



Aviation Assistant

ADS-B

METAR

LiveATC

Operations Manual

Technical Specifications

Development Guide

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Contents

Introduction.....	3
Basis of Operation.....	3
Device Diagram and Parts Required.....	3
Part List.....	4
Device Software Workflow and Configuration.....	5

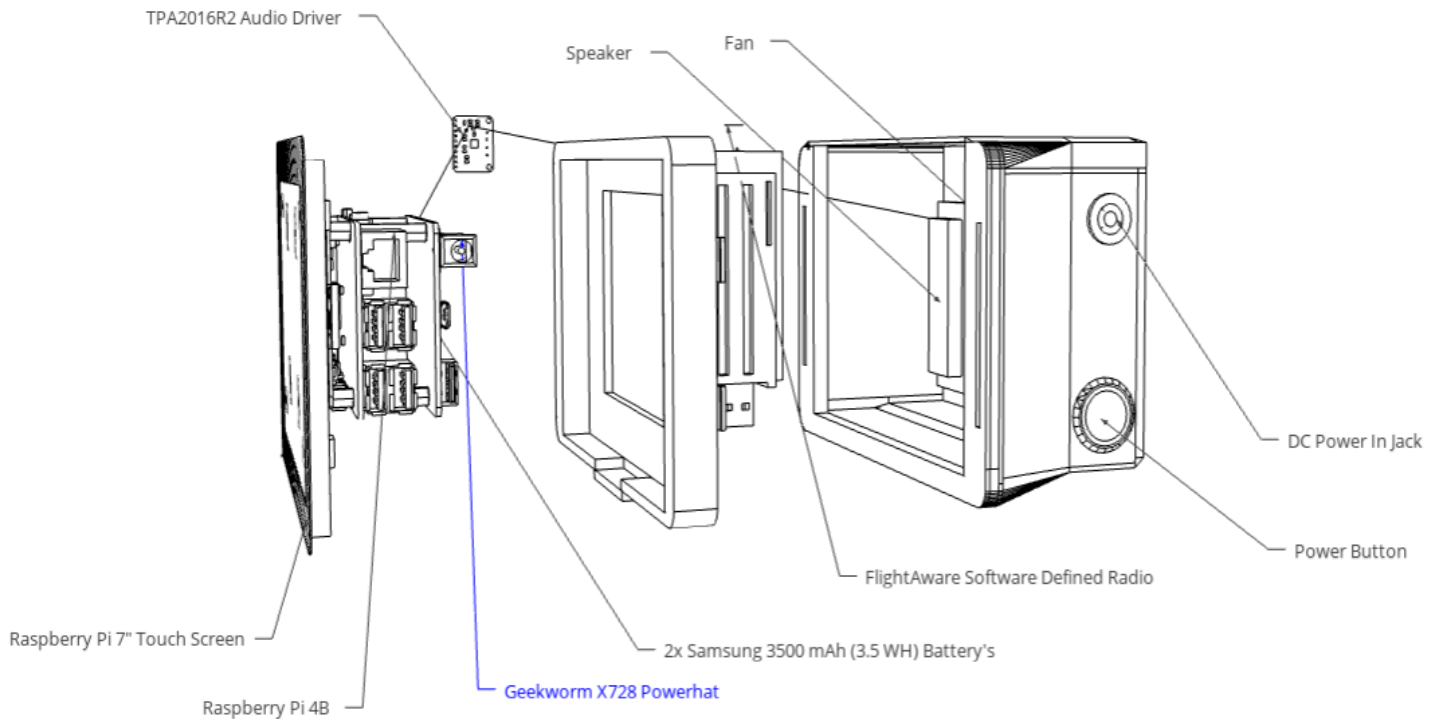
Introduction

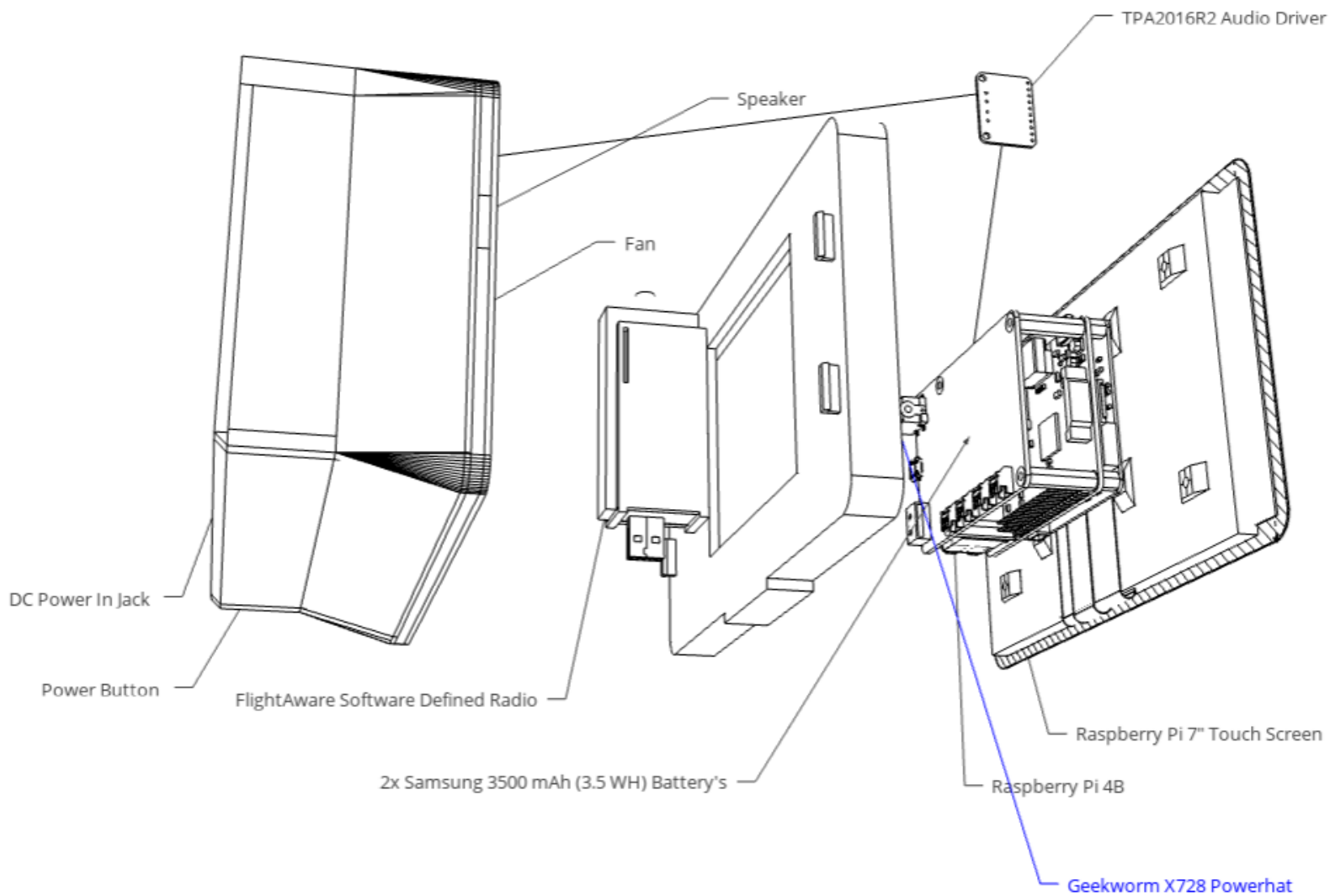
The *Aviation Assistant* is a portable adaptation of the current radar system installed in many commercial and private aircraft around the world. It consists of a simple 7" touchscreen display, with a mini-SMA port on top for an antenna connection and a power button and power socket on the back. This device has a max effective range of approximately 250 miles given pristine weather conditions and a battery life of approximately 1 to 2 hours depending on usage conditions. The device itself does not require a continuous data uplink to the internet, nor to a reporting station on the ground. Instead, the device relies entirely on its own inherent antenna and software to decipher aircraft location and plot that information on its own map. With constant internet uplink, additional functionalities are available such as automatic aircraft position reporting, live air traffic control information, the latest METAR information from the nearest reporting station, and itinerary information for all US based airports.

