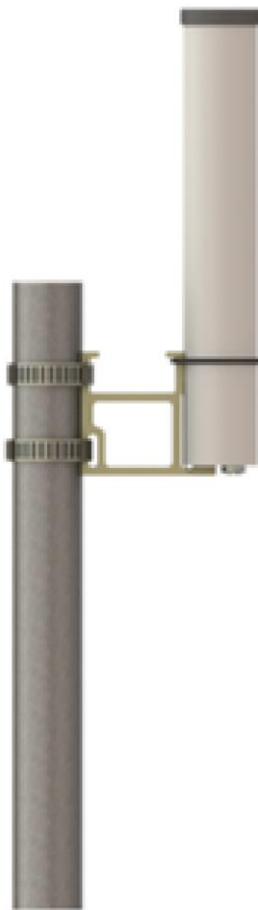




# FlightStation User and Installation Guide

REVISION A



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# 1 Revision History

Revision	Date	Comments
A	8/10/2023	Initial release

## 2 Warnings / Disclaimers

All device operational procedures must be understood prior to operation. uAvionix is not liable for damages arising from the use or misuse of this product.

### 3 Limited Warranty

uAvionix FlightStation products are warranted to be free from defects in material and workmanship for one year from purchase. For the duration of the warranty period, uAvionix, at its sole option, will repair or replace any product which fails under normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost.

This warranty does not apply to cosmetic damage, consumable parts, damage caused by accident, abuse, misuse, water, fire or flood, damage caused by unauthorized servicing, or product that has been modified or altered.

IN NO EVENT, SHALL UAVIONIX BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

#### Warranty Service

Warranty repair service shall be provided directly by uAvionix.

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## 5 Introduction

FlightStation is a dual band (978MHz and 1090MHz), networkable ADS-B receiver with a Power-Over-Ethernet (POE) interface enclosed in an IP67 rated protective enclosure. FlightStation provides ground surface or low-altitude ADS-B surveillance within line of sight of the antenna, with range dependent upon the output power of the transmitting ADS-B transceiver. FlightStation is robust enough to be permanently mounted outdoors in harsh environmental conditions, and small enough to be used as a mobile asset for roaming operations. Installation is simple with included pole-mount bracket, and a single POE cable which provides both power and data communications. Configuration is accomplished via a simple web interface. An integrated GPS provides location and precision timestamping for messaging.

The FlightStation comes preconfigured for out of the box plug and play behavior to automatically connect to the uAvionix FlightLine system. Flightline provides a method to graphically view traffic as well and an API to allow access to the data. The FlightStation is designed to the performance specifications of DO-260B, DO-282B, DO-229C. Overlapping FlightStation coverage will enable the uAvionix TruSky ADSB spoofing detection.

