Flight Historian Functional and Technical Specification

Paul Bogard

Date	Version	Comments
27 Apr 2013	1.0	• Initial version
24 Oct 2013	1.1	• Rewrote the home page to show flight maps, and top 5 lists and counts of routes, airports, aircraft, airlines, and tails • Added Index Routes and Show Routes pages • Added top aircraft, airlines, and classes to Show Routes • Added top origin/destination cities, aircraft, airlines, and classes to Show Airport • Added top airlines and classes to Show Aircraft • Added top aircraft and classes to Show Airline • Added top classes to Show Tail • Added top airlines and aircraft to Show Class • Updated logos and icons for high-resolution displays • Switched Tails and Classes on the main navigation bar • Minor bug fixes
27 Oct 2014	1.2	• Added operating airlines, fleet numbers, and codeshares
08 Feb 2015	1.3	• Added details to Index Flights by Year • Added flight distances • Minor improvements to flight entry form

Date	Version	Comments
31 Jan 2016	2.0	• Added premium economy to list of travel classes • Added IATA codes to airlines (including operator and codeshare airlines), aircraft families, and travel classes • Added aircraft illustrations to Show Aircraft Family • Added aircraft name to Show Flight • Added tables of operators to Show Aircraft Family, Show Airport, Show Airline, Show Tail Number, Show Route, and Show Travel Class views • Consolidated maps to six map types common across views, and added region selectors to many more maps • Added Add/Edit functionality for airlines and aircraft families, and created select boxes in Add/Edit Flight for these • Added boarding pass data to flights • Added sanity check to verify Departure Date and UTC Departure are close enough on Add/Edit flight
29 Apr 2017	2.1	• Added parser to convert boarding pass barcodes to HTML or JSON • Added capability to create new flights and update existing flights from Apple Wallet boarding passes • Created new message banner system • Created aircraft type model to provide more detailed variants for aircraft families • Added ICAO codes to aircraft types • Added ICAO codes and numeric codes to airlines • Added email address fields to users
15 Mar 2018	2.2	• Added ICAO codes to Airports • Added capability to filter by multiple regions • Added New Flight by BCBP capability • Added New Flight by Flight Number capability • Removed Edit Flight with Pass capability

Contents

Overview

The Flight Historian is a web-based system to keep track of all flights flown by Paul Bogard, located at https://www.flighthistorian.com. The primary use will be for Paul to be able to generate various reports and maps of his flight history; however, visitors should be able to read most of the reports and maps as well.

Definitions

Aircraft Category	The large group of aircraft that this aircraft falls into, with the following possible options:

- **wide-body** (twin aisle jet)
- **narrow-body** (single aisle jet with capacity of over 100 passengers)
- **regional jet** (single aisle jet with capacity of 100 or fewer passengers)
- **turboprop** (any passenger aircraft powered by turboprop engines)

Aircraft Family	The general family of aircraft (for example, "Boeing 737")
Aircraft Type	The specific type of aircraft (for example, "737-800")
Airline	The entity responsible for the flight, as the flight is branded. If a codeshare is involved, the actual brand of the flight is used. If the flight is branded as one airline but operated by another (for example, a regional subsidiary), the brand airline shall be used as the Airline, and the operating airline shall be used as the Operator.
Airport	A known location which flights may have as an origin or destination.
Bar Coded Boarding Pass (BCBP)	Boarding pass data in IATA BCBP format.
Boarding Pass	A digital boarding pass in Apple Wallet PKPass format.

Current User	The Verified User that is currently logged in.
Distance	The great circle distance between two airports.
Fleet Number	The Operator's identification for an aircraft. May contain letters, numbers, or both.
Flight	A nonstop plane route from an origin city to a destination city, including a wheels up event.

- Stops where passengers do not leave the plane (for example, weather diversions) are not considered a layover, and the portions before and after that stop count together as a single flight. If passengers are permitted to deplane and reboard, the stop shall be considered a layover, and the routes prior to and following the layover shall be considered separate flights (even if the flights have the same flight number).
- If an airplane returns to its origin airport after achieving wheels up and passengers are permitted to deplane, it shall still be considered a flight with the origin and destination the same. This shall count as two visits to the airport in question.

Flyer	The User whose flights are being viewed by a Verified User or Visitor. Will always be Paul Bogard until multiple Flyer functionality is enabled.
Layover	A stop at an airport between two flights on a trip, where the traveler does not leave the airport property (but may leave the airside part of the airport). The destination of the earlier flight must be the same as the origin of the later flight.
Operator	The entity which operates the flight. May or may not be the same as the Airline.
Route	A connection between two airports on a map. Many flights may use the same route in either direction.
Section	A collection of one or more flights describing a one-way part of a

trip.

Tail Number	A unique identifier for an aircraft. May contain letters, numbers, or both.

Travel Class

Quality of service for the seat booked on a flight, with the following possible values (in decreasing order of quality):

- First
- Business
- Premium Economy
- Economy

Generally, these should be defined for each flight using the airline's own categorization or the categorization from sites like seatguru.com; however, judgment should be used. Not every airline or flight will have every class available.

Trip

A collection of one or more flights taken for the same purpose. Belongs to one Flyer.

Verified User

A person using the website who is successfully logged in.

Visitor

A person using the website who is not logged in.

Scenarios

Scenario 1: Paul

Paul is an engineer who travels frequently. He likes to make maps of routes he's flown and airports he's visited, but with several hundred flights in his history, keeping track of them with a spreadsheet and copying and pasting into mapping software has become unwieldy.

Paul wants a way to easily record his flights on his smartphone while he's at the airport, rather than waiting until he gets home from his trip to enter the data into his spreadsheet. If he has a digital boarding pass, he'd like to use that data to create the flight; if he doesn't, he'd like to create the flight by searching for an airline and flight number.

When he's home, Paul will want to spend hours looking at maps of his flights based on arbitrary criteria. Often, he'll just look at a map of every flight he's taken, but sometimes he'll want to create maps filtered by airports, airlines, dates, tail numbers, Aircraft Family,

or travel class. He will probably want to post links to interesting maps on his social networks and forums.

Of course, he doesn't want visitors to his maps to see that he's currently traveling, so Paul would prefer his flights to be invisible to visitors until he gets home and specifically marks them visible.

Scenario 2: Alice

Alice follows Paul on Twitter, and sees that he's posted a link about his travels that he seems sufficiently excited about. Having nothing better to do, she clicks the link and sees a map with a lot of airports connected by a lot of lines.

This view does not particularly interest her, but she sees a menu which allows her to view other maps – one of them will let her see what airlines Paul flies on. "My cousin works for Oceanic Airlines," she thinks. "I wonder if Paul's flown on them." She clicks the link and is presented with a list of airlines Paul's flown and the number of flights on each. She picks Oceanic from the list and is presented with a map and a list showing every Oceanic flight Paul has flown on.

Non-Goals

The Flight Historian is specifically designed to track only Paul's flights. Multiple users are not supported. While it would be interesting to develop a site where anybody could track their own flight history, the amount of data could grow beyond the site's current capacity, and there are no plans to commercialize the site to cover the costs.

Physical Architecture

Flight Historian is hosted on AWS via Heroku.