Basis of Operation

The *Aviation Assistant* processes radio transmissions in real time by passing commercial and recreational aircraft by the on board *Automatic Dependent Surveillance – Broadcast (ADS-B)* system. When the device is powered on, and commercial aircraft are within radio distance, ADS-B packets transmitted on the 1090mhz frequency are received and deciphered in real time. Deciphered data is sent to the web interface and displayed on a real time map. Additional information on the operational capacities of the device as well as the

Device Diagram and Parts Required

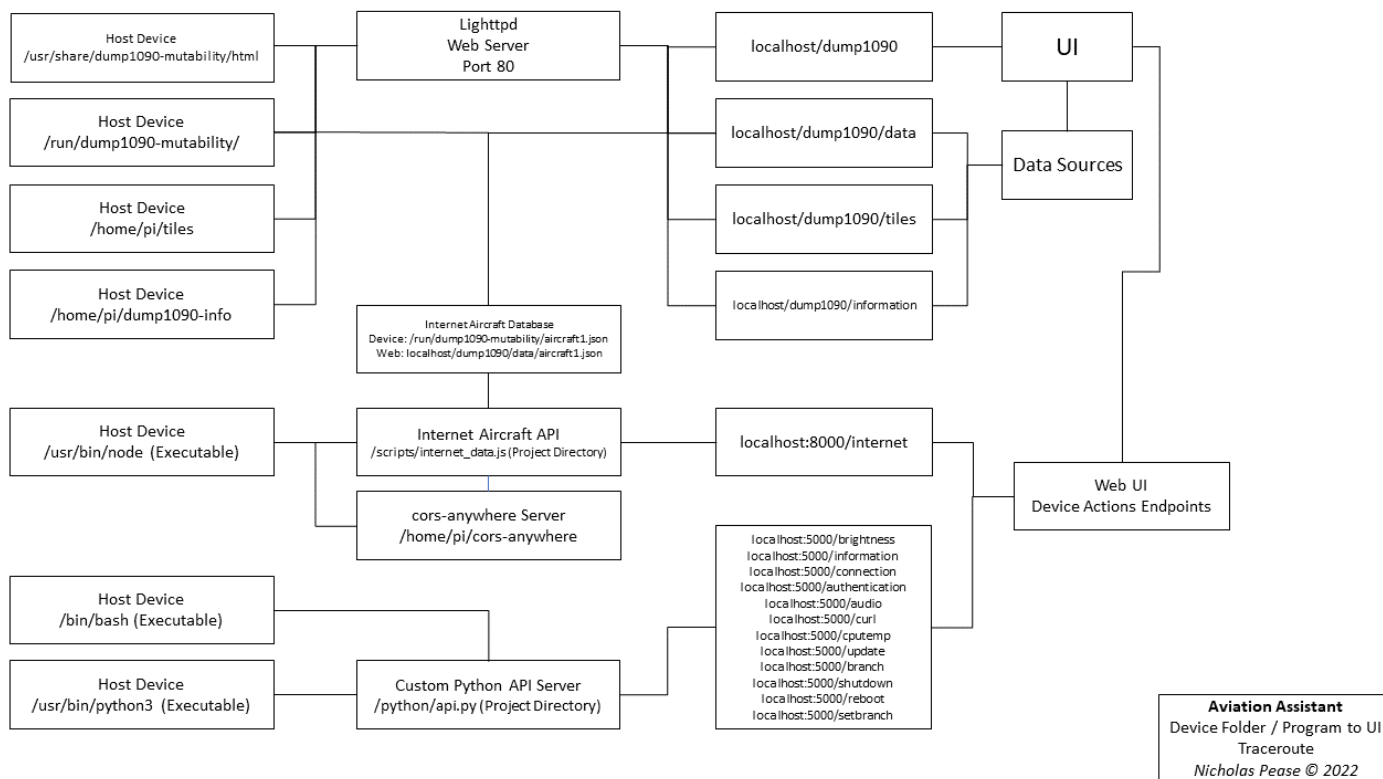




Part List

#	Part Name	Purpose
1	Raspberry Pi 4B+ (2 GB)	Main processing unit, runs software
2	Geek worm X728 Power Supply Board	Provides power for device and components
3	Raspberry Pi 7" Touchscreen	User interface for device
4	Flight Aware Software Defined Radio	Takes radio signals and digitizes them for processing
5	2x Samsung 3500 mAh (3.5 WH) Battery's	Stores power for device
6	TPA2016R2 Audio Driver	Amplifies audio from device and outputs it to speaker
7	Speaker	Audio output
8	Power button	Allows you to turn the device on and off
9	DC Jack In	Plug in to recharge the device
10	Fan	Cools device internals

Device Software Workflow and Configuration



The Aviation Assistant uses two primary means of executing the written code files, and serving live, updated information from its respective sources. Although not pictured above, the dump1090 software that process the raw signals into a readable stream of data places this data in the /run/dump1090-mutability directory of the device. The /home/pi/tiles directory houses the hundred of saved map data tiles in the format /x/y/z where the x, y, and z directory/file names correspond to the latitude and longitude system of the earth.