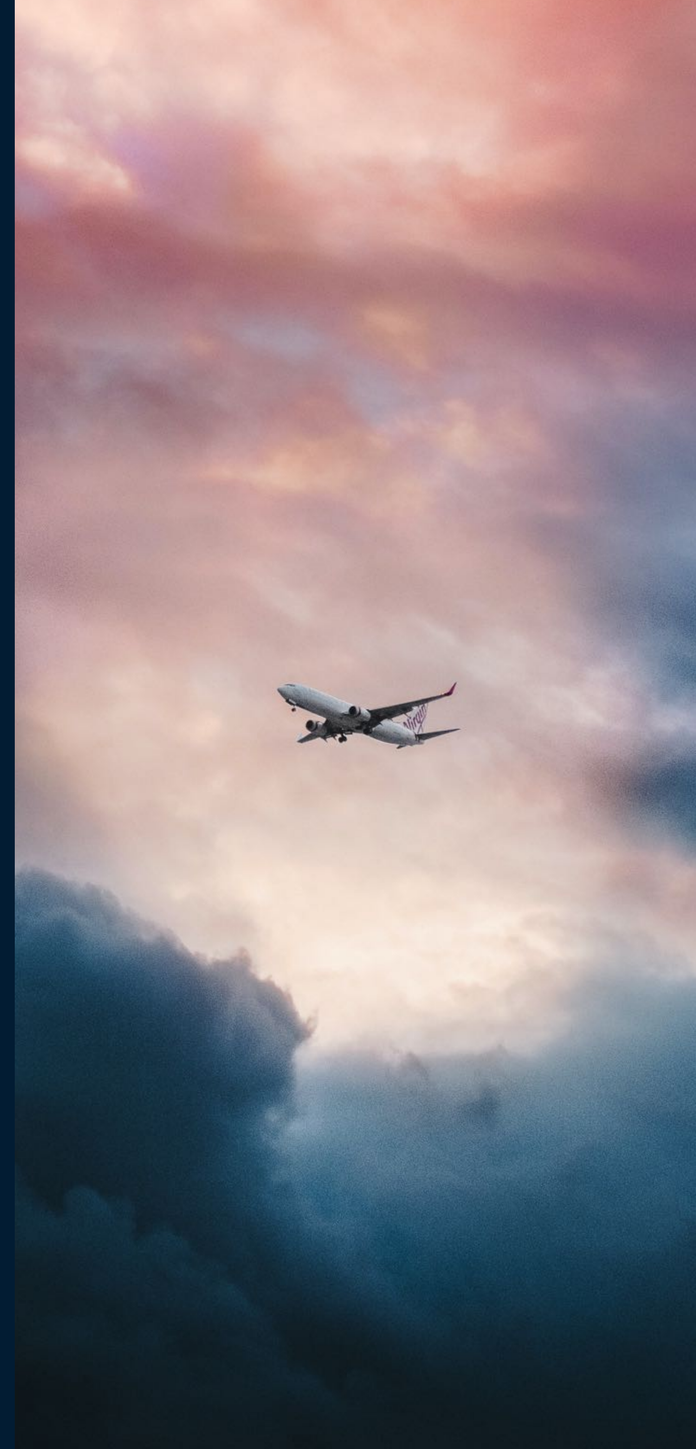
Media City Bergen

Norwegian Centres of Expertise
NCE Media

LOOK UP!

Tracking the air traffic over your head with a Raspberry Pi and a RTL-SDR-dongle



KETIL MOLAND OLSEN
SENIOR PROJECT MANAGER

Norwegian Innovation Clusters

GOLD Cluster Management Excellence
PROVEN FOR CLUSTER EXCELLENCE


BLUE
BLUE

AND THE FLIGHT TRACKING?

Image © Laszlo Fekete

Reg.:	LN-RRF
	Norway
DB flags:	none
Type:	B738
	BOEING 737-800
Type Desc.:	L2J
Squawk:	2345

History

SPATIAL

Groundspeed:	178 kt
Baro. Altitude:	▼4050 ft
Geom. Altitude:	▼3475 ft
Vert. Rate:	-1280 ft/min
Track:	14.3°
Pos.:	60.113°, 5.274°
Distance:	n/a

SIGNAL

Source:	ADS-B
RSSI:	-6.1
Msg. Rate:	12.3
Receivers:	2
Last Pos.:	2.2 s
Last Seen:	2.0 s

FMS SEL

Sel. Alt.:	2496 ft
Sel. Head.:	348.8°

WIND

Speed:	47 kt
Direction (from):	341°
TAT / OAT:	2 / -6 °C

SPEED

Ground:	178 kt
True:	218 kt
Indicated:	211 kt
Mach:	0.344

ALTITUDE

Barometric:	▼4050 ft
Baro. Rate:	
Geometric:	-1280 ft/min
Geom. Rate:	▼3475 ft
QNH:	-1248 ft/min
	991.2 hPa

DIRECTION

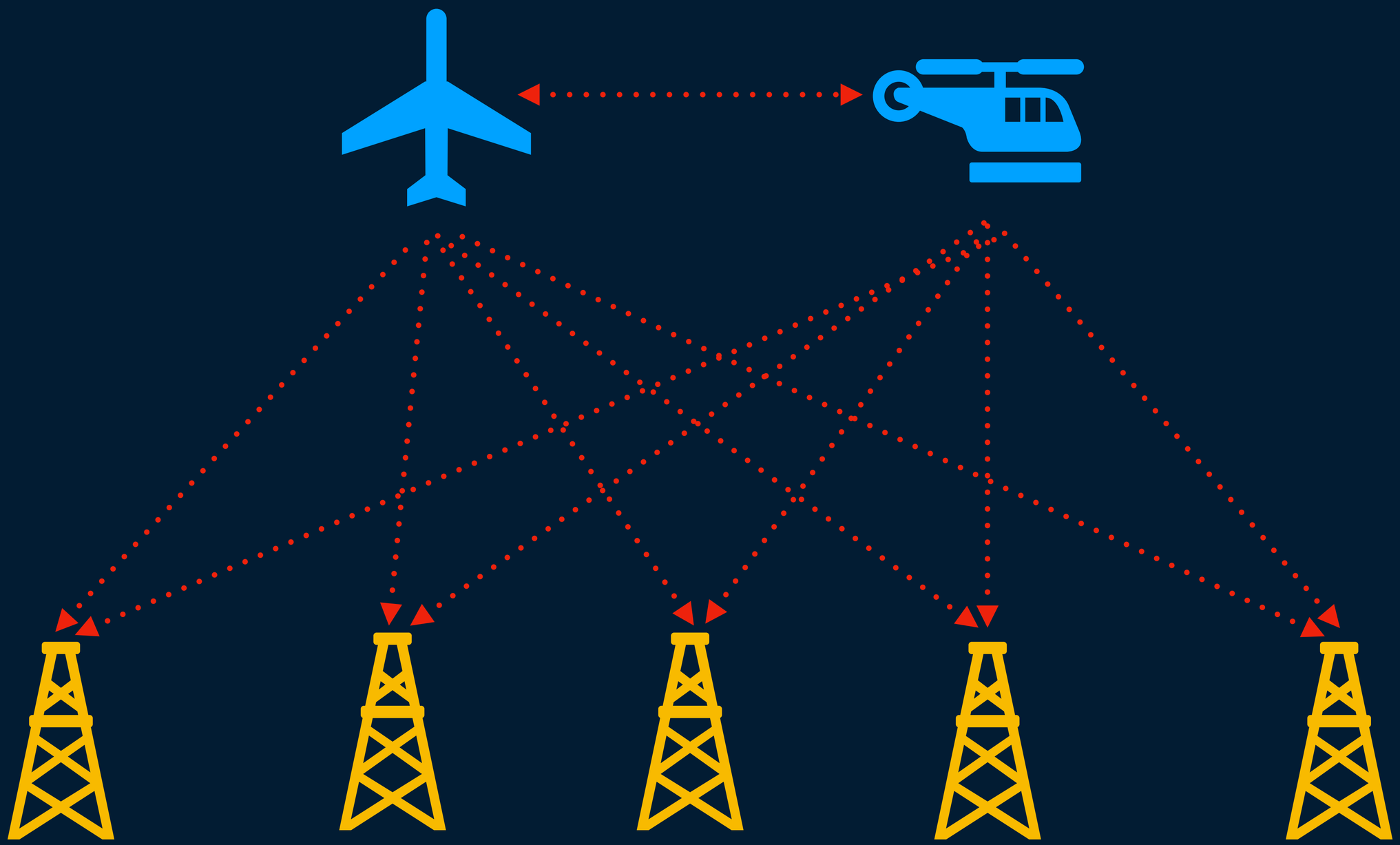
L O K M P I R F

KEY CONCEPT: ADS-B

Automatic Dependent Surveillance Broadcast

KEY CONCEPT: MULTILATERATION

Reverse GPS



WHAT HARDWARE DO WE NEED?