# 6 Installation

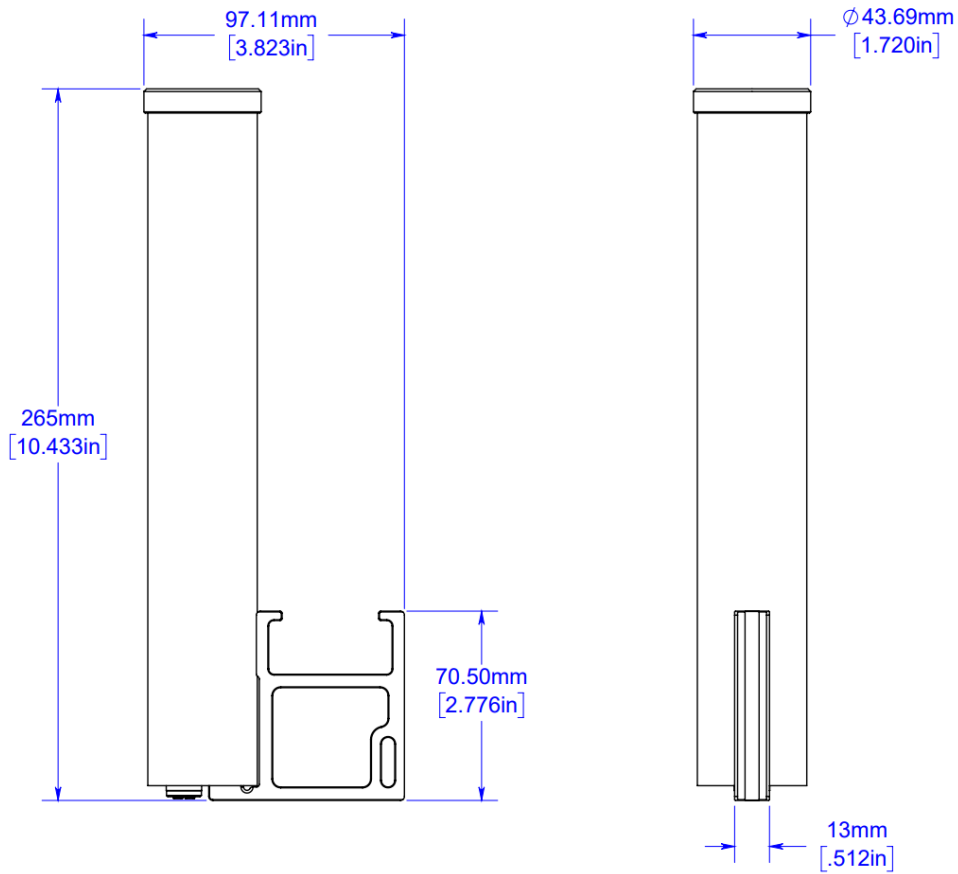
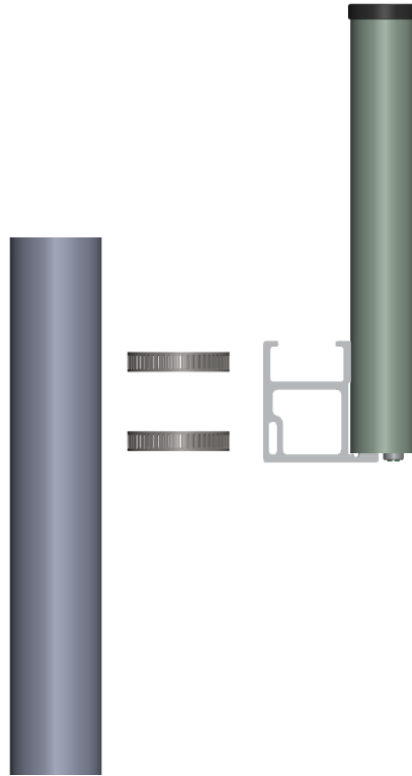


Figure 1: FlightStation-dimensional drawing

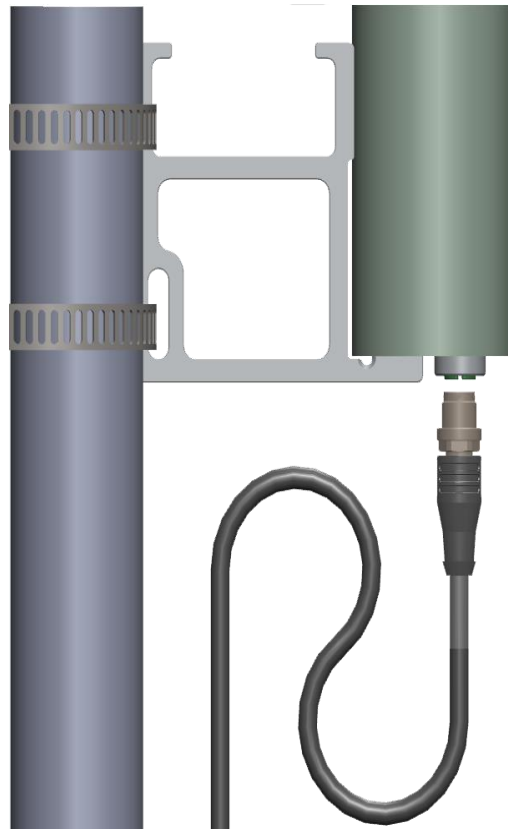


## 6.1 Mechanical Mounting Recommendations

FlightStation is supplied with an installation bracket and hose clamps to mount to poles of various sizes.



Seat and tighten the hose clamp mount into the FlightStation and secure with provided screws using a screwdriver. Tighten hose clamps to secure FlightStation to the mounting pole.



