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Technical note

# uAvionix PingUSB

The uAvionix PingUSB device is a ground ADS-B & UAT receiver. **uAvionix** is a US company based in California, specialized in UAS and General Aviation detect and avoid systems. See www.uavionix.com/.

# So, what is an ADS-B & UAT ground receiver?

### What is ADS-B?

- **ADS-B** stands for “Automatic Dependent Surveillance-Broadcast”:
  - **Automatic:** no need for pilot action.
  - **Dependent**: it is linked to GPS, Barometer, and other aircraft data sources.
  - **Surveillance**: it’s purpose is getting specific data about aircraft and some airport vehicles (this process is called “surveillance” in ATM / air traffic industry).
  - **Broadcast**: no need to establish a connection, the device sends out signals.

### What is UAT?

- **UAT** is a variant of ADS-B, on a different frequency (978 MHz), mainly used in the US by General Aviation aircraft, also in China, which helps to de-saturate the ADS-B frequency (1090 MHz) and allows the transmission of additional data (traffic information, weather data, etc.).
  References:
  https://www.iaopa.eu/static/CKFinderJava/userfiles/files/news/2017/RM-Madrid/ADS-b-in-Europe.pdf

### Receiver

- **ADS-B can be operating:**
  - **IN** (receiver only) which is what PingUSB is doing: it’s a receiver, which listens for other aircraft’s transmitted signals.
  - **OUT** (emitter) where data is transmitted in space to other aircraft, which is not the case for PingUSB, currently.

### Ground

- It is designed to be plugged to eMotion directly
- It can be used on a laptop or tablet

# What are the basic principles?

### What is it useful for?

- **Sense**
  - To be aware of other aircraft’s identification, position and altitude
  - To be aware of other aircraft’s data (ground track, type of aircraft, callsign, etc.)
- **Avoid**
  - Allows the pilots (manned or unmanned) to stay separated or well-clear of other aircraft.

## Who is equipped?

- The large majority of **airliners** (mandatory for access to upper airspace)
- Many **aircraft** and **helicopters** from General Aviation (mandatory in US by 2020)

## What does it detect?

- ADS-B-out signals from equipped aircraft, where the equipment is active.

## What does it DOES NOT detect?

- Transponder signals (Mode A/C, Mode S, etc.)
- FLARM signals
- WiFi, etc.

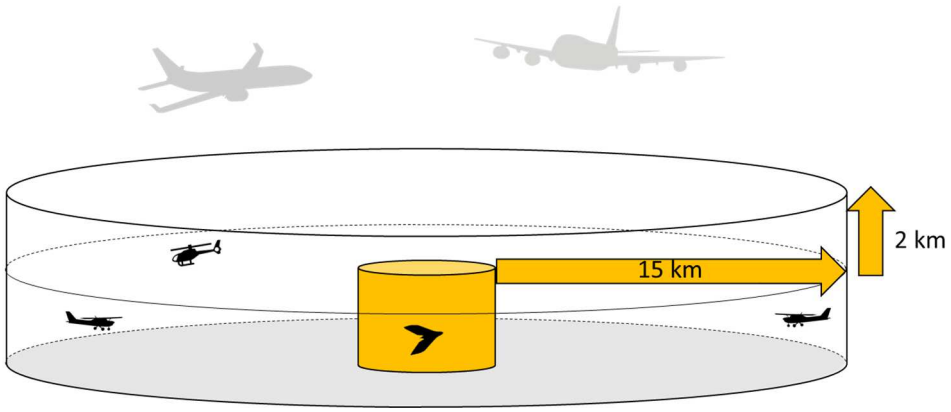
## How does it work on eMotion?

1. Just plug the PingUSB device
   **Note:** You need to be connected to internet for the first time, so that it installs the driver automatically.
2. The icon appears in the top bar and is set ON by default.
3. The traffic and alerts can be turned OFF by pressing the icon.

## What is the range of detection?

ADS-B signal from aircraft is very powerful and can be detected over >150 NM (>300 km). But to avoid cluttering of the screen with too much aircraft, the traffic displayed is filtered, relative to the Working Area. Only the following aircraft are shown:

- **15km away** from the boundary of the Working Area
- **2000m above** the top of the Working Area



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## How does it work on eMotion?

ADS-B/UAT air traffic is displayed with:


- a 2D/3D arrow indicating the current position (2D and 3D)
- a vector indicating the projected position in 15 seconds
- a vertical line indicating the ground height (3D only)
- a label with
    - Aircraft **identifier** (flight plan ID, callsign or registration)
    - The **relative** altitude above (+) or below (-) the drone

## What kind of alert are displayed and when?

Two types of alerts can be trigged, depending on the severity of the risk.