A Raspberry Pi and a RTL-SDR USB dongle


FlightAware

SOFTWARE

balena-ads-b

README.md

balena ADS-B Flight Tracker

ADS-B Flight Tracker running on balena with support for FlightAware, Flightradar24, Plane Finder, OpenSky Network, AirNav RadarBox, and ADSB Exchange.

Contribute to the flight tracking community! Feed your local ADS-B data from an RTL-SDR USB dongle and a supported device (see below) running balenaOS to the tracking services FlightAware, Flightradar24, Plane Finder, OpenSky Network, AirNav RadarBox and ADSB Exchange. In return, you will receive free premium accounts worth several hundred dollars/year!

Stay in the loop

👉 Subscribe to our newsletter 👈 to stay updated on the latest development of balena ADS-B Flight Tracker.

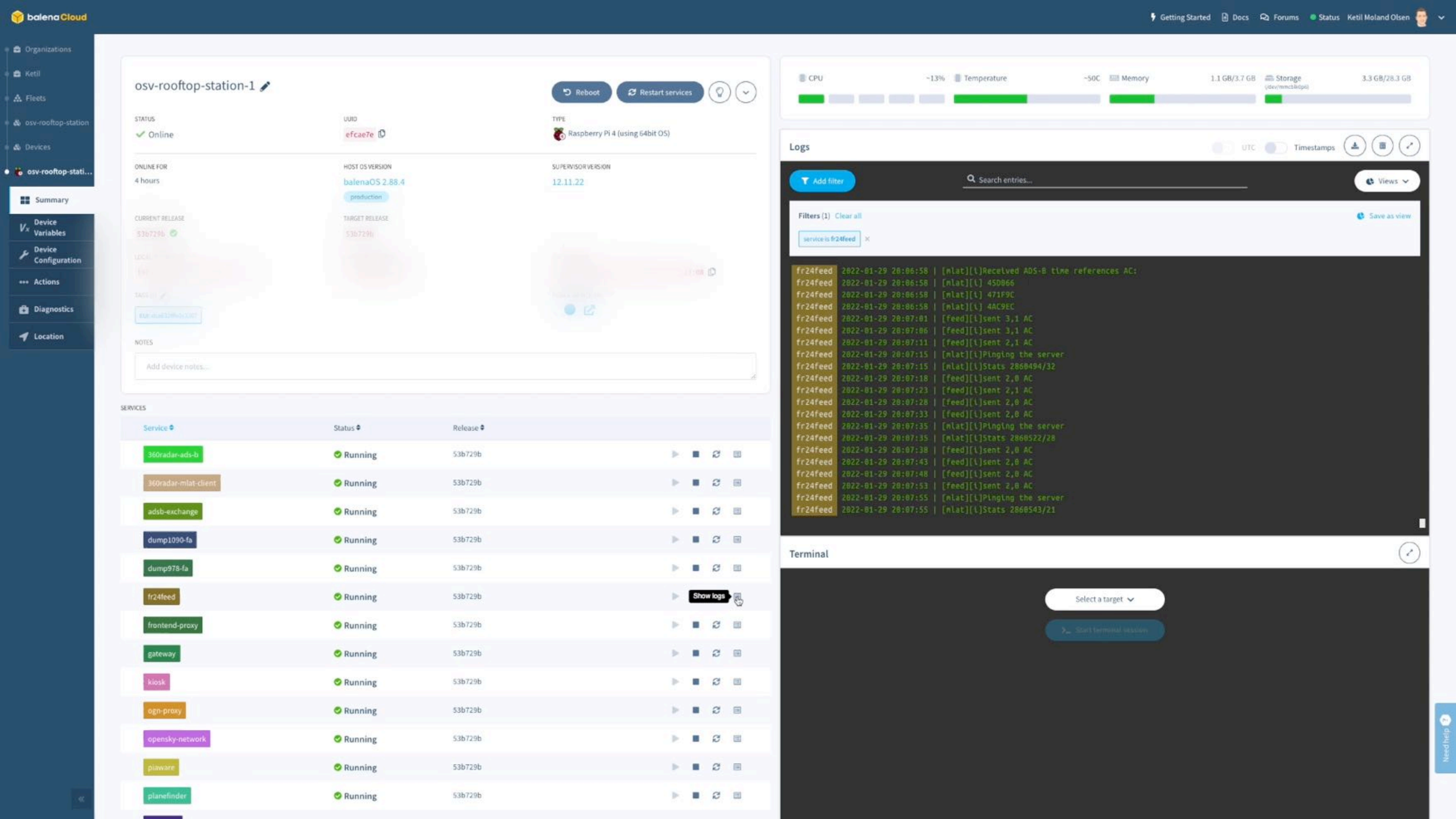
Got stuck? Get help

- Raise an issue on GitHub
- Create a post in our forum thread
- Watch the videos from the balena IoT Happy Hour in March 2021 and from balena Hackathon in October 2021
- Reach out directly
- Read past newsletters

Supported devices

Fin	balenaFin
intel NUC	Intel NUC
NANO	Nvidia Jetson Nano 2GB Devkit SD
NANO	Nvidia Jetson Nano SD-CARD

https://github.com/ketilmo/balena-ads-b


balenaCloud
Getting Started
Docs
Forums
Status
Ketil Moland Olsen
Organizations
Ketil
Fleets
osv-rooftop-station
Devices
osv-rooftop-stati...
Summary
Device Variables
Device Configuration
Actions
Diagnostics
Location
osv-rooftop-station-1
Reboot
Restart services
STATUS
Online
UUID
efcae7e
TYPE
Raspberry Pi 4 (using 64bit OS)
ONLINE FOR
4 hours
HOST OS VERSION
balenaOS 2.88.4
production
SUPERVISOR VERSION
12.11.22
CURRENT RELEASE
53b729b
TARGET RELEASE
53b729b
NOTES
Add device notes...
SERVICES
Service
Status
Release
360radar-ads-b
Running
53b729b
360radar-mlat-client
Running
53b729b
adsb-exchange
Running
53b729b
dump1090-fa
Running
53b729b
dump978-fa
Running
53b729b
fr24feed
Running
53b729b
Show logs
frontend-proxy
Running
53b729b
gateway
Running
53b729b
kiosk
Running
53b729b
ogn-proxy
Running
53b729b
opensky-network
Running
53b729b
piaware
Running
53b729b
planefinder
Running
53b729b
CPU
~13%
Temperature
~50C
Memory
1.1 GB/3.7 GB
Storage
3.3 GB/28.3 GB
Logs
UTC
Timestamps
Add filter
Search entries...
Views
Filters (1)
Clear all
Save as view
service is fr24feed
fr24feed 2022-01-29 20:06:58 | [mlat][i]Received ADS-B time references AC:
fr24feed 2022-01-29 20:06:58 | [mlat][i] 45D866
fr24feed 2022-01-29 20:06:58 | [mlat][i] 471F9C
fr24feed 2022-01-29 20:06:58 | [mlat][i] 4AC9EC
fr24feed 2022-01-29 20:07:01 | [feed][i]sent 3,1 AC
fr24feed 2022-01-29 20:07:06 | [feed][i]sent 3,1 AC
fr24feed 2022-01-29 20:07:11 | [feed][i]sent 2,1 AC
fr24feed 2022-01-29 20:07:15 | [mlat][i]Pinging the server
fr24feed 2022-01-29 20:07:15 | [mlat][i]Stats 2860494/32
fr24feed 2022-01-29 20:07:18 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:23 | [feed][i]sent 2,1 AC
fr24feed 2022-01-29 20:07:28 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:33 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:35 | [mlat][i]Pinging the server
fr24feed 2022-01-29 20:07:35 | [mlat][i]Stats 2860522/28
fr24feed 2022-01-29 20:07:38 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:43 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:48 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:53 | [feed][i]sent 2,0 AC
fr24feed 2022-01-29 20:07:55 | [mlat][i]Pinging the server
fr24feed 2022-01-29 20:07:55 | [mlat][i]Stats 2860543/21
Terminal
Select a target
Need help?