Connect the FlightStation with the M12 connector using Cat5e or better ethernet cable. It is recommended to use shielded Cat5e cable to protect against EMI interference depending on your installation location.

Seat M12 plug into the FlightStation M12 receptacle then install and tighten the connector as shown. M12 X Code cables can be sourced to accommodate longer installation runs. Alternatively, a shielded, waterproof coupler can be installed to extend a cable run to the POE switch/injector location.

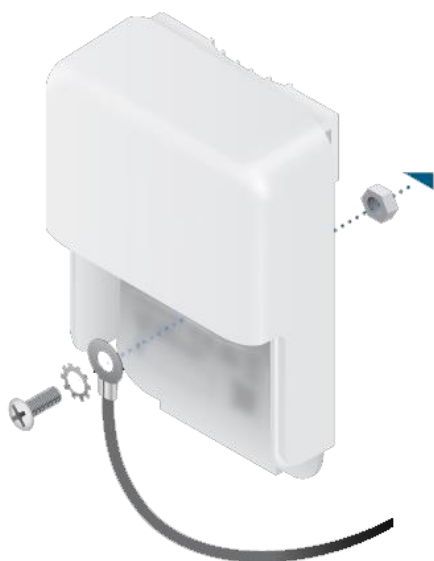
Mount FlightStation as high on the pole as possible, preferably at the top with an unobstructed 360° view of the sky.

Secure the ethernet cable to the FlightStation mounting arm or to the pole using a zip tie in a drip loop configuration for strain relief.



Run the X-code ethernet cable to the desired network switch/router location. If a longer cable is required use the supplied coupler and a shielded CAT5 or suitable cable to extend cable.

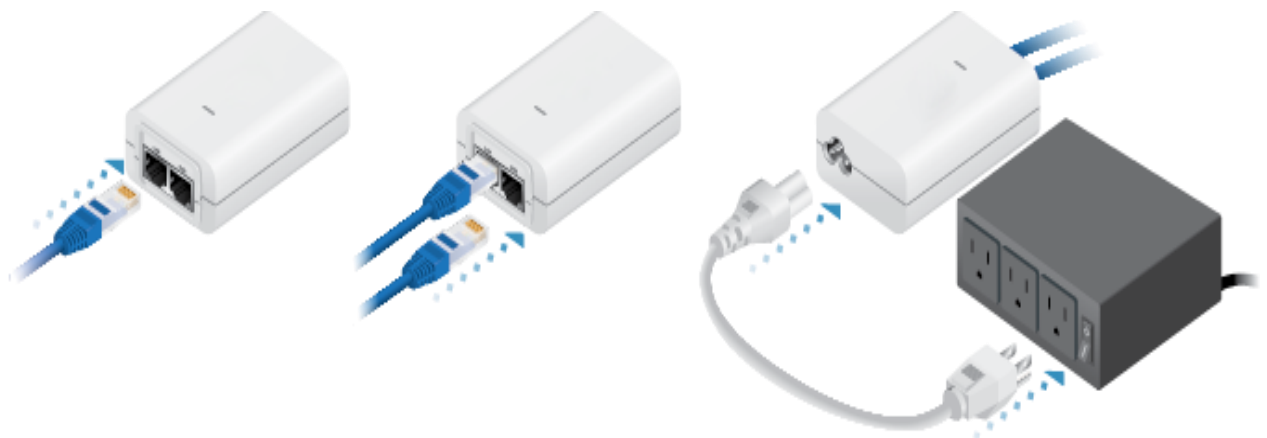
Unthread each side of the coupler and pass the RJ45 connectors through the blue seals. Tighten the threaded portions to create a waterproof seal. The total installation length should not exceed 100 meters.



Install the surge protection indoors near the network switch/router. Use an M5 machine screw and nut to attach a drain wire that is connected to a remote grounding block or structure. The surge protection enclosure has molded provisions for surface mounting.



Connect the RJ45 from the FlightStation to an available port on the surge protector. Insert an additional shielded CAT5 or suitable cable into the second RJ45 port of the surge protector.



Connect the remaining end of the shielded CAT5 or suitable cable from step 5 into the port marked POE on the supplied PoE injector. Connect an additional ethernet cable from your network switch or router to the LAN port of the PoE injector. Connect the Power Cord to the injector, and then plug the power cord into a power outlet.