Scaling is not expected to be an issue, as this application is tracking data for a single user (see Non-Goals), and most the traffic is from that single user.
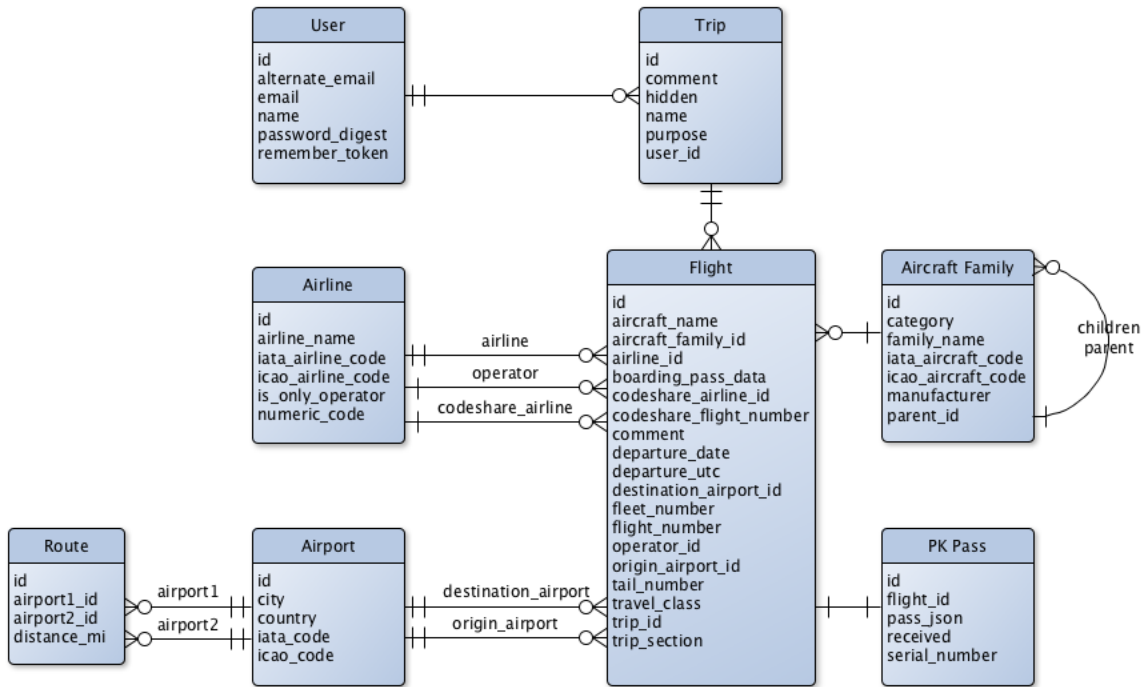
Software Architecture

Flight Historian is a Rails (version 5.0 or greater) web application written in Ruby (version 2.3 or greater). Interaction will be entirely through web pages.

Database

Flight Historian will use a PostgreSQL database.

Structure

Attributes

Model	Attribute	Type	Description
Aircraft Family			
Aircraft Family	id	integer (required)	*Has many "children" via Aircraft Family parent_id* *Has many "flights" via Flight aircraft_family_id*
Aircraft Family	category	string	Turboprop, regional jet, narrow body, or wide body
Aircraft Family	family_name	string (required)	Name of the aircraft family (if this is a family) or aircraft type (if this is not a family)

Model	Attribute	Type	Description
Aircraft Family	iata_aircraft_code	string (3)	IATA code of the aircraft family (if this is a family) or aircraft type (if this is not a family)
Aircraft Family	icao_aircraft_code	string (4)	ICAO code of the aircraft type. Families will not have ICAO codes.
Aircraft Family	manufacturer	string (required)	Manufacturer of the aircraft family (if this is a family) or aircraft type (if this is not a family)
Aircraft Family	parent_id	integer	*Belongs to "parent" via Aircraft Family id*
Airline			
Airline	id	integer	*Has many "flights" via Flight airline_id* *Has many "operated flights" via Flight operator_id* *Has many "codeshared flights" via Flight codeshare_airline_id*
Airline	airline_name	string (required)	Name of the airline
Airline	iata_airline_code	string (2, required, unique)	IATA code of the airline

Model	Attribute	Type	Description
Airline	icao_airline_code	string (3, required, unique)	ICAO code of the airline
Airline	is_only_operator	boolean	True when this airline only acts as an Operator and never an Airline, false otherwise
Airline	numeric_code	string (3)	Three-digit numeric code of the airline
Airport			
Airport	id	integer (required)	*Has many "originating flights" via Flight origin_airport_id* *Has many "arriving flights" via Flight destination_airport_id* *Has many "first routes" via Route airport1_id* *Has many "second routes" via Route airport2_id*
Airport	city	string (required)	Airport city. Include state abbreviations and/or airport names as necessary to uniquely name the airport.
Airport	country	string (required)	Airport country
Airport	iata_code	string (required)	IATA code of the airport

Model	Attribute	Type	Description
Airport	icao_code	string (required)	ICAO code of the airport
Flight			
Flight	id	integer (required)	*Has one "PK Pass" via PK Pass id*
Flight	aircraft_name	string	The name of a named aircraft that operated this flight (special liveries, airlines that name each plane, etc.)
Flight	aircraft_family_id	integer	*Belongs to "aircraft family" via Aircraft Family id*
Flight	airline_id	integer (required)	*Belongs to "airline" via Airline id*
Flight	boarding_pass_data	text	IATA Bar Coded Boarding Pass (BCBP) string for this flight's boarding pass
Flight	codeshare_airline_id	integer	*Belongs to "codeshare airline" via Airline id*
Flight	codeshare_flight_number	string	Flight number of the codeshare if this flight was purchased as a codeshare
Flight	comment	text	Comments about this flight
Flight	destination_airport_id	integer (required)	*Belongs to "destination airport" via Airport id*

Model	Attribute	Type	Description
Flight	departure_date	date (required)	*The flight's departure date in the time zone of the origin airport*
Flight	departure_utc	datetime (required)	*The flight's departure date and time in UTC*
Flight	fleet_number	string	*The flight operator's fleet number for the aircraft that operated the flight*
Flight	flight_number	string	Flight number of the flight, not including airline code
Flight	operator_id	integer	*Belongs to "operator" via Airline id*
Flight	origin_airport_id	integer (required)	*Belongs to "origin airport" via Airport id*
Flight	tail_number	string	The tail number of the aircraft that operated the flight
Flight	travel_class	string	F (first), J (business), W (premium economy), or Y (economy)
Flight	trip_id	integer (required)	*Belongs to "trip" via Trip id*
Flight	trip_section	integer (required)	The sequential section number this flight belongs to in the given Trip

Model	Attribute	Type	Description
PK Pass			
PK Pass	id	integer (required)	ID
PK Pass	flight_id	integer	*Belongs to "flight" via Flight id*
PK Pass	pass_json	text (required)	The contents of the PK Pass format's pass.json file
PK Pass	received	datetime	The date and time that the email containing the current PK Pass values was opened. Used to determine if subsequent emails with the same pass serial number are newer than the existing data.
PK Pass	serial_number	string	Unique identifiers from the PKPass format.
Route			
Route	id	integer (required)	ID
Route	airport1_id	integer (required)	*Belongs to "airport 1" via Airport id*
Route	airport2_id	integer (required)	*Belongs to "airport 2" via Airport id*

Model	Attribute	Type	Description
Route	distance_mi	integer (required)	Great circle distance between the two airports in statute miles.
Trip			
Trip	id	integer (required)	*Has many "flights" via Flight trip_id*
Trip	comment	text	Comments about this trip
Trip	hidden	Boolean	True if this trip should be hidden to non-authenticated users, false if it should be visible to everybody. Used to hide trips from the public until the trip is completed.
Trip	name	string	Name of the trip
Trip	purpose	string	Business, Personal, or Mixed
Trip	user_id	Integer (required)	*Belongs to "user" via User id*
User			
User	id	integer (required)	*Has many "trips" via Trip user_id*

Model	Attribute	Type	Description
User	alternate_email	string (unique with email)	A secondary email address. Flight Historian will accept boarding pass attachment emails from this user from this address.
User	email	string (unique with alternate_email)	The user's primary email address. Flight Historian will accept boarding pass attachment emails from this user from this address.
User	name	string (required, unique)	The user's name. Used to log in.
User	password_digest	string (required)	Hash of the user's password
User	remember_token	string	Used to maintain sessions even after browser is closed

Nomenclature

This section defines naming conventions for the application.

Anything referring to the number of flights that meet a given criteria shall be referred to as a `count`. Each model's method for returning an array of flights and counts shall be named `Model.flight_count` (or `Module.flight_count` if the item being counted is not a model, like travel classes.). The partial to display a model's summary table shall be named `views/`**`controller`**`/_model_count_table` or `views/`**`controller`**`/_module_count_table`.