SHARING DATA WITH SERVICES

flightradar24
LIVE AIR TRAFFIC

FlightAware
Live Flight Tracking

OPENSKY
NETWORK

planefinder

AirNav RadarBox
You fly. We track.

ADS-B Exchange
World's largest source of unfiltered flight data

IF YOU SHARE YOUR DATA...

Subscription plans

Basic

- ✓ Live flight tracking
- ✓ Limited Enhanced 3D
- ✓ Search
- ✗ Ads removed
- ✗ Extra map labels
- ✗ Alerts
- ✗ Full aircraft details
- ✗ Aeronautical charts
- ✗ Weather layers
- ✗ Additional flight history

Create account

Silver

Everything in Basic +

- ✓ Ads removed
- ✓ Unlimited Enhanced 3D
- ✓ Alerts
- ✓ 90 days of past flights
- ✓ Text labels
- ✓ More aircraft details

See all Silver features

Subscription options:

Monthly | Annual

$9.99/year *

Start your 7-day free trial

Gold

Everything in Silver +

- ✓ Aeronautical charts
- ✓ Aviation weather layers
- ✓ More flight details
- ✓ ATC boundaries
- ✓ 365 days of past flights

See all Gold features

Subscription options:

Monthly | Annual

$34.99/year *

Start your 7-day free trial

Business

Everything in Gold +

- ✓ Licensed for businesses
- ✓ High-level significant weather layer
- ✓ Lightning layer
- ✓ AIRMETs/SIGMETs layer
- ✓ Airport view
- ✓ Fleet view

See all Business features

Subscription options:

Monthly | Annual

$499.99/year *

7-day free trial

All prices in US dollars. EU VAT added to prices in countries where applicable.

You can use your subscription on any computer, phone, or tablet. No commitment. Cancel anytime.

Compare plans

CHOOSE THE RIGHT PLAN FOR YOU

SPOTTER

$2.45 /mo
or $24.50 per year

Tailor made for aviation enthusiasts and plane spotters. Get access to our premium mobile apps, filters and no time-outs.

TRY NOW

PILOT

$7.95 /mo
or $79.50 per year

Ideal for pilots, ATC controllers & dispatchers. Weather layers, SkyVector, ATC Boundaries & NavAids make this plan the professional's choice.

TRY NOW

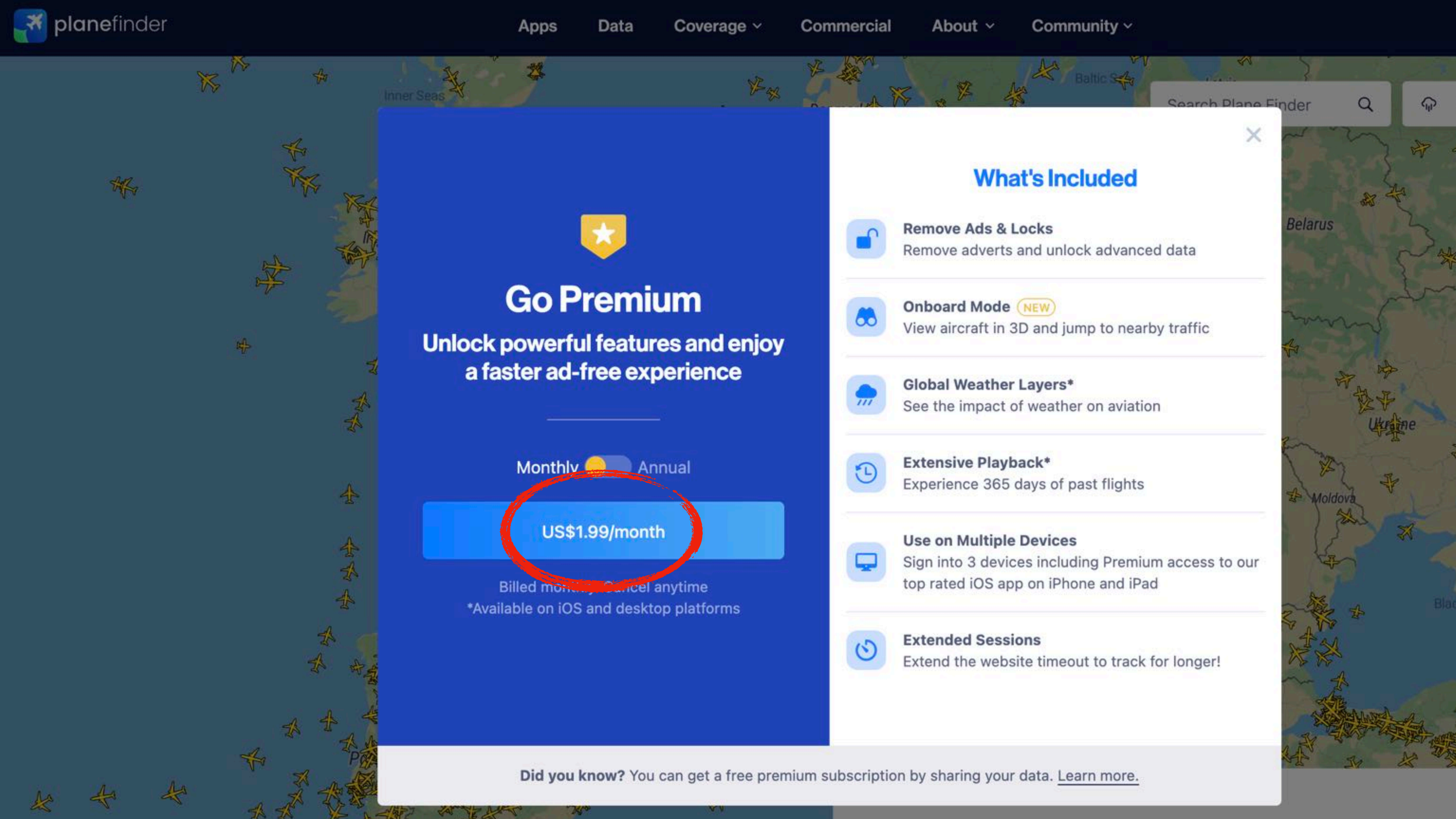
BUSINESS

$39.95 /mo
or $399.50 per year

Meant for [illegible] such as airports and airlines. Experience our exclusive fleet tracker, one year historic flight data and much more.

CURRENT PLAN

COMPARE PLANS


planefinder
Apps
Data
Coverage
Commercial
About
Community
Search Plane Finder
Go Premium
Unlock powerful features and enjoy a faster ad-free experience
Monthly
Annual
US$1.99/month
Billed monthly. Cancel anytime
*Available on iOS and desktop platforms
What's Included
Remove Ads & Locks
Remove adverts and unlock advanced data
Onboard Mode NEW
View aircraft in 3D and jump to nearby traffic
Global Weather Layers*
See the impact of weather on aviation
Extensive Playback*
Experience 365 days of past flights
Use on Multiple Devices
Sign into 3 devices including Premium access to our top rated iOS app on iPhone and iPad
Extended Sessions
Extend the website timeout to track for longer!
Did you know? You can get a free premium subscription by sharing your data. Learn more.