## 6.2 Connection to the POE network

The FlightStation connects to a network via POE using an M12 X-Coded connector.

POE Specifications:

Parameter	Value
Standard	802.3af (802.3at Type1)
Maximum power	15.4W
Voltage Range	37 – 57V
Maximum Current	350mA
Maximum Cable Resistance	20Ω
Supported Cabling	Shielded Cat 3 and Shielded Cat 5
Supported Modes	Mode A (endspan), Mode B (midspan)
Power Management	Power Class 0
Maximum Cable Length	100 meters

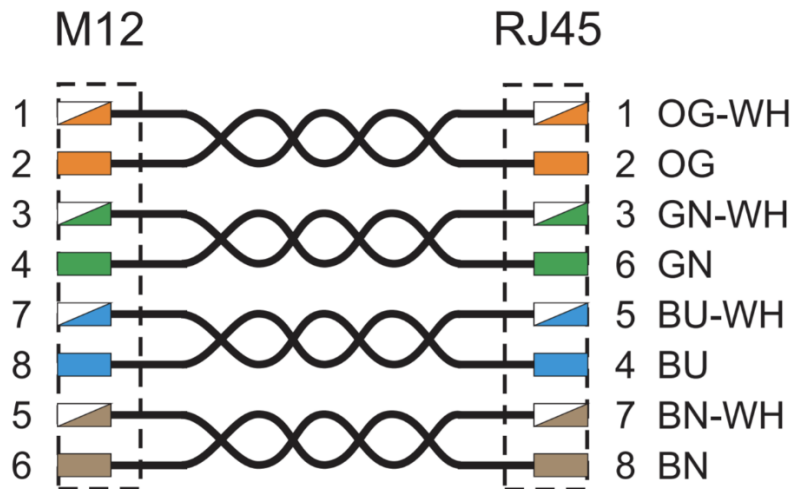


Figure 2: M12 to RJ45 wiring diagram

### Caution!



Absolute maximum DC voltage +57 V. A higher DC voltage value will permanently damage the equipment!

# 7 Configuration

## 7.1 POE Installation

FlightStation must be powered via POE. This can be accomplished with a POE capable switch, or with a standalone POE injector.

Connect the shielded POE cable to an active POE switch or a regular switch via a Class 0 POE power injector as shown below.