Coding Style Guide

[Not to be confused with the [View Style Guide](#)]

Anchors

HTML ids and anchors shall use hyphens to separate words.

Strings

In order of preference, strings shall be encapsulated in double quotes, then `%Q()` notation, then single quotes.

Strings shall prefer `#{}` notation over concatenation.

Text that will be displayed to the user shall use smart quotes and smart apostrophes.

Stylesheet

CSS styles shall use hyphens to separate words.

Symbols

Ruby symbols shall use `parameter: value` notation instead of `:parameter => value` notation when possible.

Security

Flight Historian shall use SSL; any visitors attempting to access the site via HTTP shall be redirected to HTTPS.

Features

Boarding Passes

Flight Historian shall have the ability to connect to a specified IMAP email address, find any emails containing an Apple Wallet boarding pass (.pkpass) attachment, and import the boarding pass data. This will allow a verified user to share their boarding passes via email to assist in populating form fields while creating or modifying flights.

Pages (Views)

Common to Every View

Menus

Every view shall include a link to the following "Index *[object]*" views at the header of the page:

- o [Index Aircraft Families](#)
- o [Index Airlines](#)
- o [Index Airports](#)
- o [Index Flights](#)
- o [Index Routes](#)
- o [Index Tail Numbers](#)
- o [Index Travel Classes](#)
- o [Index Trips](#)

Hidden Trips, Flights, and Airports

By default, all new trips and their associated flights shall be considered hidden. This allows the user to enter data as he travels without visitors knowing the user is traveling until after the travel is complete.

All views on all pages for visitors who are not logged in shall ignore any flights and trips which are considered hidden. On airport views, any airport associated only with hidden flights shall not be listed. However, if the same routes or airports are associated with non-hidden flights, the route and airports shall be displayed as normal on maps as they would be if the hidden flight did not exist. The hidden flight filter supersedes any conflicting selection of flights – visitors shall *never* see hidden flights or trips, nor shall they see these flights included in any totals or counts of any criteria.

For verified users, hidden trips and flights shall be displayed in all views. Any time a hidden trip, flight, or airport is listed in a table, it shall be formatted to obviously distinguish it as hidden.

Maps

All map flight paths shall be plotted as the shortest great circle path.

Region-Aware Maps

For any map specified as region-aware, the map shall offer the option to toggle between World and various regions in a menu above the map.

If a region in the region select menu has no flights (on a flights map) or airports (on an airports map), then its menu option shall be disabled. If all flights are in a single region (one region is identical to world flights, and all other regions have zero flights), then the region select menu shall not be shown.

Additionally, users shall be able to view custom regions by manually editing the region parameter in the querystring. The region attribute shall be a hyphen-separated list of strings, where each string represents the start of an ICAO code. (For example, `EG-K` would match any airports whose ICAO code started with `EG` or `K`.

If any highlighted airports are specified, they shall always be considered in-region for any region selected, regardless of whether they are actually located in that region.

When a region is specified on a map with flight paths, the map zoom and center shall be such that all flight routes with both airports in the region are shown at the highest zoom possible to include them all. Routes with one or zero airports in the region shall be shown if they are within or partially within the map window; these routes shall be displayed with a less prominent line.

When a region is specified on a map with only airports (no flight routes), only the airports which are part of the specified region shall be shown.
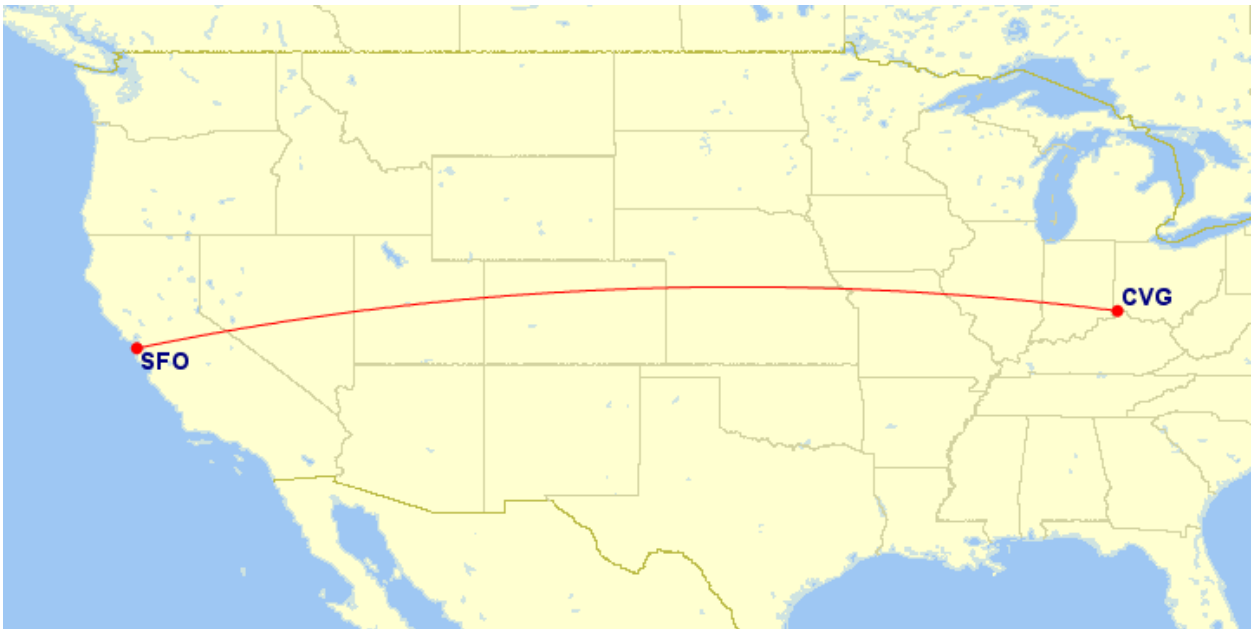
Flights Map