Select a FlightAware Subscription

Flight tracking features at every level.

Paid plans are billed monthly. You can cancel or change your subscription any time.

Enterprise WX

First-class fleet tracking with complete, live weather data.

$129.95/month

Upgrade

Enterprise

Enhanced fleet tracking for enterprise monitoring.

$89.95/month

You currently have this subscription.

Premium +

Extra features for frequent flyers and professionals.

$39.95/month

Downgrade

Basic

Flight tracking for travelers and plane spotters.

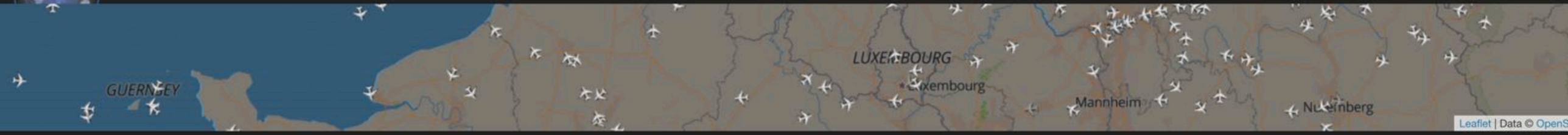
Free

Downgrade

Compare Subscriptions

or view other flight tracking products

FUN, ALL RIGHT. BUT USEFUL?



Open Air Traffic Data for Research.

×1000 MODE-S messages collected so far:	# tracked a/c MODE-S:	# MODE-S Messages / s:	# of seen aircraft:
16,396,836,489	4,249	154,354	454,985

FLARM messages collected so far:	# tracked a/c FLARM:	# FLARM Messages / s:
3,335,163,370	0	0

Become a VHF Feeder

OpenSky Network is extremely proud and excited to announce that we are now starting to collect, store and distribute ATC voice recordings - just as we have done so far with ADS-B data.

If you are interested in becoming a feeder, please do check out this web page: https://atco.opensky-network.org/. There simple to follow instructions have been given on how to set up a receiver. In addition to the set-up web page, there are lots of useful blog posts on ATCO2 project web page: check those out too: https://www.atco2.org/news. The very basic, how-to-set-up-your-receiver post is here: https://www.atco2.org/news/setting-up-vhf-receiver-for-air-traffic-communication

One thing that we would like to stress is that we are still in the development phase and therefore there might be few issues here and there. If you encounter any of the issues, please

Donate
for better coverage

Tweets by @OpenSkyNetwork

OpenSky Network Retweeted

BUT Speech
@ButSpeech

If you live near an airport, you can help us! Become a "Tower-and-pilot" speech feeder...
opensky-network.org

This is part of the @Atco2P project that collects "Tower-and-pilot" speech database via Swiss non-profit organization OpenSky Network.#ATCO2

traffic – Air traffic data processing in Python

Source code on github

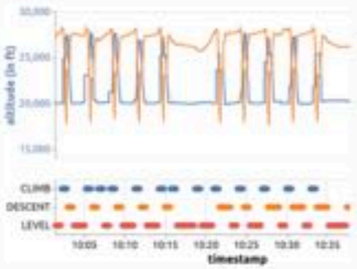
The traffic library helps working with common sources of air traffic data.

Its main purpose is to provide data analysis methods commonly applied to trajectories and airspaces. When a specific function is not provided, the access to the underlying structure is direct, through an attribute pointing to a pandas dataframe.

The library also offers facilities to parse and/or access traffic data from open sources of ADS-B traffic like the OpenSky Network or Eurocontrol DDR files. It is designed to be easily extendable to other sources of data.

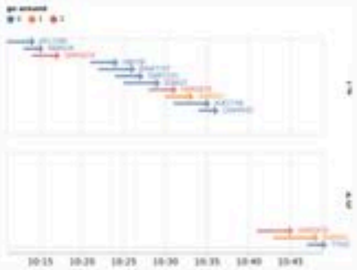
Example Gallery

This page contains only nice visualisations on recreational examples. More solid examples with a strong storyline are available in the Scenarios and use cases page.