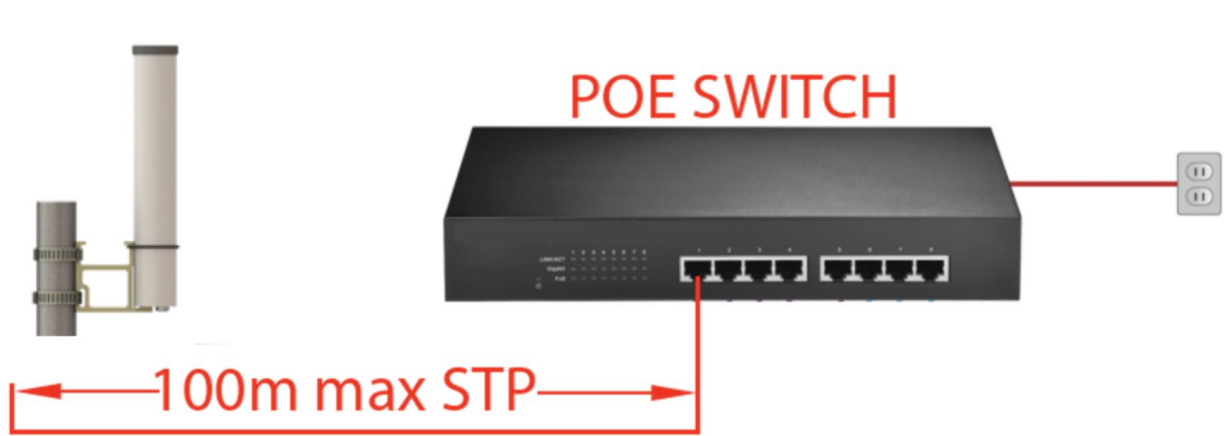


Figure 3: pingStation powered by POE switch

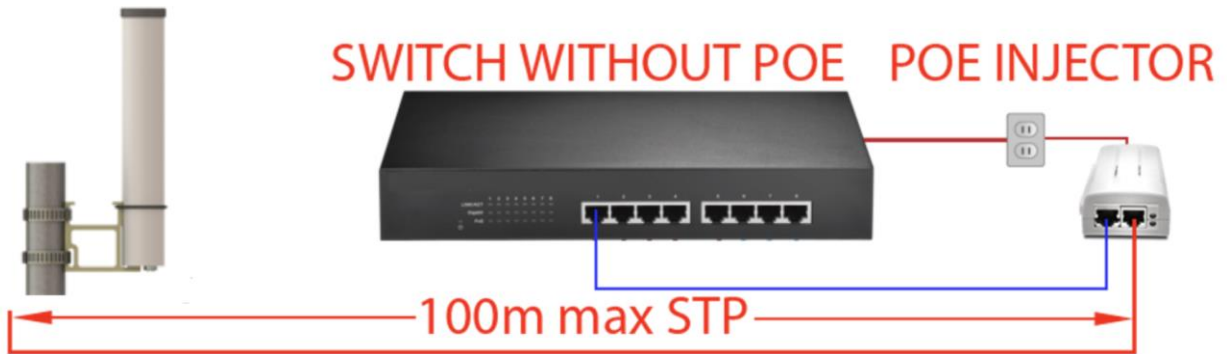


Figure 4: pingStation powered by POE injector

At power-up an IP address will be assigned to the FlightStation by the local DHCP server. This IP address is dynamic and assigned by your local network. Determining the assigned IP address is required for configuration. The FlightStation IP address can

be determined by accessing the local DHCP server and reviewing the connected devices or by using industry accepted network scanning tools.

Directions for each DHCP server, router, or network scanning tool differ. Refer to the instruction manual for these devices or tools to help determine the IP address assigned to the FlightStation. The MAC address for each FlightStation can be found on the device housing.

**Optional:** You may wish to configure your DHCP server to reserve an IP address for FlightStation in order to ensure its address does not change in the future. Refer to your router or DHCP server instructions for how to reserve IP addresses.

## 7.2 DHCP Fallback

- The system will always enter DHCP client mode on power up.
- If we have a preferred IP address configured, it will be loaded as the default into the network interface.
- **If we have a preferred IP address configured and the unit is on a network with a DHCP server, the DHCP address received from the DHCP server will overwrite the preferred IP address in the network interface. The network administrator can create a DHCP reservation based on the MAC address for that IP address if needed.**
- If we have a static IP address configured, the DHCP requests will stop after 75 seconds. The 75 seconds was chosen because the default port configuration on some switches can take 60+ seconds for the link to come up.

## 7.3 FlightStation Information URL

FlightStation settings can be observed and changed by navigating via web browser from a PC or mobile device which is on the same Local Area Network (LAN) as the powered FlightStation. The IP address assigned by the DHCP server serves as the base URL.

FlightStation base URL:

`http://###.###.###.###/`

Note “###.###.###.###” is the IP address of the device



## Firmware Information

FlightStation ID: 546F71500014  
FlightStation Version: V 0. 1. 8 [Update](#)  
Radio Version: V2.4.61 [Update](#)  
FPGA Version: V 2. 1. 0  
DNS Server: 192.168.110.1

## Settings

### Flightline Information

Admin URL:   
Traffic URL:

### [Network Configuration](#)

## Status Information

Name	Value
Up Time	2d:35m:42s
GPS Fix	4
Num GPS Sats	12
Latitude	42.01016
Longitude	-91.6580864
GPS Altitude	689
PPS Detected	true
Admin Up Time	2d:35m:40s
Admin Connection	Connected
Traffic Up Time	2d:35m:41s
Traffic Connection	Connected
Num UAT Traffic	13
Num 1090ES Traffic	66

Figure 5: Example information screen



The health of your FlightStation can be seen by reviewing the Status Information section of this webpage. The key indicators that your health is good are as follows:

- GPS fix acquired
- Admin Connection state is Connected
- Traffic Connection state is Connected
- Num UAT/ADSB traffic numbers are non-zero

When all of these things are true, this FlightStation will be feeding the FlightLine system with ADSB traffic.