This map shall take a list of flights and plot these flights' paths. This map shall have the option to highlight specific airports. This map shall be [region-aware](#).
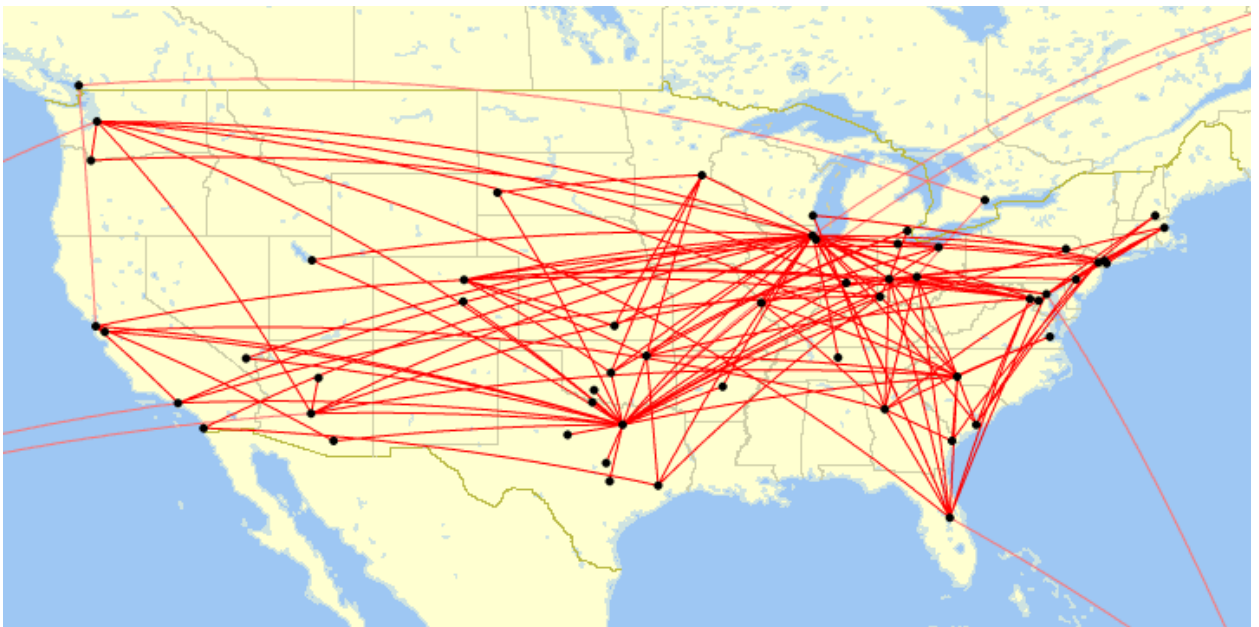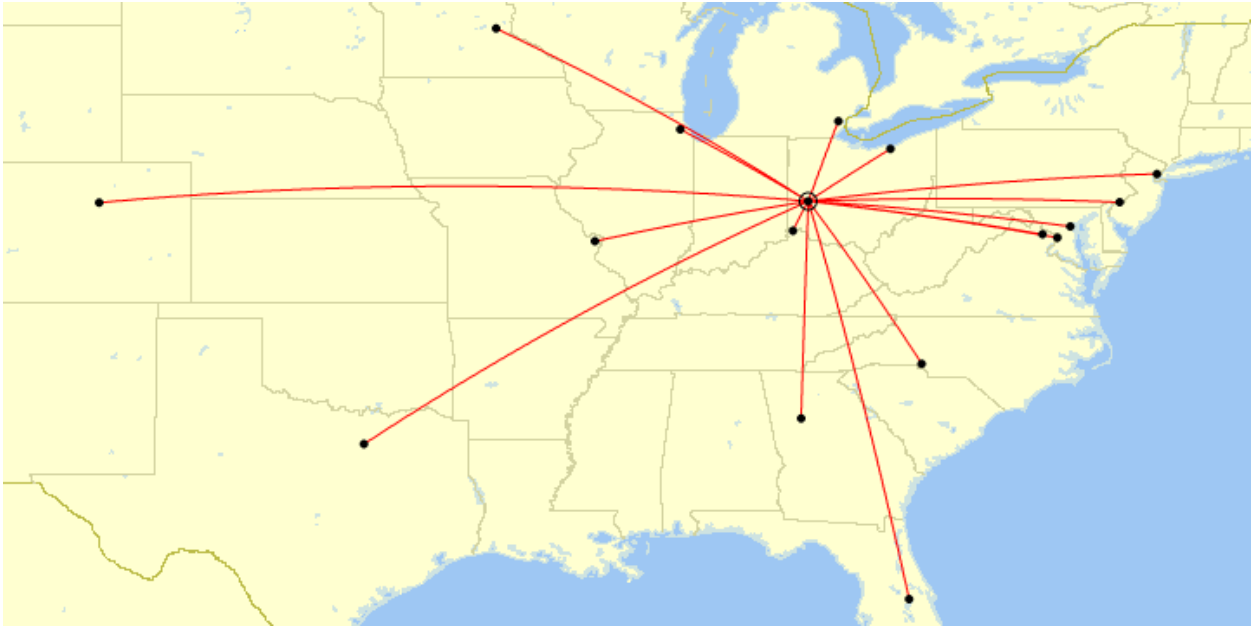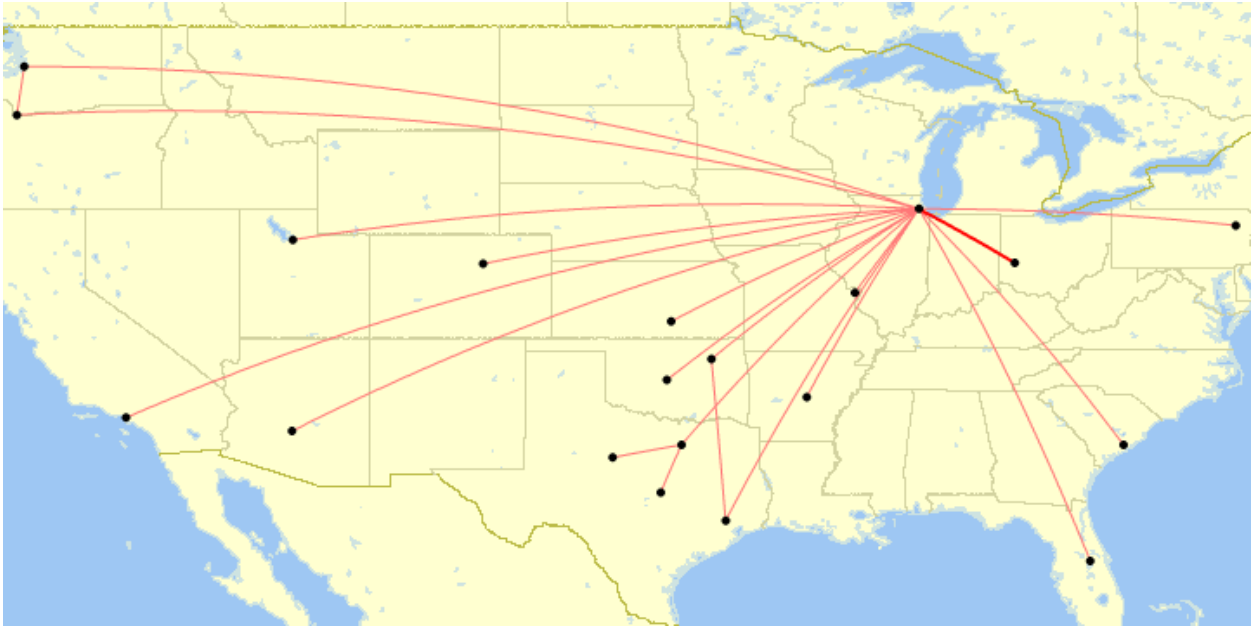
Single Flight Map

This map displays the path of a single flight.

Route Highlight Map

This map shall plot the paths of a collection of flights, and shall highlight a specific path.

Airports Map

This map shall plot a collection of airports with no paths between them. This map shall be [region-aware](#).

Airport Frequency Map

This map shall plot a collection of airports with no paths between them. Additionally, this map shall place a ring around each airport whose enclosed area is proportional to the number of flights through the airport. This map shall be [region-aware](#).
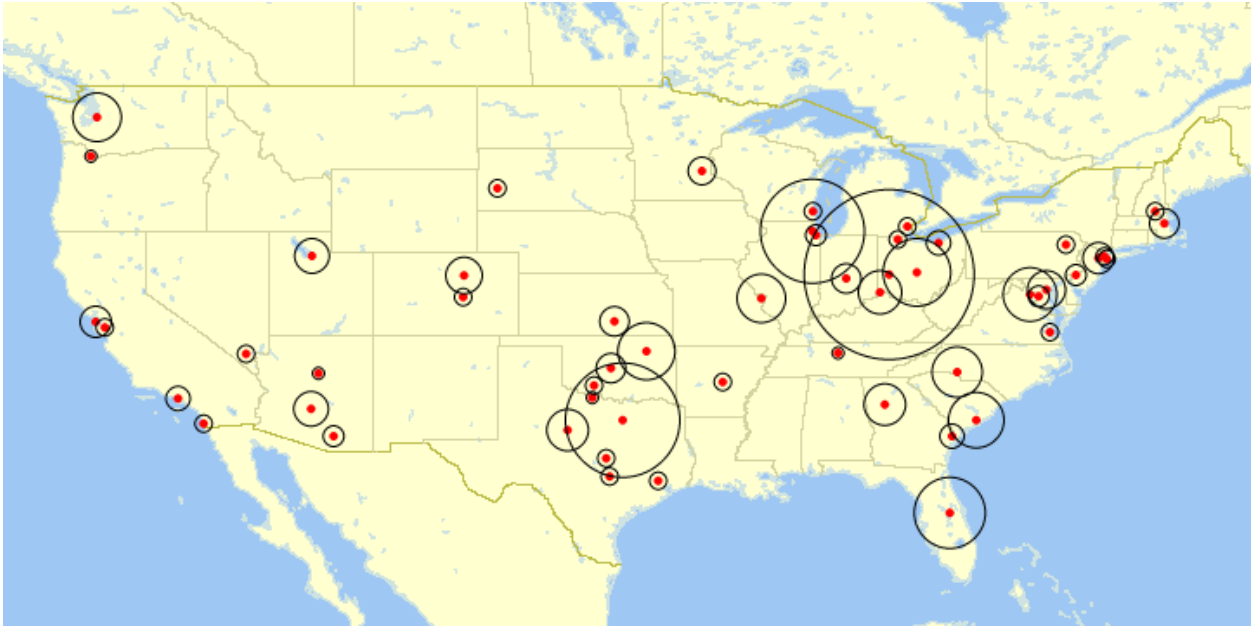
Tables