Zero gravity flights

Tour de France 2020

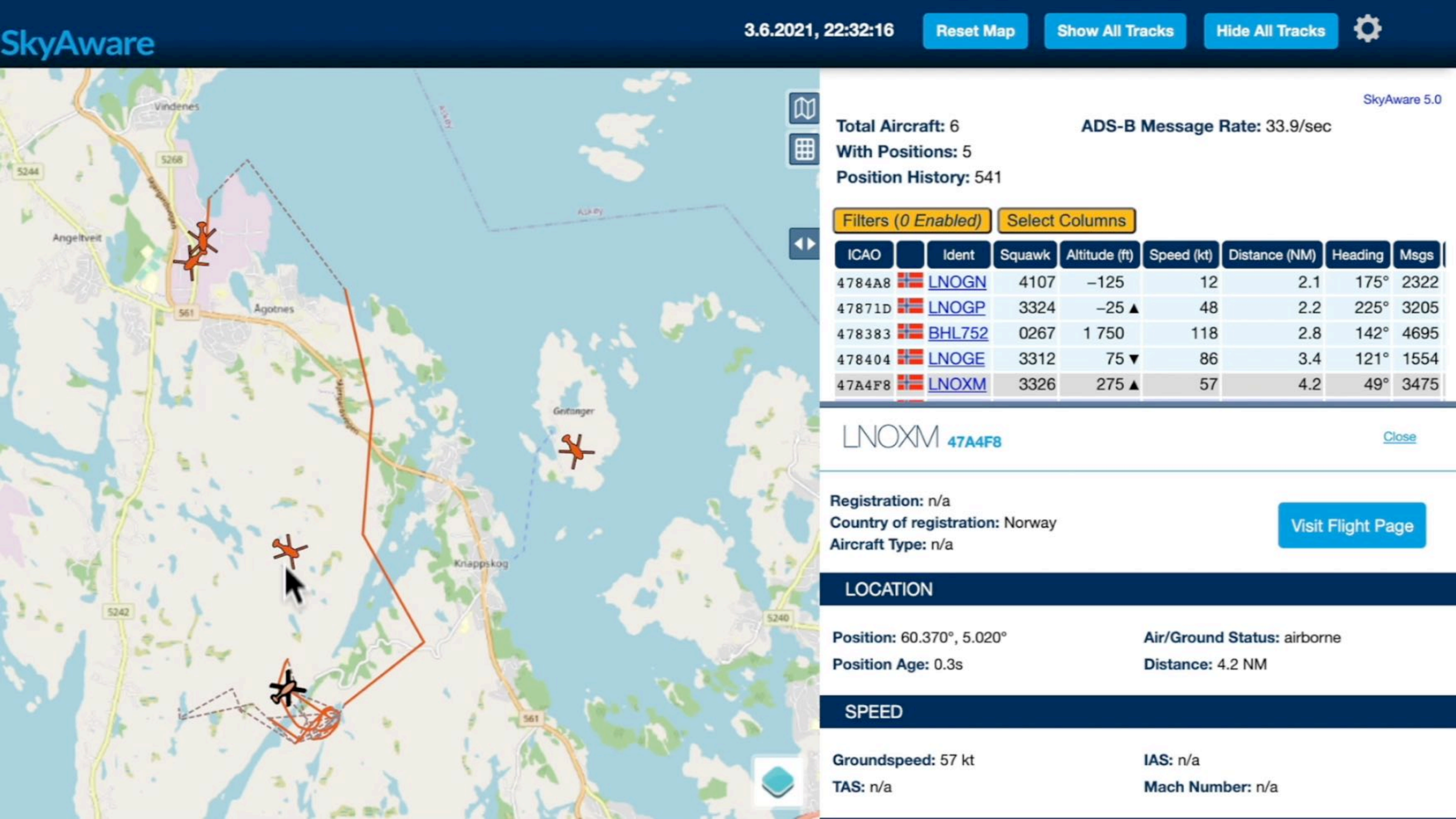


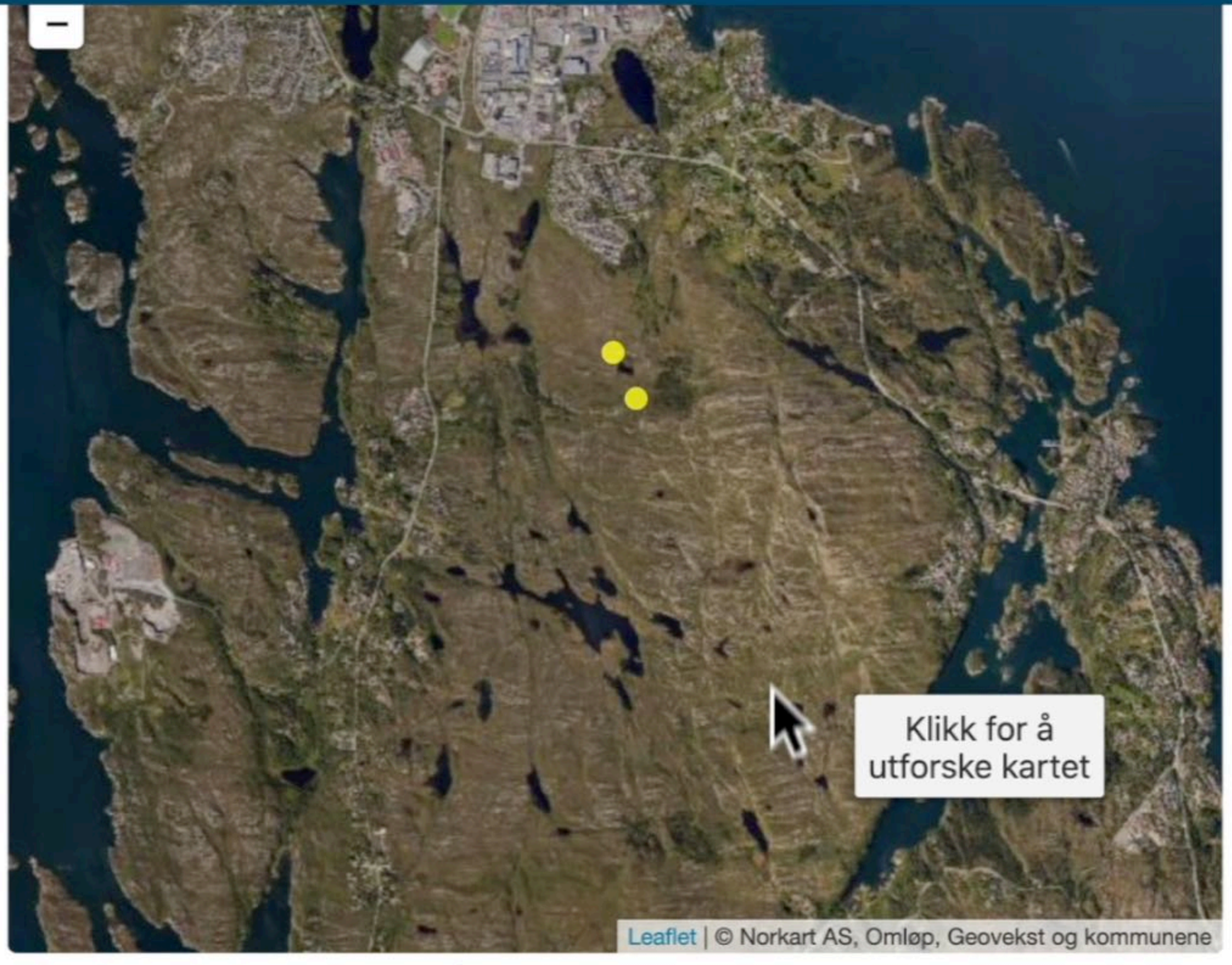
Landing sequence

Landing configuration

Previous

Next


SkyAware
3.6.2021, 22:32:16
Reset Map
Show All Tracks
Hide All Tracks
Vindenes
5244
5268
Angeltveit
561
Agotnes
Knappskog
5242
5240
561
SkyAware 5.0
Total Aircraft: 6
With Positions: 5
Position History: 541
ADS-B Message Rate: 33.9/sec
Filters (0 Enabled)
Select Columns
ICAO | Ident | Squawk | Altitude (ft) | Speed (kt) | Distance (NM) | Heading | Msgs
4784A8 | LNOGN | 4107 | –125 | 12 | 2.1 | 175° | 2322
47871D | LNOGP | 3324 | –25 ▲ | 48 | 2.2 | 225° | 3205
478383 | BHL752 | 0267 | 1 750 | 118 | 2.8 | 142° | 4695
478404 | LNOGE | 3312 | 75 ▼ | 86 | 3.4 | 121° | 1554
47A4F8 | LNOXM | 3326 | 275 ▲ | 57 | 4.2 | 49° | 3475
LNOXM 47A4F8
Close
Registration: n/a
Country of registration: Norway
Aircraft Type: n/a
Visit Flight Page
LOCATION
Position: 60.370°, 5.020°
Position Age: 0.3s
Air/Ground Status: airborne
Distance: 4.2 NM
SPEED
Groundspeed: 57 kt
TAS: n/a
IAS: n/a
Mach Number: n/a



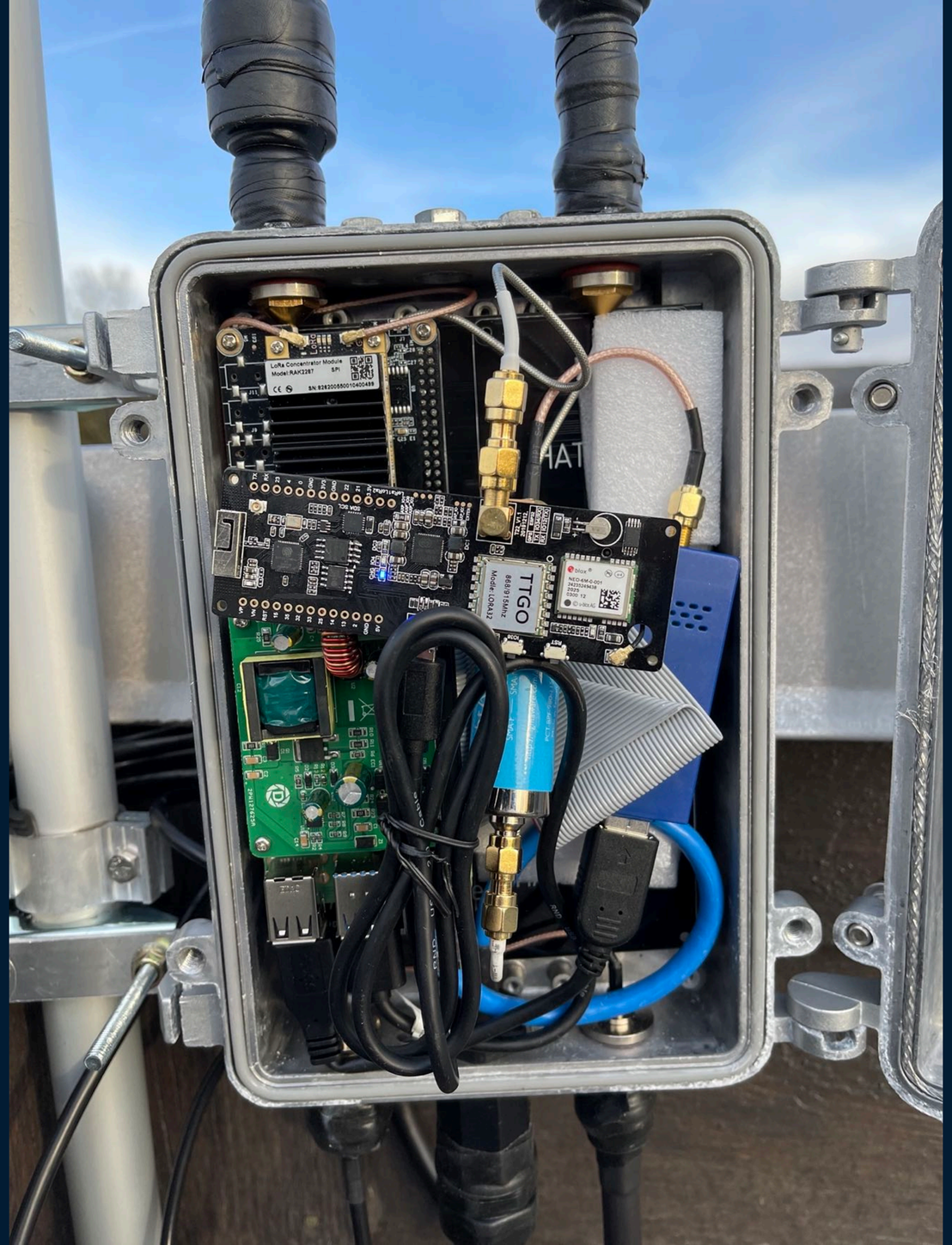
Posisjonen til helikoptre i området vises med gul prikk. Oppdateres ca hvert 10. sekund. Enkelte helikoptre kan falle ut av kartet ved dårlig dekning på signalene fra helikoptrene.