### 7.3.1 Information Items

Information Category	Information Item	Description
<b>Firmware Information</b>		General information on the firmware versions and links for updating.
	FlightStation ID	The MAC address of the FlightStation.
	FlightStation Version	The version number of the network firmware and also provides a link for network firmware updates.
	Radio Version	The version of the ADSB receiver firmware and also provides a link for radio firmware updates.
	FPGA version	The version of the receiver FPGA.
	DNS server	The active DNS server IP address being used to resolve hostnames..
<b>Settings</b>		FlightLine information for managing the FlightStation and the data delivery path.
	Admin URL	The websocket URL used by FlightLine to manage the this FlightStation. This will use port 80- on your network
	Traffic URL	The websocket URL used to deliver the ADSB traffic to FlightLine. <b>This will use port 9090 on your network and needs to be open on your firewall for ADSB traffic delivery to FlightLine.</b>
	Network Configuration	The link to allow you to set a preferred network address, subnet mask, gateway, or DNS server address on <b>fully static IP networks. If there is a DHCP server on your network it will override this preferred network address.</b>

Information Category	Information Item	Description
	Save	A button to allow you to save modified settings to flash.
<b>Status Information</b>		General status, health and live statistics.
	Uptime	The amount of time the system has been up since its last power cycle or reset.
	GPS Fix	The GPS fix type.
	Num GPS Sats	The number of satellites the GPS can currently see.
	Latitude	The actual Latitude of this FlightStation
	Longitude	The actual Longitude of this FlightStation
	GPS Altitude	The actual GNSS altitude of this FlightStation in feet
	PPS Detected	The hardware UTC 1 pulse per second(PPS) signal is detected
	Admin Uptime	The amount of time the Admin websocket has been connected.
	Admin Connection	The current state of the Admin Connection.
	Traffic Uptime	The amount of time the Traffic websocket has been connected
	Traffic Connection	The current state of the Admin Connection.
	Num UAT Traffic	The number of ADSB broadcasting UAT aircraft being currently tracked by this FlightStation
	Num 1090ES Traffic	The number of ADSB broadcasting 1090 aircraft being currently tracked by this FlightStation

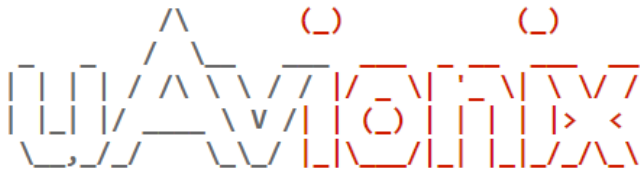
**Note: When modifying any configuration item, press the Save button to store the changes. These fields are non-volatile and persist through power cycles.**

## 8 Update

Most of the FlightStation upgrades will be performed remotely using the Admin WebSocket. However, the FlightStation supports software upgrades thru a local web-based flashing system as well. The user will launch the update webpage, select a firmware binary file and press a button to start the update process. There are two separate firmware files which can be updated through this process, the system software, and the ADS-B receiver software.