Flights Table

This view shall show a ranked table of all flights, with a column for flights (airline icon, airline, and flight number), a column for route, and a column for departure date. The flight ranking number shall be the chronological ranking of the flight (not necessarily the flight ID), with the oldest flight as flight 1, no matter which direction the table is sorted. Each flight in the table shall be a link to the appropriate Show Flight view. Each airport in the route column of the table shall be a link to the appropriate Show Airport view. Flights that are in the same trip section of the same trip shall not have a horizontal border between them.

#	Flight	Route	Date
...	...	...	...
107	American Airlines 3905	DAY - ORD	1 Feb 2012
108	American Airlines 1155	ORD - LAX	1 Feb 2012
109	American Airlines 267	LAX - HNL	1 Feb 2012
110	American Airlines 298	HNL - LAX	14 Feb 2012
111	American Airlines 2416	LAX - DFW	15 Feb 2012

112		American Airlines 1822	DFW - DAY	15 Feb 2012
113		United 3334	DAY - IAD	20 Feb 2012
114		United 5760	IAD - CHS	20 Feb 2012
115		US Airways 2686	CHS - CLT	23 Feb 2012
116		US Airways 2269	CLT - DAY	23 Feb 2012
…	…		…	…
250 flights				

Trips Table and Trip Sections Table

When specified, views shall show a table of trips or trip sections relevant to the view.

The table shall contain a column for the name of the trip (which shall also include section number only on a trip section table). The text of this column shall link to the appropriate Show Trip or Show Trip Section view.

The table shall also contain a column for the departure date of the earliest flight in the trip or trip section. Unless otherwise specified, the table shall be sorted by departure date from earliest to most recent.

The table shall contain a total row, displaying the total number of trips or trip sections in the table.

Superlatives Table

When specified, views shall show a table of the longest and shortest route flown in the given collection of flights, along with the distance of each of these routes. If multiple flights are tied for longest or shortest, all ties shall be shown. If the shortest route is zero distance, then the shortest non-zero distance route shall also be shown, including ties if necessary. All routes listed shall link to the appropriate Show Route view.

Ranked Table

When specified, sortable tables shall have a column with a numeric ranking, identifying the row's rank in the current sort column and direction (either numeric or alphabetic, in either direction).

When the table is sorted by a numeric columns and multiple rows have identical values, a tie has taken place between those values. In a tie situation, the topmost row with that value shall show the rank number, and all subsequent rows within that table with the same value shall show the ":" (three dots vertical) symbol to indicate a tie. The next row in the table that is not part of the current tie shall show a rank number as if the tied rank numbers had not been replaced by a symbol. For example:

Rank	Sorted Value
1	19
2	16
3	14
⋮	14
⋮	14
6	12
⋮	12
8	11
9	9
10	8
⋮	8
12	7

Graph Columns

Unless otherwise specified, numeric table columns which the table can be sorted by shall have a graph bar in the background of the cell. A portion of that bar, starting from the left, shall be shaded to show the ratio of the current cell's value to the maximum value of that column. (For example, if this cell's value is 40, and the largest value in the column is 100, then the left 40% of the bar shall be shaded.)

Legal

Every view that uses a map generated by gcmap.com shall have the required gcmap.com copyright notice in the footer. (See http://www.gcmap.com/faq/other#embed.)

Every view that uses an airline icon shall have the following notice in the footer:

Home

Path	/
Title for Links to this View	View the home page of Paul Bogard's Flight Historian

This view shall be the default view.

This view shall show a [Flights Map](#) for all flights. The view shall have a count of flights and a link to the Index Flights page. This view shall show the total distance flown across all flights.

The view shall show top 5 lists of routes, airports, aircraft, airlines, and tails, with the number of flights for each. Each entry in each list shall link to the appropriate Show page for that entry. At the bottom of each list shall be a count of the total number of routes, airports, aircraft, airlines, and tails, and a link to the appropriate Index page for each.

This view shall show a [Superlative Table](#) for all flights.

If any trips are hidden and the user is verified, a link to each hidden trip shall be displayed near the top of the view.

If any boarding passes are available for import and the user is verified, a link to [the Import Boarding Passes](#) view shall be displayed.

Add/Edit Airport

Path	/airports/new /airports/:id/edit /airports/**1**/edit

This view shall allow a verified user to add or edit an airport. The form shall be identical between Add and Edit, but Edit shall prefill the form fields with the airport record's information from the database. The form shall have the following fields:

Field	Type	Required?
IATA code	Input	Yes

ICAO code	Input	Yes
City	Input	Yes
Country	Input	Yes

Visitors attempting to access this view shall be redirected to the Home view.

Add/Edit Aircraft Family/Type

Path	/aircraft/new /aircraft/new/family/:family_id /aircraft/:id/edit /aircraft/**2**/edit

This view shall allow a verified user to add or edit an aircraft family or type. The displayed form shall be identical between Add and Edit, but Edit shall prefill the form fields with the flight record's information from the database. If the New view does not have a family ID parameter or the Edit view was accessed for an aircraft family with no parent ID, the user is trying to work with an aircraft family, and the form shall have the following fields:

Field	Type	Required?
Manufacturer	Input	Yes
Aircraft family	Input	Yes
IATA aircraft code	Input	No
Category	Select (Wide-body, Narrow-body, Regional jet, Turboprop)	Yes

If the New view has a family ID parameter set, or the Edit view was accessed for an aircraft family that does have a parent ID, the user is trying to work with an aircraft type, and the form shall have the following views:

Field	Type	Required?
Manufacturer	Input (default to same as parent)	Yes
Aircraft type	Input	Yes
IATA aircraft code	Input	No
ICAO aircraft code	Input	No
Category	Select (Wide-body, Narrow-body, Regional jet, Turboprop) (default to same as parent)	Yes

| Parent ID | Hidden (defaults to parent ID parameter) | No |

Visitors attempting to access this view shall be redirected to the [Home](#) view.

Add/Edit Airline

| Path | /airlines/new

/airlines/:id/edit
/airlines/**2**/edit |

This view shall allow a verified user to add or edit an airline. The displayed form shall be identical between Add and Edit, but Edit shall prefill the form fields with the flight record's information from the database. The form shall have the following fields:

Field	Type	Required?
Airline name	Input	Yes
IATA airline code (if not unique, append a hyphen and the airline name, with spaces converted to hyphens)	Input	Yes
ICAO airline code	Input	No
This airline only operates flights (it does not sell or market flights)	Checkbox	No

Visitors attempting to access this view shall be redirected to the Home view.

Add Flight Menu

| Path | /flights/new-flight-menu/

/flights/new-flight-menu/trip/:trip_id
/flights/new-flight-menu/trip/**136** |

Add/Edit Flight

Path	/flights/new/ /flights/new/ /flights/:id/edit /flights/**2**/edit

This view shall allow a verified user to add or edit a flight. The Add Flight form shall be launched from the Add Flight Menu view.