MY SETUP

FROM THIS...

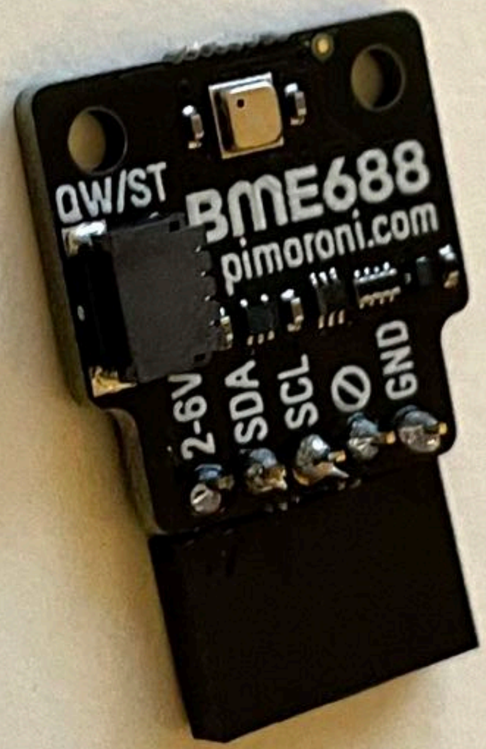

FlightAware

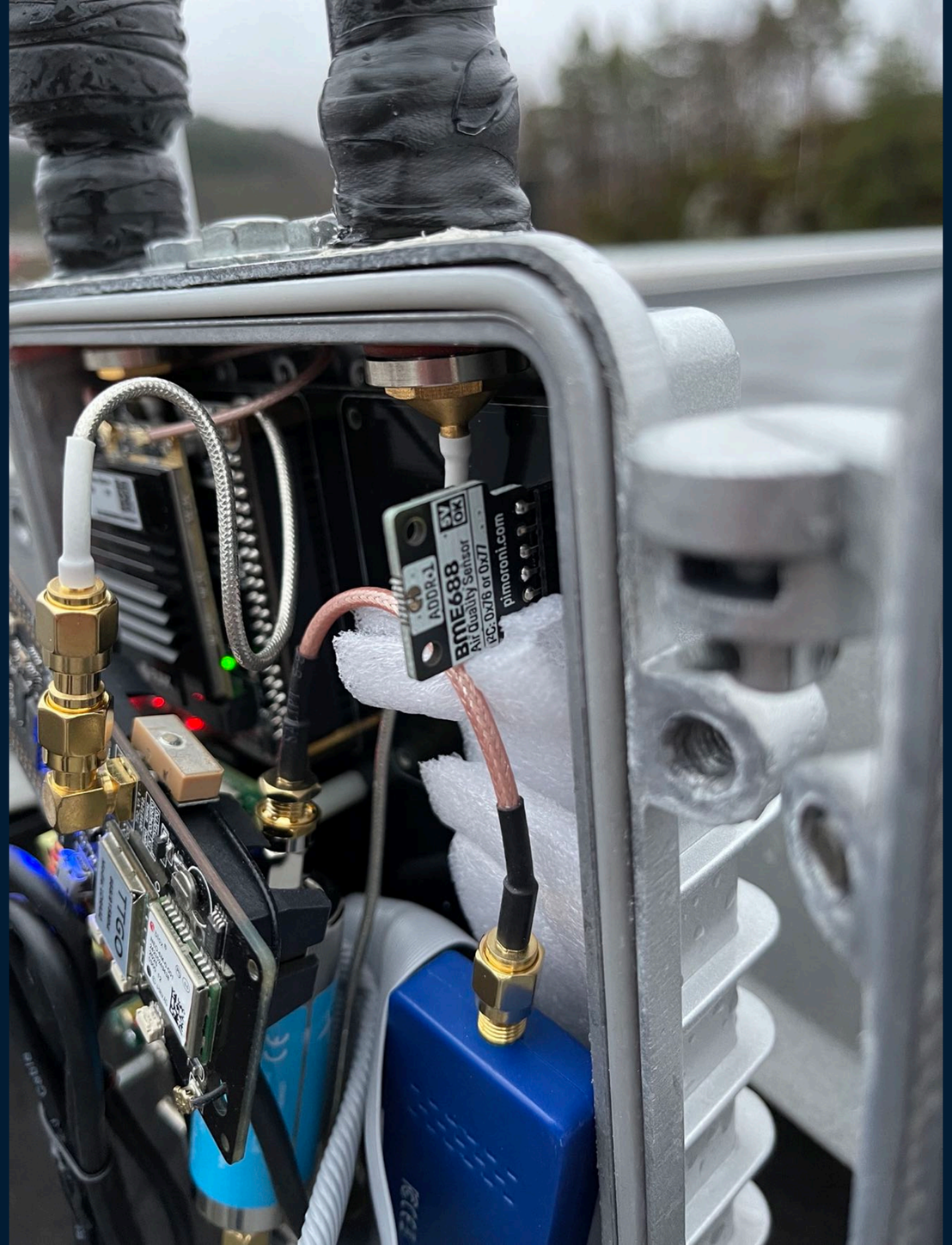
TO THIS...


LoRa Concentrator Module
Model: RAK2287
SPI
TTGO
Mode: LORA32
868/915Mhz
NEO-6M-0-001

HOW TO AVOID DRILLING HOLES?

LATEST ADDITION


QW/ST
BME688
pimoroni.com
2-6V
SDA
SCL
GND


ADDR
BME688
Air Quality Sensor
I2C: 0x76 or 0x77
pimoroni.com
TTGO

Home Assistant

Oversikt
Energi
Kart
Loggbok
Historie
File editor
Node-RED
Snapshots
Studio Code Server
Terminal
Z-Wave JS
deCONZ
Medieleser

Utviklerverktøy
Konfigurasjon

Varsler 3
KMO Ketil Moland Olsen

Integrasjoner | Enheter | Entiteter | Områder

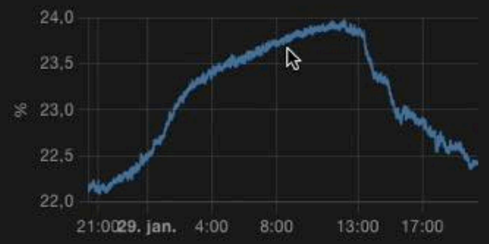
rooftop

Navn	Entitets-ID	Integrasjon
rooftop_station_humidity	sensor.rooftop_station_humidity	sensor
rooftop_station_pressure	sensor.rooftop_station_pressure	sensor
rooftop_station_temperature	sensor.rooftop_station_temperature	sensor

rooftop_station_humidity

rooftop_station_humidity 22,424 %
For 6 sekunder siden

Historie Vis mer



ADDON: CATCH SMALL PLANES

glidernet.org

navigation

- Welcome
- Installing new receiver
- Downloads
- OGN Tracker
- Opt In / Opt Out
- List of Receivers
- Statistics
- Developers Corner
- Marketing Materials
- FAQ
- SAR
- News
- Nice-to-have Ideas
- More about OGN
- History
- Contact

live!

