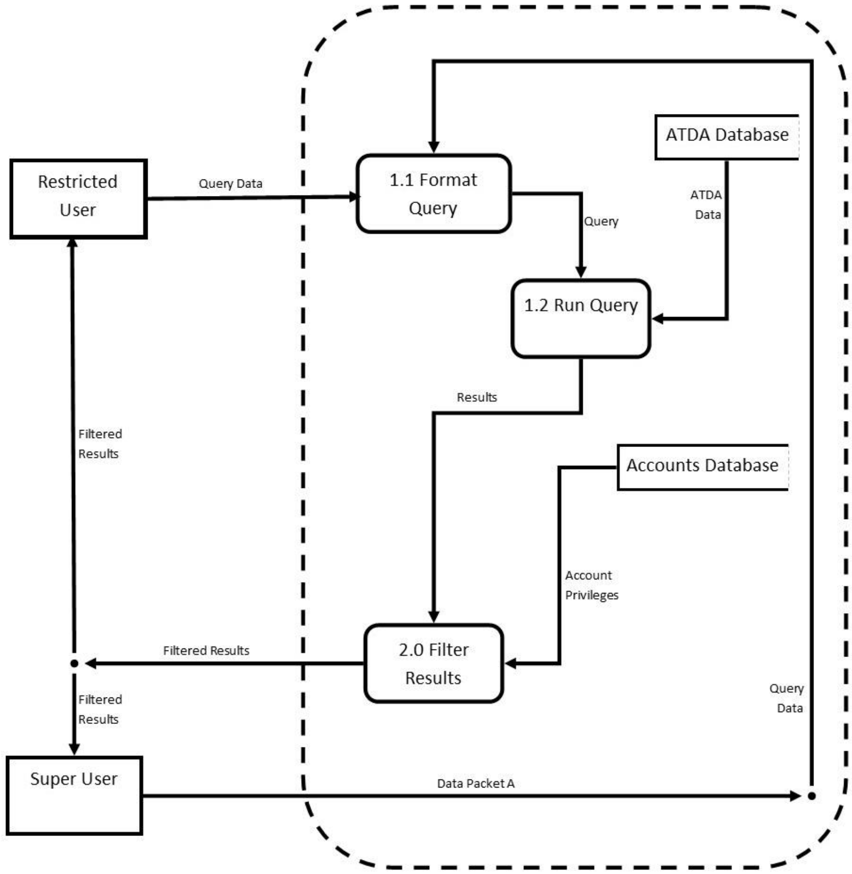

Figure A-5: Level 2 DFD of 1.0 Create Query – models sources, sinks, sub-processes, data stores, and data flows inside, in, and out of the system related to 1.0 Create Query process.

4.4. State Transition Diagram

5. End of Document

End of Document