The displayed form shall be identical between Add and Edit, but Edit shall prefill the form fields with the flight record's information from the database. The form shall have the following fields:

Field	Type	Required?
Trip section	Input	Yes
Origin	Select (all IATA airport codes)	Yes
Destination	Select (all IATA airport codes)	Yes
Departure date (local)	Date select	Yes
UTC departure (for sorting flights)	Date/time select	Yes
Airline	Select (airline names for airlines that are not only operators)	Yes
Flight number	Input	Yes
Codeshare airline	Select (airline names for airlines that are not only operators)	No
Codeshare flight number	Input	No
Aircraft family or type	Select (all aircraft type names, plus "Unknown [family] type" for each family)	No
Tail number	Input	No
Aircraft name	Input	No
Operator	Select (all airline names)	No
Fleet number	Input	No
Travel class	Select (First, Business, Premium Economy, Economy)	No

Comment	Input	No
Boarding pass data	Textarea	No

To help the verified user enter the correct UTC departure time, the form shall also show the current UTC date and time as of the page load.

If provided data (a BoardingPass ID, Barcoded Boarding Pass (BCBP) data, or an airline and flight number) are available, the form shall be prepopulated from the provided data where possible. Additionally, if enough data is present to perform a FlightAware FlightXML API lookup, FlightXML data shall be prepopulated as well.

If the provided data could match multiple FlightXML flights, then a select flight menu shall be shown to allow the user to choose the appropriate flight (or no flight) before the form is prepopulated. If any flights are more likely to be correct than others due to known departure dates or origin airports, then those flights shall be highlighted as a suggestion to the user.

When adding a flight, the Origin airport field shall default to the destination airport of the most recent flight (the flight with the latest UTC Departure), unless the origin airport was prepopulated from a boarding pass.

For new flights, any non-date/time fields that are automatically populated from provided or FlightXML data shall be highlighted. Date/time fields shall not be highlighted if they default to the current date or time, but they shall be highlighted if they are set to a specific date or time from provided data or FlightXML lookups. If the new flight form is redisplayed after an error, the fields set to the user's values do not need to be highlighted.

The form shall only show origin and destination airports that are already in the database; the user must add the airports via the Add/Edit Airport view prior to adding the flight. However, if provided or FlightXML data use any airports which are not in the database, the user shall be redirected to a form allowing them to create these airports prior to adding the flight.

The form shall only show airlines, codeshare airlines, and operators (airlines) that are already in the database; the user must add the airlines via the Add/Edit Airline view prior to adding the flight. However, if provided or FlightXML data use any airlines or operators which are not in the database, the user shall be redirected to a form allowing them to create these airlines prior to adding the flight. The Operators field shall list all airlines and operators, plus an "unknown operator" option. The Airline field and Codeshare Airline field shall only list airlines (as defined in the Definitions), and the Codeshare Airline field shall additionally have a "no codeshare" option.

The form shall only show aircraft families and types that are already in the database; the user must add the aircraft families via the Add/Edit Aircraft Family view prior to adding the flight. However, if provided or FlightXML data use any aircraft types which are not in the database, the user shall be redirected to a form allowing them to create these types prior to adding the flight.

Upon submission, leading and trailing spaces shall be stripped from string form fields before saving to the database. Tail numbers shall be capitalized and have non-alphanumeric characters stripped before saving to the database.

If midnight of the departure date and the UTC date/time are more than 48 hours apart, a flash message alert shall be posted letting the verified user know that one of these dates is likely incorrect; however, the form shall still submit with the user supplied dates.

Visitors attempting to access this view shall be redirected to the Home view.

Add/Edit Trip

Path	`/trips/add`
	
	`/trips/:id/edit`
	`/trips/`**`1`**`/edit`

This view shall allow a verified user to add or edit a trip. The displayed form shall be identical between Add and Edit, but Edit shall prefill the form fields with the flight record's information from the database. The form shall have the following fields:

Field	Type	Required?
Trip name	Input	Yes
Hidden	Checkbox	No
Comment	Input	No

For new trips, the Hidden field shall default to selected.

Visitors attempting to access this view shall be redirected to the Home view.

Edit Route

Path	`/routes/:airport1/:airport2/edit` `/routes/`**`DAY`**`/`**`DFW`**`/edit`

This view shall allow a verified user to edit a route's distance. If a record already exists for this route's distance, then the distance shall be prefilled. The form shall have the following field:

Field	Type	Required?
Distance (statute miles)	Input	Yes

Upon submittal, if no record exists for this route distance, it shall be created, otherwise, the existing record shall have its distance updated. Route distances shall be direction insensitive.

Visitors attempting to access this view shall be redirected to the Home view.

Import Boarding Passes

Path	/boarding-passes/import /boarding-passes/import/trip/:trip_id /boarding-passes/import/trip/**136**

This view allows a verified user to manage Apple Wallet (PKPass) boarding passes sent to a predetermined boarding pass email account.

This view shall check the boarding pass email account for any passes that have been sent to it from one of the email addresses associated with the user's profile, and shall import those passes.

Any passes that have been imported and have a serial number identical to the boarding pass serial number of an existing flight shall be associated with that flight, and these flights shall be listed in a table of Flights with Updated Boarding Passes. The table shall show the airline, flight number, and route of each such flight, and provide a link to Edit Flight with Pass with the boarding pass ID as a parameter. Each row shall also provide the ability to delete the boarding pass.

Any passes that have been imported which are not associated with a flight shall be shown in a table of New Boarding Passes, showing the PNR locator, airline code, flight number, and route. Each row shall provide a link to Add Flight with the boarding pass ID and the provided trip ID as parameters. If no trip ID is provided, the most recently created hidden trip shall be assumed, unless there are no hidden trips, in which case the most recently created trip shall be assumed.

The view shall show the name of the currently selected or assumed trip, and shall provide the ability for the user to switch to a different trip.

Index Aircraft Families

Path	/aircraft
Title for Links to this View	View a list of the types of planes on which Paul has flown

This view shall show a ranked table of all Aircraft Families flown, the IATA code of each aircraft family, and a graph column of the number of flights on each. Each Aircraft Family shall be a link to the Show Aircraft Family view for that Aircraft Family. Aircraft types shall not be listed, but their flights shall be included in the total counts for their parent aircraft families.

The table shall be sortable by any column, but by default shall be sorted by count descending, then aircraft family ascending.

Verified users shall have the option to add a new aircraft family with a link to the Add/Edit Aircraft Family view.

Index Airlines

Path	/airlines
Title for Links to this View	View a list of the airlines on which Paul has flown

This view shall show a ranked table of all airlines flown, the IATA code of each airline, and a graph column of the number of flights on each. Each airline shall link to the Show Airline view for that airline.

This view shall also show a ranked table of all operators flown, the IATA code of each operator, and a graph column of the number of flights on each. Each operator shall link to the appropriate Show Operator view.

Both tables shall be sortable by any column, but by default shall be sorted count descending, then airline or operator ascending.

#		Airline	Code	Flights
1		American Airlines	AA	135
2		United	UA	28
3		US Airways	US	18
4		AirTran	FL	17
5		Delta	DL	9

| 6 | ![nwa logo] | Northwest | NW | 2 |

6 airlines

#		Operator	Code	Flights
1	![envoy logo]	Envoy	MQ	68
2	![American Airlines logo]	American Airlines	AA	50
3	![TSA logo]	Trans States Airlines	AX	48
4	![ExpressJet logo]	ExpressJet	EV	45
5	![Mesa logo]	Mesa Airlines	YV	23
6	![AirTran logo]	AirTran	FL	17
7	![Delta logo]	Delta	DL	9
8	![United logo]	United	UA	5
9	![US Airways logo]	US Airways	US	2
⋮	![nwa logo]	Northwest	NW	2

10 Operators

Verified users shall have the option to add a new airline with a link to the Add/Edit Airline view.

Index Airports

Path	/airports
Title for Links to this View	View a list of airports Paul has visited

This view shall show a [ranked table](#) of all airports that are the origin or destination for at least one flight. The table shall include columns for the country, city, IATA code, and a [graph column](#) of the number of times each airport was visited (layovers count as a single visit to an airport). Each IATA code and airport name shall link to the appropriate [Show Airport](#) view. The table shall include a total row which shows the total number of airports visited (not the total number of flights).