- Live 2D
- Glide and Seek
- GliderRadar
- OGN's flight Logbook
- OGN's Flightbook
- KTrax Logbook
- KTrax tracking
- Live Glidertracker
- Navplan Live Traffic
- Live Thermalmap

search

Search

toolbox

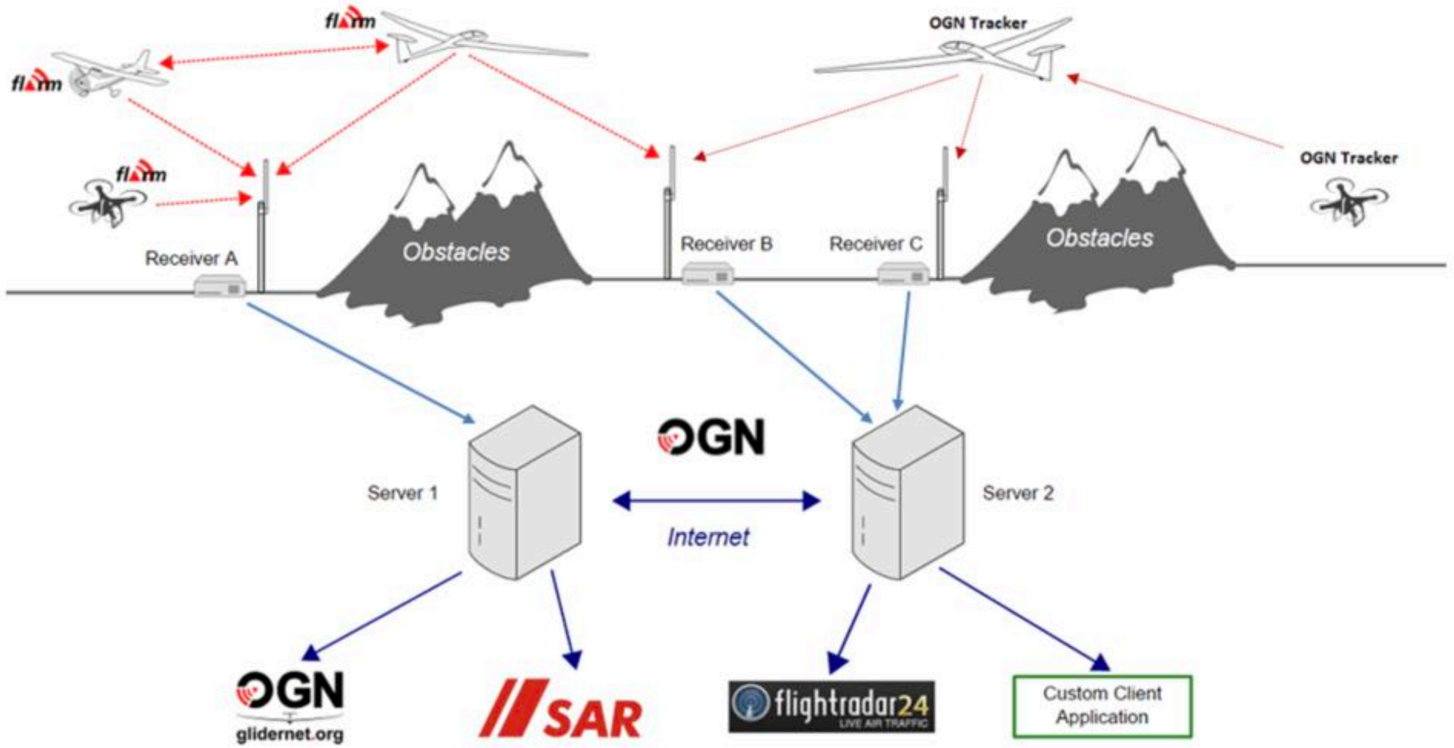
- Online geoid calc
- Receiver GPS pos & alt finder
- Devices database
- IGC logs
- Look up your Flarm-ID
- Add PilotAware Uplink
- OGN receiver range
- Competition tracking

Open Glider Network

Welcome to The Open Glider Network project!

The objective of the Open Glider Network is to create and maintain a unified tracking platform for gliders, drones and other aircraft. Focused on tracking aircraft equipped with FLARM and OGN trackers, OGN is also open for integration of other flying objects tracking d sources. At the moment you already can see beacons from PilotAware, SPOT, Garmin InReach, Skymaster, FANET (paragliders) and Spidertracks circulating through our network.

The tracking data is freely available. Please have a look at the ogn data usage policy.



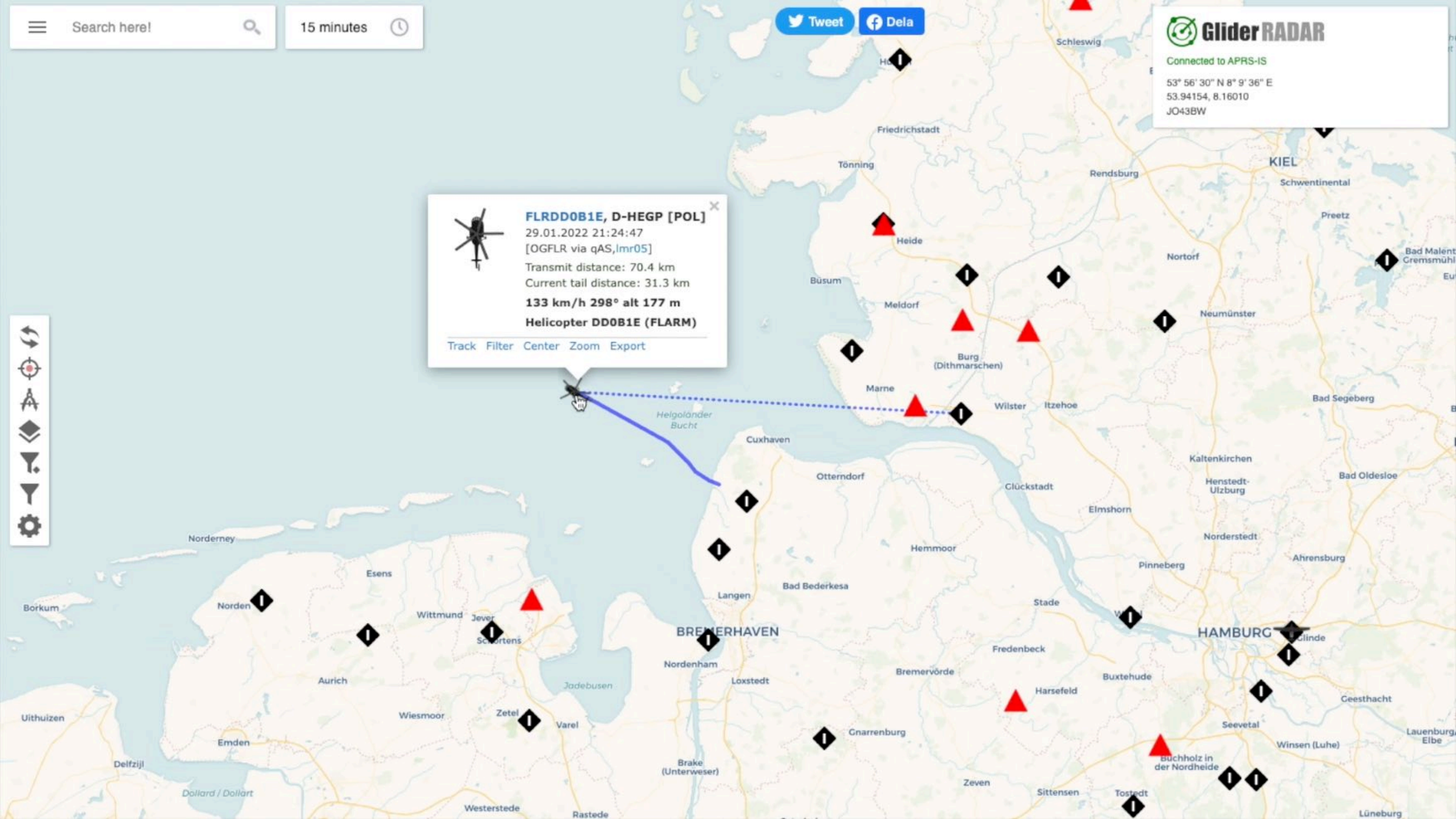
Today FLARM is mainly utilized in gliders, however other small aircraft (planes, helicopters, deltas, para-gliders or even drones) are more and more often equipped with it, especially if operating in the areas intensively used by gliders, such as the Alps.

