Graphs and Gauges

When the app is connected to the controller, the controller will periodically send updated temperature and door position readings. Currently, the controller sends these readings every 5 seconds.

When the engine is in the OFF state, the app will update the gauges with these reading but it will not update the graphs. When the engine is switched to the ON state, the app will then begin graphing the readings on the Oil and Coolant graphs. This is considered to be the beginning of a “flight”.

Due to resource limitations, the graphs will only display the most recent 120 values for each reading (5 minutes of data). Once more than 120 readings have come in, the graph will start to “scroll”, adding new readings to the right side and dropping the oldest readings from the left side. However, the app is still maintaining all of the readings from the current flight. When the engine is switched to the OFF state, the graphs will reload with all of the readings for the flight that just ended.

The graphs will remain populated with the data from the most recent flight until a new flight begins (the controller tells the app that the engine has entered the ON state). At this point, the graphs will clear and begin graphing data for the current flight.

If the app disconnects from the controller during a flight and then reconnects, the app will continue graphing data for the same flight, so long as the engine is still in the ON state when the controller reconnects. However, the graphs will be missing values for the time periods where the app was disconnected from the controller.

The graphs can be zoomed in/out by pinching the graph and scrolled left/right by sliding the graph. If the graph is zoomed in and slid “backwards”, new readings that arrive won’t be visible until the graph is zoomed back out or slid back to the “front”.

Log Data

The controller is continuously logging data, which includes periodic readings as well as all events and changes of state. The user can download this data from the controller to the app, and then save it to a local file on the iOS device to be viewed later.

In order to retrieve the logs from the controller, the user must switch to the Settings page in the app and click the button under “Retrieve Logs”. This will kick off the log transfer of all flight data stored in the controller. Data sent to the app is stored in a local database on the iOS device.

When the app initiates a log transfer, it first requests that the controller send it the flight number of the most recent flight. The app then checks the local database to see which flights it already has log data for. It compiles a list of flight numbers for which it’s missing log data, and requests only those ones from the

controller. This ensures that the controller isn't sending more log data than necessary over the relatively slow BLE connection.

Additionally, after each flight, when the controller reports the engine state has switched to OFF, the app will silently request the log data from the most recent flight and store it in the local database. This happens in the background. If the user always has the app connected to the controller during flights, then by the time the user clicks the "Retrieve Logs" button, most or all of the log data should already be on the iOS device and the log transfer will finish very quickly. However, if the user rarely uses the iOS app during flights, then log transfers will take longer. Also, if the user ever uninstalls the app or clears the app's cache, then the data will be wiped from the local database and all flight data for every past flight will need to be transferred next time.

While the log transfer is in process, a progress bar will be displayed in the "Retrieve Logs" section of the settings page. After the transfer is completed successfully, the app will then process all log data from its local database and generate a CSV file with human-readable text. The CSV file is saved in the iOS device's local file store.

In order to retrieve this CSV file from the device, the user will need to connect the device to a computer running the iTunes software and do the following:

1. In iTunes, click the device icon to switch to the Device view (the icon appears under the volume slider, next to the dropdown box after the device is plugged in).
2. Select "File Sharing" from the left, then choose the Wings app from the Apps list.
3. The Documents list on the right will populate with all of the log files stored on the device (this can take a few seconds). Then select any of the log files and save them to the local computer.
    a. There will also be a file called "SystemLog.csv", which logs various system events and can be used by us to help debug problems.
4. Once the log files are saved to the computer, they can be viewed in any app that can read and render CSV files, such as Excel. The simplest way to view one of the files is to select it and hit the spacebar, which will open it in the Preview app.