**Caution alert**


(3D example here)

**Criterias :**
<3000m distance,
<500m altitude difference,
<45 seconds to closest point.

**Warning alert**

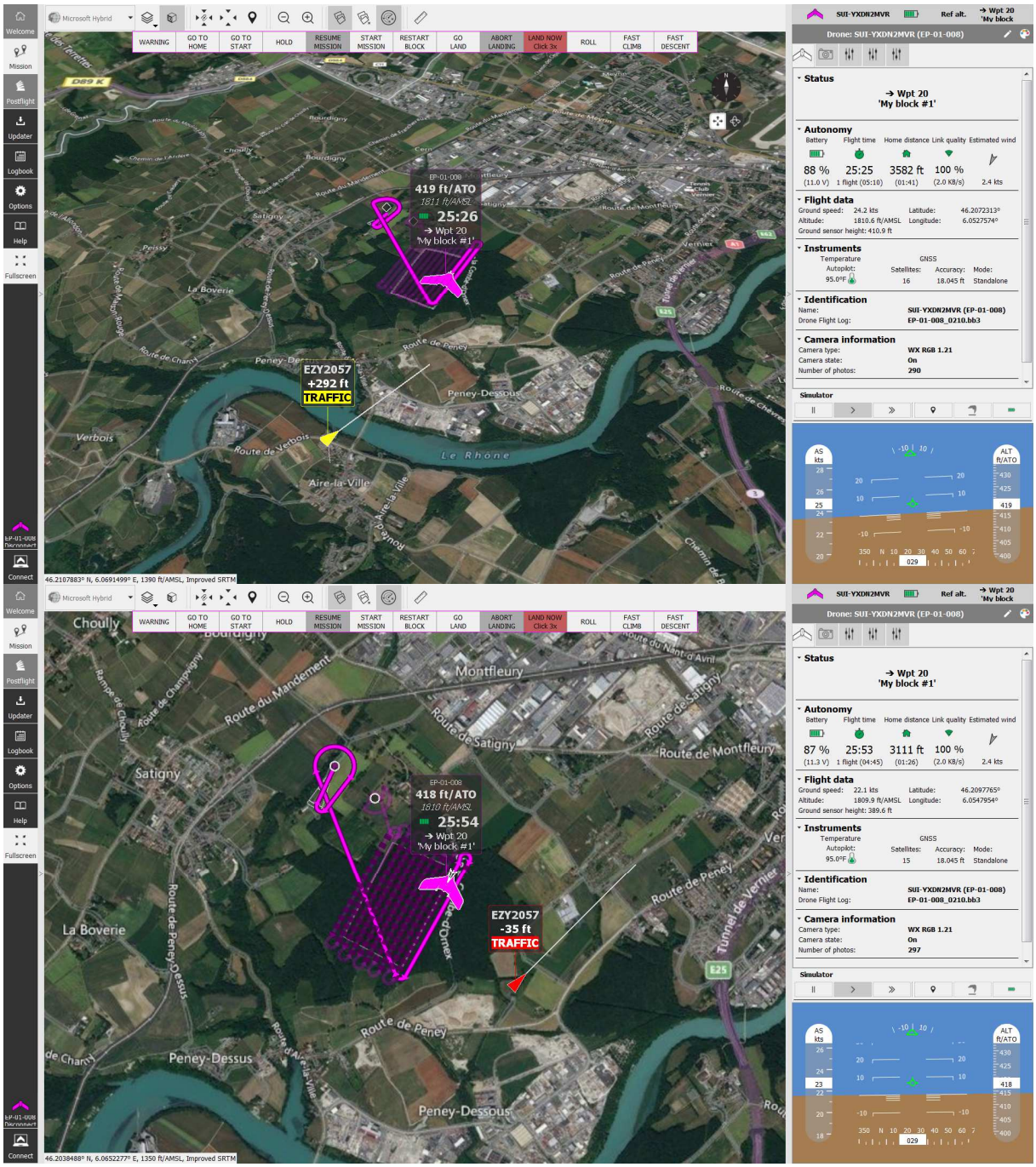

(2D example here)

**Criterias :**
<1000m distance,
<200m altitude difference,
<15 seconds to closest point.

# Key take-aways:

- PingUSB is compatible with eMotion, therefore with **all senseFly drones**
- PingUSB is compatible with PC or tablet, running eMotion
- PingUSB is **Plug and play**: you don't need to install anything (internet connection is required to let the driver install at first connection)
- PingUSB can be purchased at low price at senseFly or at uavionix.com

**Example of caution and warning:**




# Disclaimer:

The Air Traffic services (awareness and alerts) are provided as a support only without any warranty of fitness for a specific purpose. The drone pilot remains sole responsible for compliance with local regulations, especially for separation from air traffic. SenseFly shall not assume any liability for any damage caused using Air Traffic data by its users or for any errors or bugs.



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