The table shall be sortable by any column, but by default shall be sorted by number of visits descending, then city ascending.

#		Operator	Code	Flights
1		Dayton	DAY	92
2		Dallas/Fort Worth	DFW	64
3		Chicago O'HARE	ORD	25
4		Abilene	ABI	12
⋮		Charleston, SC	CHS	12
6		Columbus	CMH	11
7		Washington DULLES	IAD	10
8		Charlotte	CLT	9
…	…		…	…
		37 Airports		

This view shall show an [Airports Map](#) for all airports, and an [Airport Frequency Map](#) for all airports.

Verified users shall have the option to add a new airport with a link to the [Add/Edit Airport](#) view.

Index Flights

Path	/flights

Title for Links to this View	View a list of all of Paul's flights

This view shall show a [flight table](#) for all flights. The table shall be sortable by departure date in chronological or reverse chronological order. By default, the sort shall be chronological order.

This view shall show a [Flights Map](#) for all flights. This view shall offer links to filter flights by calendar year.

Index Routes

Path	`/routes`
Title for Links to this View	View a list of the routes Paul has flown

This view shall display a [ranked table](#) of all routes (direction-insensitive), their distances, and a [graph column](#) of the number of flights involving them. Each route shall link to the appropriate [Show Route](#) page.

By default, this table shall be sorted by number of flights descending, but the table shall be sortable by number of flights or distance, ascending or descending.

Index Tail Numbers

Path	`/tails`
Title for Links to this View	View how many flights Paul has flown on each individual airplane

This view shall display a table of all tail numbers, the flag of their country of registration, their aircraft types and airlines, and a [graph column](#) of the number of flights involving them. Each tail number shall be a link to the appropriate [Show Tail Number](#) view.

The table shall be sortable by any column, but by default shall be sorted by number of flights descending, then tail number ascending.

Index Travel Classes

Path	/classes
Title for Links to this View	View how many flights Paul has flown in each class

This view shall display a table of International First, Business/Domestic First, Premium Economy, and Economy travel classes (not including classes with no flights), the IATA class code for each, and a graph column of the number of flights involving them. Flights with an unknown travel class shall not be listed. Each of the travel class titles shall be a link to the appropriate Show Travel Class view.

The table shall be sortable by travel class quality or number of flights, but by default shall be sorted by travel class quality descending.

Index Trips

Path	/trips
Title for Links to this View	View a list of trips Paul has taken

This view shall display a trip table of all trips. The table shall be sortable by departure date either most recent first or oldest first, with most recent first as the default. Verified users shall have the option to add a new trip via a link to the Add/Edit Trip view.

Show Aircraft Family/Type

Path	/aircraft/:id /aircraft/**14**
Title for Links to this View	View flights on *Aircraft.manufacturer Aircraft.family_name* aircraft View flights on **Embraer ERJ-145** aircraft

This view shall display a Flights Map of all flights using the specified aircraft family or type and the total distance of all flights flown on this aircraft family. This view shall display a

side profile illustration (at a scale of 720 pixels = 84 meters) of the aircraft type (if the ID parameter represents an aircraft type) or of any subtype of the aircraft family (if the ID parameter represents an aircraft family), if available.

If the ID parameter represents an aircraft family, the view shall show a ranked table of aircraft types associated with this aircraft family, and the number of flights on each subtype. Each row shall link to the appropriate Show Aircraft Type view.

For each of the below tables in this view, if the ID parameter represents an aircraft family, the counts shall include all flights on aircraft types associated with the family as well.

This view shall show ranked tables of airlines, operators, and classes on this aircraft type or family versus the number of flights for each, sorted by number of flights for each. The number of flights column shall be a graph column.

This view shall show a Superlatives Table for all flights on this aircraft type or family.

This view shall show a Flights Table of all flights using this aircraft type or family.

Verified users shall have the option to edit (via the Add/Edit Aircraft Family/Type view) or delete the aircraft type or family. Deleting the aircraft type or family shall require a confirmation. Aircraft types or families shall be able to be deleted only if no flights use the type or family. Aircraft families shall be able to be deleted only if no aircraft types belong to them.

Show Airline

Path	/airlines/:iata_airline_code /airlines/**DL**
Title for Links to this View	View flights on *Airline.airline_name* View flights on **Delta**

This view shall display a Flights Table and Flights Map of all flights flown on a particular airline, and the total distance flown on that airline. The view shall show ranked tables of operators, aircraft, and classes on this airline versus the number of flights for each, sorted by number of flights for each.

This view shall show a Superlatives Table for all flights on this airline.

Verified users shall have the option to edit (via the Add/Edit Airline view) or delete the airline. Deleting the airline shall require a confirmation. The airline may only be deleted if no flights use it as an Airline, Codeshare Airline, or Operator.

Show Airport

Path	`/airports/:iata_code` `/airports/`**ORD**
Title for Links to this View	View airport details for *Airport.city* View airport details for **Chicago (O'Hare)**

This view shall display the name, city, and IATA code of an airport.

This view shall display an Airport Highlight Map and a Flights Table of all flights involving this airport (all flights with the airport as an origin or destination).

This view shall show an Airport Highlight Map and a Trip Section Table of the flights of all trip sections involving this airport (all trip sections with a flight involving this airport).

This view shall show an Airport Highlight Map and a Trip Table of the flights of all trips involving this airport (all trips with a flight involving this airport).

The view shall show ranked tables of airlines, operators, aircraft, and classes at this airport versus the number of flights for each, sorted by number of flights for each.

This view shall show a Superlatives Table for all flights involving this airport.

This view shall show a ranked table of origin and destination airports paired with this airport. Each row shall show an airport with flights to or from the current airport, the number of flights between these two airports, and the distance between these two airports in miles. The entire table shall be sorted by number of flights descending by default, but shall be sortable by city, code, number of flights, or distance in either direction. Each city and airport shall link to the appropriate Show Airport view. Each flight count shall link to the appropriate Show Route view. The Flights and Distance columns shall be graph columns.

#		City	Code	Flights	Distance
1	🇺🇸	Dayton	DAY	28	240 mi
2	🇺🇸	Charleston, SC	CHS	7	760 mi
3	🇺🇸	Dallas/Fort Worth	DFW	6	802 mi
4	🇺🇸	Columbus, OH	CMH	3	296 mi

5	🇺🇸	Seattle/Tacoma	SEA	3	1721 mi
10 Operators					

Verified users shall have the option to edit (via the Add/Edit Airport view) or delete the airport. Deleting the airport shall require a confirmation. The airport may only be deleted if no flights use it as an origin or destination.

Show Fleet Number

Path	/operators/:operator/:fleet_number /operators/**G7**/**155**
Title for Links to this View	View flights on *Airline.airline_name* aircraft *#Flight.fleet_number* View flights on **GoJet** aircraft **#155**

The operator and fleet number shall be listed in the page title.

A link shall be provided to the appropriate Show Operator view.

This view shall display a Flights Table and Flights Map of all flights involving an aircraft with this operator and fleet number, and the total distance flown on this collection of flights. The Flights Table shall additionally list the aircraft family and tail number for each flight. The view shall show ranked tables of airlines, aircraft, and classes on this fleet number versus the number of flights for each, sorted by number of flights for each. This view shall show a Superlatives Table for all flights on this fleet number.

Show Flight

Path	/flights/:id /flights/**204**
Title for Links to this View	View flight details for *Flight.airline Flight.flight_number* View flight details for **American Airlines 3260**

This view shall display information relevant to a flight. Airline, flight number, trip name, departure date, origin airport, destination airport, aircraft family, aircraft type, tail number, travel class, codeshare, operator, operator fleet number, operator aircraft name, and distance shall be listed in tabular format. The trip, airports, airline, aircraft family, tail

number, travel class, operator, and fleet number shall all be links to the appropriate Show view. If any entries in the table would be blank, their row shall not be shown. Comments (if any) shall be displayed immediately below the page title.

