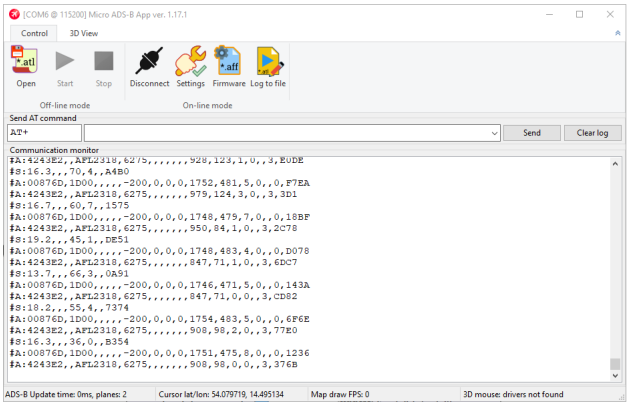
Aerobits

Subsystems for the
UAS intergration into
the airspace

Micro ADS-B Software



Data sheet & User manual

Introduction

AEROBITS Micro ADS-B application is used to quickly familiarize yourself with the functioning of the company's devices. It enables visualization of air traffic in both tabular and 3D forms. Air traffic can be recorded to file for later playback. The application also allows to configure and update the firmware of all devices manufactured by AEROBITS.

Features

- Quick start with the products of AEROBITS company
- Easy air-traffic visualization
- Product settings configuration
- Recording air-traffic to file for later replay
- Product firmware upgrade
- Aircraft flight parameters preview

For more information please contact: support@aerobits.pl.

Contents

1 Installation

Here is an instruction how to prepare software to use it properly.

1.1 Driver installation

1.1.1 Driver for evaluation kits

When connecting evaluation sets, you must install the FTDI VCP driver. The driver can be found at ftdichip.com/Drivers/VCP.htm. Download and install the driver appropriate for your operating system.

1.2 Download of installer

The current version of the software may be downloaded from the www.aerobits.pl website. The software is continuously optimised and developed, thus it may be a good idea to visit our website from time to time for updates.

1.3 App installation

Run the Micro_ADSB_setup.exe file.

1. First choose application language. For now only Polish and English are available.

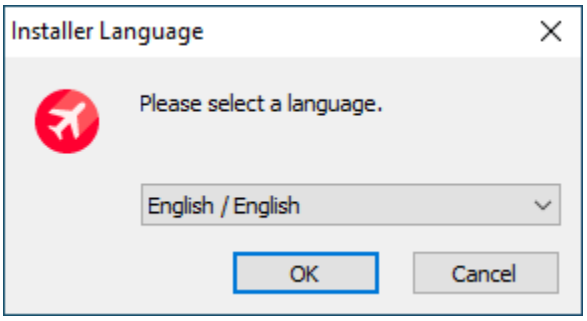


Figure 1: Language selection window

2. Follow the instructions of the installation wizard.

3. After installation a red icon of the Micro ADSB application should appear on the desktop. Run the application with marking **Run Micro ADS-B App** or double-click on the desktop icon.

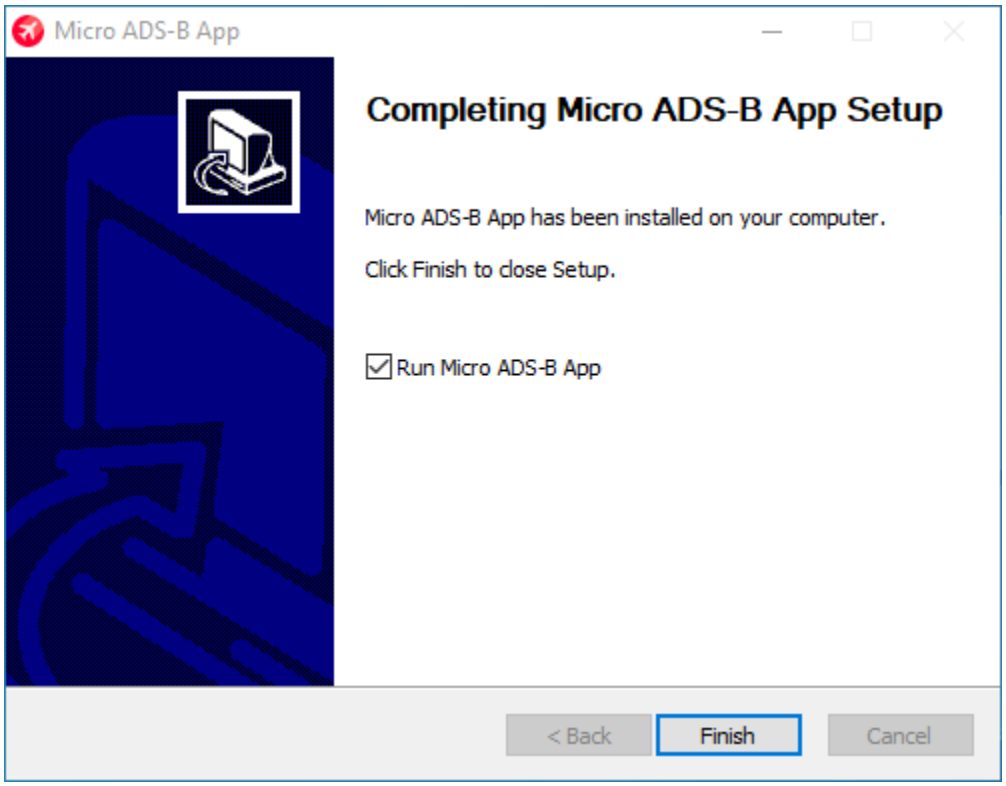


Figure 2: Main window of installation wizard

2 Quick start

2.1 Main window

The main application window performs the following functions:

- Connection with the device
- Device configuration
- Firmware update
- Record of current air traffic to a file
- Replay of the recorded air traffic
- Sending commands to the device and monitoring data received from the device

The application can operate in two modes. Off-line and On-line mode. In Off-line mode, the application visualizes previously recorded air traffic, while in On-line mode it visualizes the current air traffic received by the connected device.