### 8.1 Update the FlightStation system software

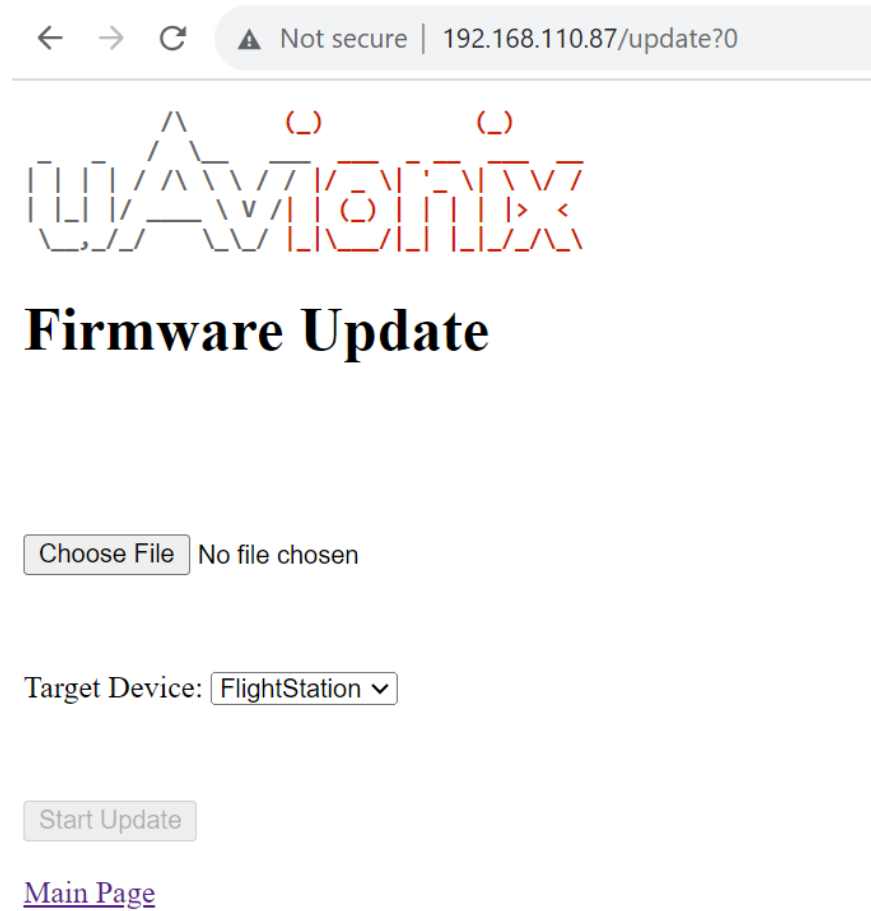
Click on the “FlightStation Version” “Update” link



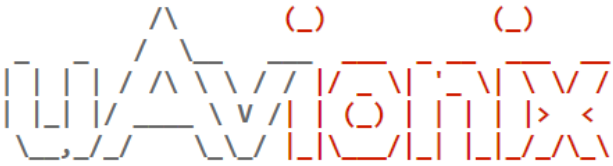
## Firmware Information

FlightStation ID:	546F71500014
FlightStation Version:	V 0. 1. 8 <a href="#">Update</a>
Radio Version:	V2.4.61 <a href="#">Update</a>
FPGA Version:	V 2. 1. 0
DNS Server:	192.168.110.1

This will bring you to the Update page.



Choose the UAV file and press “Start Update”



## Firmware Update

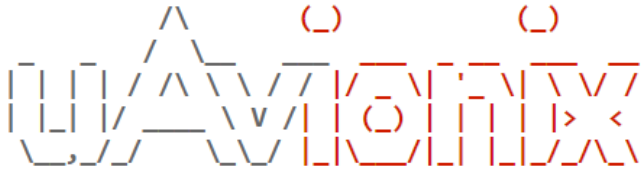
Release\_UA...1c2afc3.uav

Target Device:

[Main Page](#)

## 8.2 Update ADS-B receiver software

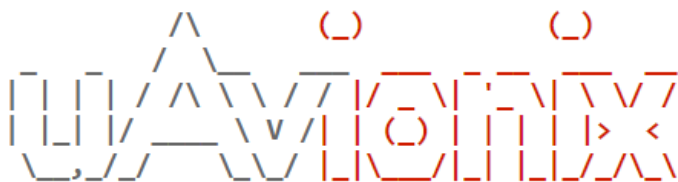
Click on the “Radio Version” “Update” link



### Firmware Information

FlightStation ID:	546F71500014	
FlightStation Version:	V 0. 1. 8	<a href="#">Update</a>
Radio Version:	V2.4.61	<a href="#">Update</a>
FPGA Version:	V 2. 1. 0	
DNS Server:	192.168.110.1	

This will bring you to the Update page.



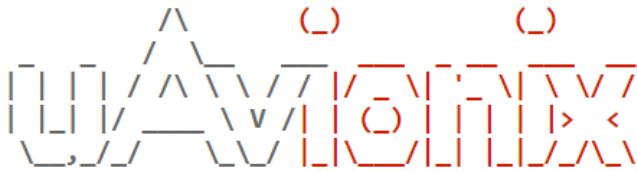
## Firmware Update

No file chosen

Target Device:

[Main Page](#)

Choose the UAV file and press “Start Update”



## Firmware Update

PingStation...\_V2.4.62.uav

Target Device:

[Main Page](#)



## 9 Support

For support with FlightStation visit <http://uavionix.com/support/>