This view shall display a [Single Flight Map](#) of the flight.

Verified users shall have the option to edit (via the [Add/Edit Flight](#) view) or delete the flight.

If boarding pass data is available for this flight, the view shall show a link to the boarding pass data only to logged-in users.

American Airlines 3260

This is a comment about this flight.

DAY ✈ DFW
Dayton   Dallas/Fort Worth

Departure Date	29 Mar 2009
Trip	**Dallas, TX**
Route	DAY ⇄ DFW 861 miles
Airline	American Airlines
Codeshare	British Airways 6876

Travel Class	Economy
Aircraft Family	ERJ-145
Aircraft Type	ERJ-140
Aircraft Name	*PSA Livery*
Tail Number	🇺🇸 N476AA
Operated By	envoy Envoy (#476)

Show Flights by Year

Path	`/flights/year/:year` `/flights/year/`**2014**
Title for Links to this View	View a list of all of Paul's flights in *:year* View a list of all of Paul's flights in **2014**

This view shall show a map of all flights in the given year, with tabs to switch between World and CONUS views.

This view shall show a [ranked table](#) of airports visited in the given year, sorted by number of visits to each airport in the given year descending. Airports that were visited for the first time in the given year shall be highlighted.

This view shall show a [ranked table](#) of airlines flown in the given year, sorted by number of flights on each airline in the given year descending. Airlines that were flown for the first time in the given year shall be highlighted.

This view shall show a [ranked table](#) of aircraft families flown in the given year, sorted by number of flights on each aircraft family in the given year descending. Aircraft types shall not be shown, but their flights shall be included in their aircraft family's flight count. Aircraft families that were flown for the first time in the given year shall be highlighted.

This view shall show the total distance flown in the given year.

This view shall show a [Superlatives Table](#) for all flights flown in the given year.

Show Operator

Path	/operators/:operator /operators/**YV**
Title for Links to this View	View flights operated by *Airline.airline_name* View flights operated by **Mesa Airlines**

This view shall display a [Flights Table](#) and [Flights Map](#) of all flights operated by an airline, and the total distance of flights operated by this airline.

Additionally, this view shall display a table of fleet numbers and the aircraft family of the most recent flight using it, sorted by fleet number. The fleet number shall link to the appropriate [Show Fleet Number](#) view.

This view shall show a [Superlatives Table](#) for all flights associated with this operator.

Show Route

Path	/routes/:route /routes/**DAY-DFW**
Title for Links to this View	View flights between *airport[0]* and *airport[1]* View flights between **DAY** and **DFW**

This view shall display a [Single Flight Map](#) of a route and a [Flights Table](#) of all flights involving that route in either direction. This view shall also display the distance of the route, and the total distance of all flights flown on this route.

If this view is shown to a logged-in user, this view shall display a link to edit the route distance, which shall take the user to the [Add/Edit Route](#) view for this route.

A [Route Highlight Map](#) and [Trip Section Table](#) of all trip sections involving this flight's route (direction-insensitive) shall be displayed with the current route highlighted.

A [Route Highlight Map](#) and [Trip Table](#) of all trips involving this flight's route (direction-insensitive) shall be displayed with the current route highlighted.

The view shall show [ranked tables](#) of airlines, operators, aircraft, and classes on this route versus the number of flights for each, sorted by number of flights for each.

Verified users shall have the option to edit (via the [Add/Edit Flight](#) view) or delete the flight. Deleting the flight shall require a confirmation.

Show Tail Number

Path	`/tails/:tail_number` `/tails/`**N909EV**
Title for Links to this View	View flights on tail number *Flight.tail_number* View flights on tail number **N909EV**

This view shall display a [Flights Table](#) and [Flights Map](#) of all flights involving an aircraft with this tail number, and the total distance of all flights flown on this tail.

This view shall show a [ranked tables](#) of classes, operators, and aircraft on this tail versus the number of flights for each, sorted by number of flights for each. This view shall show a [Superlatives Table](#) for all flights on this tail.

This view shall provide a link to FlightAware's live flight tracking for this tail number.

Show Travel Class

Path	`/classes/:travel_class` `/classes/`**F**
Title for Links to this View	View *Flight.travel_class.downcase* class flights View **first** class flights

This view shall display a [Flights Table](#) and [Flights Map](#) of all flights flown on this travel class, and the total distance flown in this travel class.

The view shall show [ranked tables](#) of airlines, operators, and aircraft on this class versus the number of flights for each, sorted by number of flights for each. This view shall show a [superlatives table](#) for all flights

Show Trip

Path	`/trips/:id` `/trips/`**88**

Title for Links to this View	View trip details for *Trip.name* View trip details for **Hawaii Vacation**

This view shall display a table and Airport Highlight Map of all flights associated with a trip, with the first origin and last destination airport of each trip section highlighted. This view shall display the total distance of all flights in the trip. The flights shall be sorted by their UTC departure date. Each flight in the table shall link to the appropriate Show Flight view, and each section in the table shall link to the appropriate Show Trip Section view. If there are at least two flights in a section, the trip section column shall show the IATA codes of the first origin and last destination of that trip section.

Section		Flight	Route	Departure
Section 1 DAY - HNL		American Airlines 3905	DAY – ORD	1 Feb 2012
		American Airlines 1155	ORD – LAX	1 Feb 2012
Section 2		American Airlines 267	LAX – HNL	1 Feb 2012
Section 3 HNL - DAY		American Airlines 298	HNL – LAX	14 Feb 2012
		American Airlines 2416	LAX – DFW	15 Feb 2012
		American Airlines 1822	DFW – DAY	15 Feb 2012
6 Flights				

Verified users shall have the option to add flights to a trip via the Add/Edit Flight view.

Verified users shall have the option to delete the trip if it has no flights.

Verified users shall be provided a link to Import Boarding Passes with the current trip ID as a parameter.

Show Trip Section

Path	/trips/:*trip*/section/:*section* /trips/**88**/section/1

Title for Links to this View	View trip details for *Trip.name*
	View details for section **1** of **Hawaii Vacation**

This view shall display a [Flights Table](#) and [Flights Map](#) of all flights associated with a trip section, as well as the total distance of all flights in the section. The flights shall be sorted by their UTC departure date/time.

View Style Guide

[Not to be confused with the [Coding Style Guide](#)]

Airport Cities and Names

When located in a table with multiple airport names or in a heading, airport cities requiring disambiguating airport names (e.g. Chicago O'Hare vs. Chicago Midway) shall have the name in a small, all-caps font, separated from the city with an en space:

> Chicago O'HARE
> Chicago MIDWAY

When used in body text, in tooltips, and in metadata, the city name shall be in parenthesis:

> Chicago (O'Hare)
> Chicago (Midway)

Airports where the city itself is ambiguous (e.g. Portland, Oregon vs. Portland, Maine) shall include their disambiguating region separated by a comma. If the disambiguating region is a US state or other region which is commonly abbreviated, the region shall be abbreviated:

> Portland, OR
> Portland, ME

Colors

Website

As a large part of the Flight Log is to display maps using the [Great Circle Mapper](#), the color scheme needs to complement these maps. Thus, the base color of this website is **#9EC7F3**, which is the color of water on these maps. Other colors shall be chosen to work well with this color.

Great Circle Mapper Maps

All [Great Circle Mapper](#) maps shall use the "plain" map style.

Name	Color	Use
path_primary	#FFFFFF	Paths, in region Paths, highlighted
path_secondary	#FF7777	Paths, out of region Paths, not highlighted
airport	#000000	Airport markers
water	#9EC7F3	Water

Fonts

Body copy shall be formatted in a sans serif font. However, when IATA or ICAO codes (airport codes, airline codes, aircraft codes) are used in a table, the codes shall be formatted in a monospace font.

Tables

Tables of flights shall have thin horizontal borders between each row. However, if two flights in adjacent rows of the same table belong to the same trip and same trip section, then there shall be no horizontal border between those two flights' rows.