# Team 000000000111

# Airport Map

# Written Requirements

## *Revision History*

| Authors | Description of Change | Sections | Rev | Date |
|---|---|---|---|---|
| Lola H. | Added basic terminology. | 2 | 1 | 2/27/18 |
| Matthew Noack | Added functions of program. | 1 | 1 | 2/27/18 |
| Christine Trujillo | Added to part 3 | 3 | 1 | 3/6/18 |
| Christine Trujillo | Removed unnecessary rows in tables | 1 & 2 | 2 | 3/20/18 |
| Christine Trujillo | Fixed grammar in terminology | 2 | 2 | 3/20/18 |
| Lola | Overview made more concise | 1.1 | 3 | 3/22/18 |
| Matthew Noack | Updated Table of Contents | 1 | 1 | 4/1/18 |
| Lola | Renumbered RIDs that were duplicated (0019, 0020) | 5 | 1 | 4/12/18 |
| Christine Trujillo | Fix Table of Contents | Table of Contents | 4 | 4/17/18 |

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# Team Description

| Team Member Name | Email Address |
|---|---|
| Christine Trujillo | christinetru@csu.fullerton.edu |
| Yushuo Lu | yushuolu@csu.fullerton.edu |
| Matthew Noack | matthewnoack@csu.fullerton.edu |
| Lola Holiday | lolaholliday@csu.fullerton.edu |

# Terminology

The following table defines terms used within this document.

| Term | Definition |
|---|---|
| Vertex | An object that is connected by edges. It must be defined by an unique (x,y) coordinate. |
| Edge | A line directly linking any two vertices. An edge starts at vertex A and ends at vertex B. |
| Path | A network of one or more edges that links two specific vertices. |
| Airline | Main customer of the software; based on certain use cases, the airline alternates between primary actor and secondary actor. |
| FAA | Regulator of the software, can directly modify any flight's path data. It creates all of the vertices and edges. |

# Airport Map

## 1.1 Overview

The Airport Map program calculates optimum flight paths of shortest computed flight distances based on FAA-created maps. Two user types exist within the program: the FAA user and the Airline user. The FAA user type creates map locations with given (x,y) coordinates, creates vertices, creates edges, removes vertices, remove edges, disable vertices, disable edges, and delete paths. This user type also disables or deletes vertices on the map. The Airline user type requests flight paths between vertices.

The FAA user type **shall** have the following capabilities:

Add vertex RID-0001

Add edge RID-0002

Delete vertex RID-0003

Delete edge RID-0004

Disable vertex RID-0005

Disable edge RID-0006

Delete Path RID-0007

The Airline user type **shall** have the following capabilities:

Create path RID-0008

### 1.1.1 Create elements for map

The system allows the FAA user to add vertices and edges to the map, which will initially be empty.

1.1.1.1 Create an vertex

1.1.1.1.1 The system **shall** allow the FAA user to create a new vertex. RID-0009

1.1.1.1.2 The system **shall** allow the FAA user to input the coordinates, name and location of the vertex. RID-0010

1.1.1.1.3 The system **shall** test to check if a vertex already exists at the given coordinates. If a vertex at the given coordinates does not exist, then the new vertex is created, else, the new vertex is not created. RID-0011

1.1.1.2 Create an edge

1.1.1.2.1 The system **shall** allow FAA to create an edge between two vertices. A valid vertex is an vertex recognized as a legitimate vertex by the FAA. RID-0012

1.1.1.2.2 The system **shall** display the current vertices and allow the FAA to select the two vertices that the edge will connect. The flight distance (in miles) between vertices is stored within the system. RID-0013

### 1.1.2 Remove elements from the map

The system allows the FAA user to remove vertices and edges from the map when an vertex or edge is deleted or canceled.

1.1.2.1 Delete an vertex
1.1.2.1.1 The system **shall** allow the FAA user to remove a vertex from the map permanently. RID-0014
1.1.2.1.2 The system **shall** then delete the vertex and any connecting edges. RID-0015
1.1.2.1.3 The system **shall** delete paths affected by these deletions and notify the Airline user of these deletions. RID-0016
1.1.2.2 Delete an edge
1.1.2.2.1 The system **shall** allow the FAA user to remove an edge from the map permanently. RID-0017
1.1.2.2.2 If the edge exists, the system **shall** remove the edge. RID-0018
1.1.2.2.3 If the edge does not exist, the system **shall** notify the FAA user that no such edge exists. RID-0019

1.1.2.2.4 The system **shall** delete paths affected by these deletions and notify the Airline user of these deletions. RID-0020
1.1.2.3 Disable a vertex
1.1.2.3.1 The system **shall** allow the FAA user to disable a vertex from the map for a period of time. RID-0021
1.1.2.3.2 The system **shall** disable the vertex. RID-0022
1.1.2.3.3 The system **shall** delete paths affected by these disables and notify the Airline user of these deletions. RID-0020
1.1.2.4 Disable an edge
1.1.2.4.1 The system **shall** allow the FAA user to disable an edge from the map for a period of time. RID-0023
1.1.2.4.2 If the edge exists, the system **shall** disable the edge. RID-0024
1.1.2.4.3 The system **shall** delete paths affected by these disables and notify the Airline user of these deletions. RID-0020
1.1.2.4.4 If the edge does not exist, the system **shall** notify the FAA user that no such edge exists. RID-0019
1.1.2.5 Delete a path
1.1.2.5.1 The system **shall** allow the FAA to delete a path. The system **shall** output all saved paths for the FAA to choose from. If the FAA chooses a path, that path is deleted. RID-0025

### 1.1.3 Generate a path between two vertices

The system allows an Airline user to select a starting vertex and an ending vertex. The system generates the flight path between the vertices based on the stored flight distances between them. The Airline user can then choose to save the path or not.

1.1.3.1 Generate Path
1.1.3.1.1 The system **shall** allow the Airline user to request generation of flight paths. RID-0026
1.1.3.1.2 The system **shall** calculate the shortest flight path between the specified vertices. RID-0027
1.1.3.1.3 The system **shall** display the calculated flight path to the Airline user. RID-0028
1.1.3.1.4 If the flight path is deleted, the system **shall** notify the Airline user. RID-0029
1.1.3.1.5 Save Path
1.1.3.1.5.1 The system **shall** have the capability to save the flight path information. RID-0030
1.1.3.1.5.2 The system **shall** provide to the Airline user the option to save or not save the flight path in the system. RID-0031
1.1.3.1.5.3 If the flight path is saved, the system **shall** save the (x,y) coordinates of the vertices and the distance between the vertices. RID-0032
1.1.3.1.5.4 The system **shall** allow the Airline user to enter a departure time for the flight. RID-0033
1.1.3.1.5.5 If the flight path is not saved, the system **shall** allow the Airline user to return to the map and does not save the calculated path. RID-0034