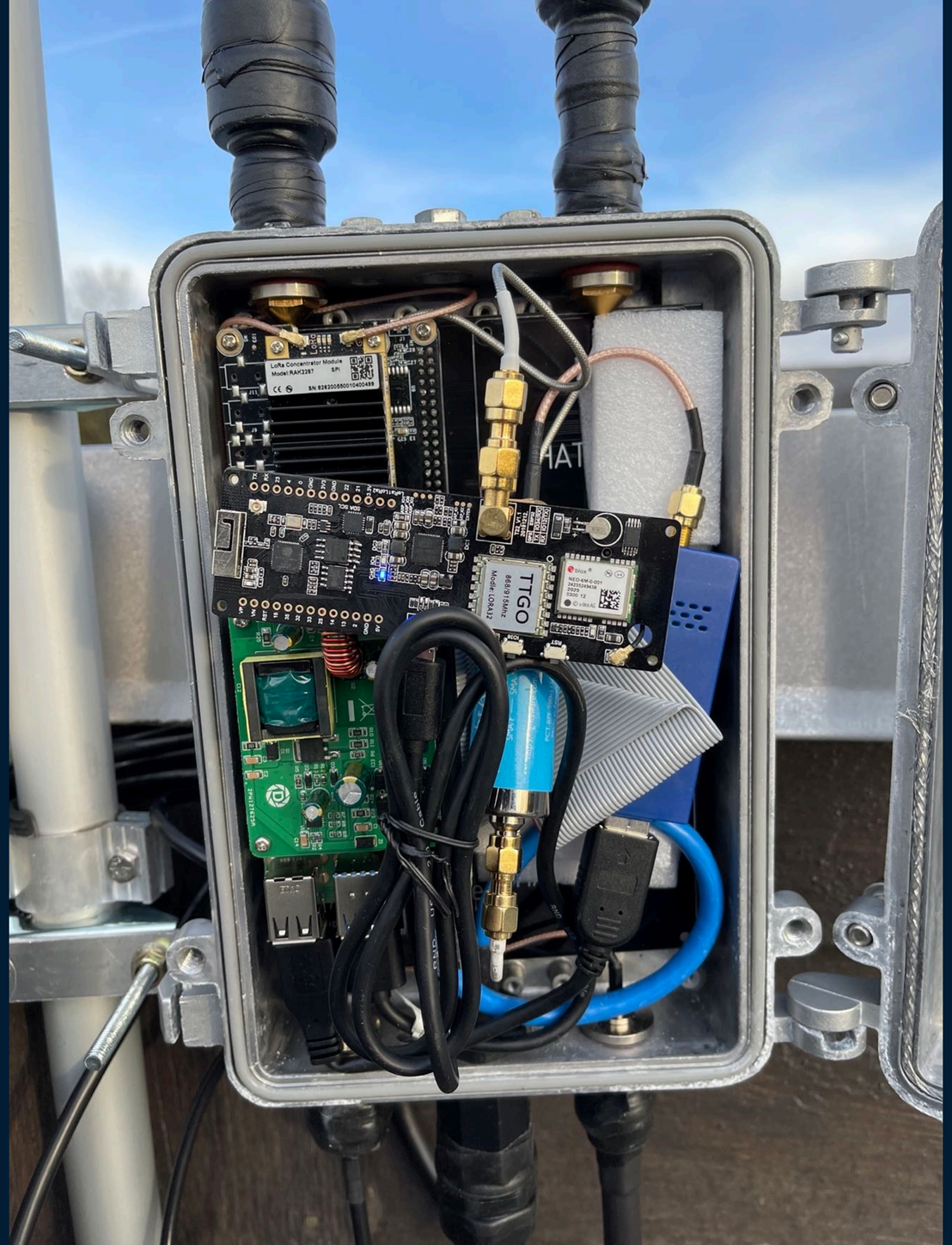
Contrary to FLARM, OGN proposes an open transmission protocol and has an ambition to influence a standard for the tracking and surveillance.

The OGN is a community project. It is based on software, hardware, receivers and other contributions from individuals and the open source community.

The OGN network consists of:

- APRS linux based servers that receive and forward data. Data includes device location information, status of receivers, status of tracking devices (OGN trackers) and the status of the OGN APRS network itself.
- A device database (aircraft). Register your aircraft/drone with tracking device in the OGN device database here if you wish to influence the way how it's going to be visible in the system (anonymous vs recognized).
- OGN ground receivers, located at airfields, gliding clubs, summits of mountains or at private houses of our community members. They listen and decode radio beacons from aircraft in their vicinity and send position reports via network to the APRS servers.


Search here!
15 minutes
Tweet
Dela
GliderRADAR
Connected to APRS-IS
53° 56' 30" N 8° 9' 36" E
53.94154, 8.16010
JO43BW
FLRDD0B1E, D-HEGP [POL]
29.01.2022 21:24:47
[OGFLR via qAS,lmr05]
Transmit distance: 70.4 km
Current tail distance: 31.3 km
133 km/h 298° alt 177 m
Helicopter DD0B1E (FLARM)
Track Filter Center Zoom Export
Schleswig
Friedrichstadt
Tönning
Rendsburg
KIEL
Schwentinental
Preetz
Heide
Nortorf
Bad Malente-Gremsmühlen
Büsum
Meldorf
Neumünster
Burg (Dithmarschen)
Marne
Wilster
Itzehoe
Bad Segeberg
Helgoländer Bucht
Cuxhaven
Kaltenkirchen
Otterndorf
Glückstadt
Henstedt-Ulzburg
Bad Oldesloe
Elmshorn
Norderney
Hemmoor
Norderstedt
Pinneberg
Ahrensburg
Esens
Langen
Bad Bederkesa
Borkum
Norden
Wittmund
Jever
Schortens
Stade
BREMERHAVEN
HAMBURG
Fredenbeck
Nordenham
Bremervörde
Buxtehude
Aurich
Loxstedt
Harsefeld
Jadebusen
Geesthacht
Uithuizen
Wiesmoor
Zetel
Varel
Seevetal
Gnarrenburg
Winsen (Luhe)
Emden
Buchholz in der Nordheide
Delfzijl
Brake (Unterweser)
Zeven
Sittensen
Tostedt
Dollard / Dollart
Westerstede
Rastede
Lüneburg


LoRa Concentrator Module
Model: RAK2287
SPI
TTGO
Mode: LORA32
868/915Mhz
NEO-6M-0-001

parapenT1sta Update README.md — Latest commit 19fb583 on 22 Jul 2021 — History

3 contributors

17 lines (12 sloc) | 1.68 KB — Raw | Blame

GxAirCom

GxAircom aims to be a complete and open source implementation of the FANET+ (Fanet + Flarm) protocol running on readily available cheap lora modules and interfacing with mobile phones via Bluetooth. It can also act as a Fanet ground station and broadcast recieved FANET information to OGN.

For information and documentation see:

- The PDF quick guide and the The PDF Documentation
- Further information can be found in the wiki and the docs folder. E.g.:
  - The list of supported hardware
  - The list of supported smartphone software
  - How to update the firmware
  - See the video tutorials

Similar/ related projects are:

https://github.com/gereic/GXAirCom

READY TO BUILD?

https://github.com/ketilmo/balena-ads-b/

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