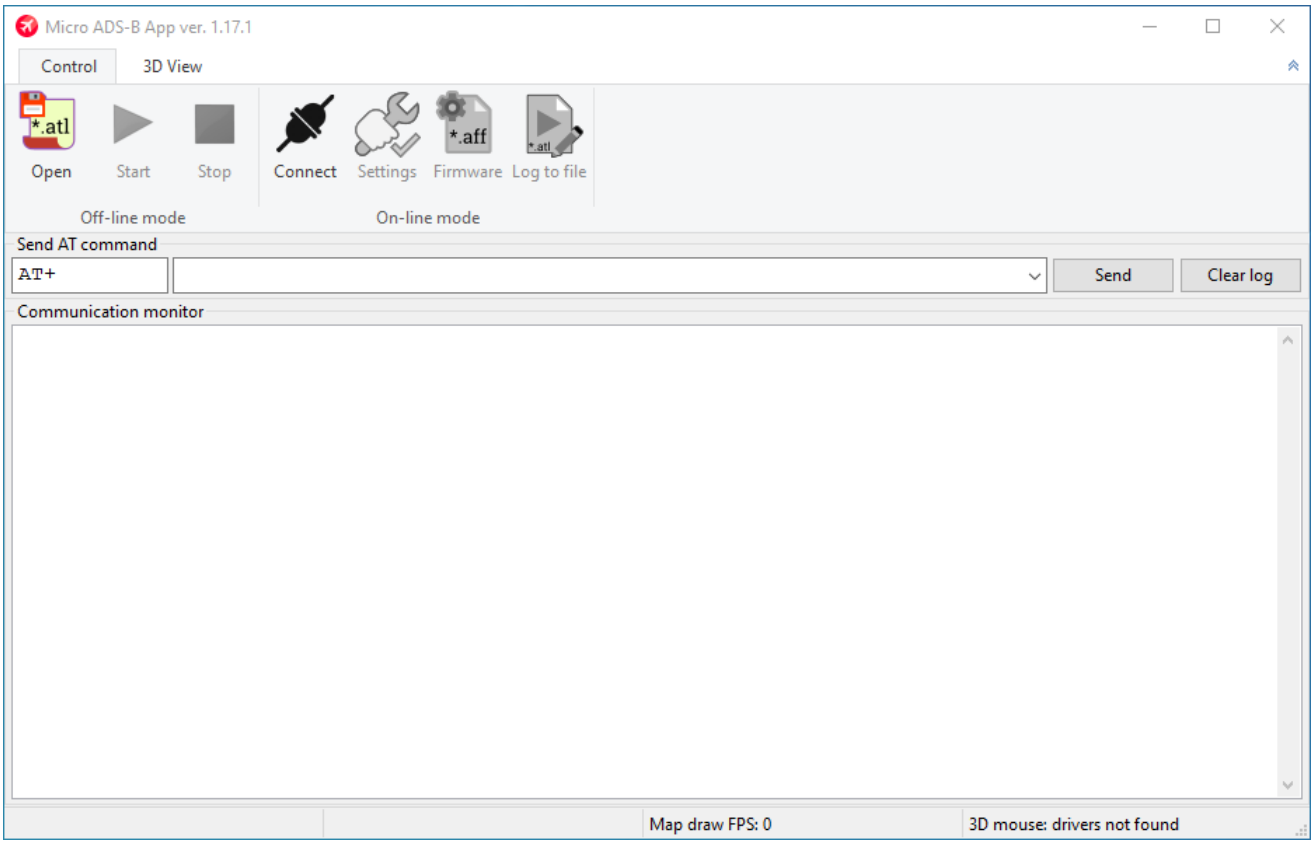


Figure 3: Main window of application

2.2 On-line mode

2.2.1 Connect

In order to connect to the device, press the “CONNECT” button and wait until the application finds the device. It is possible to only connect with one device at a time. After finding the device, the application will add it to the list along with its type and serial number. After selecting the device, click “OK” to finalize the connection.

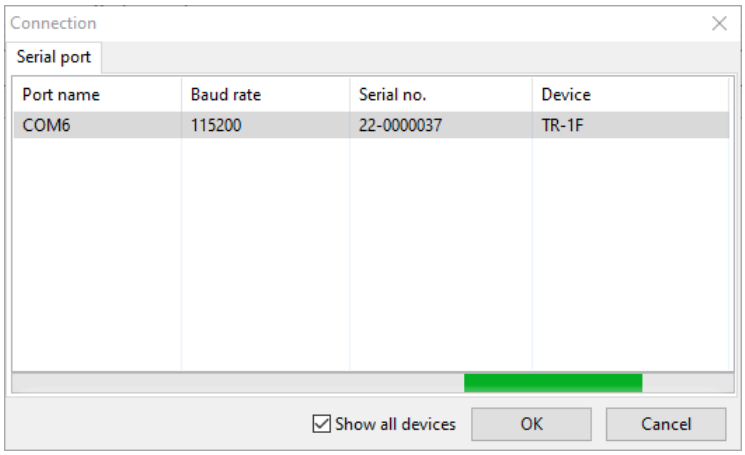


Figure 4: Connect window

2.2.2 Communication

The upper part of the window is labeled “Send AT command”. It is used to send AT commands to the device, while the lower part shows the data sent from the device to the host.

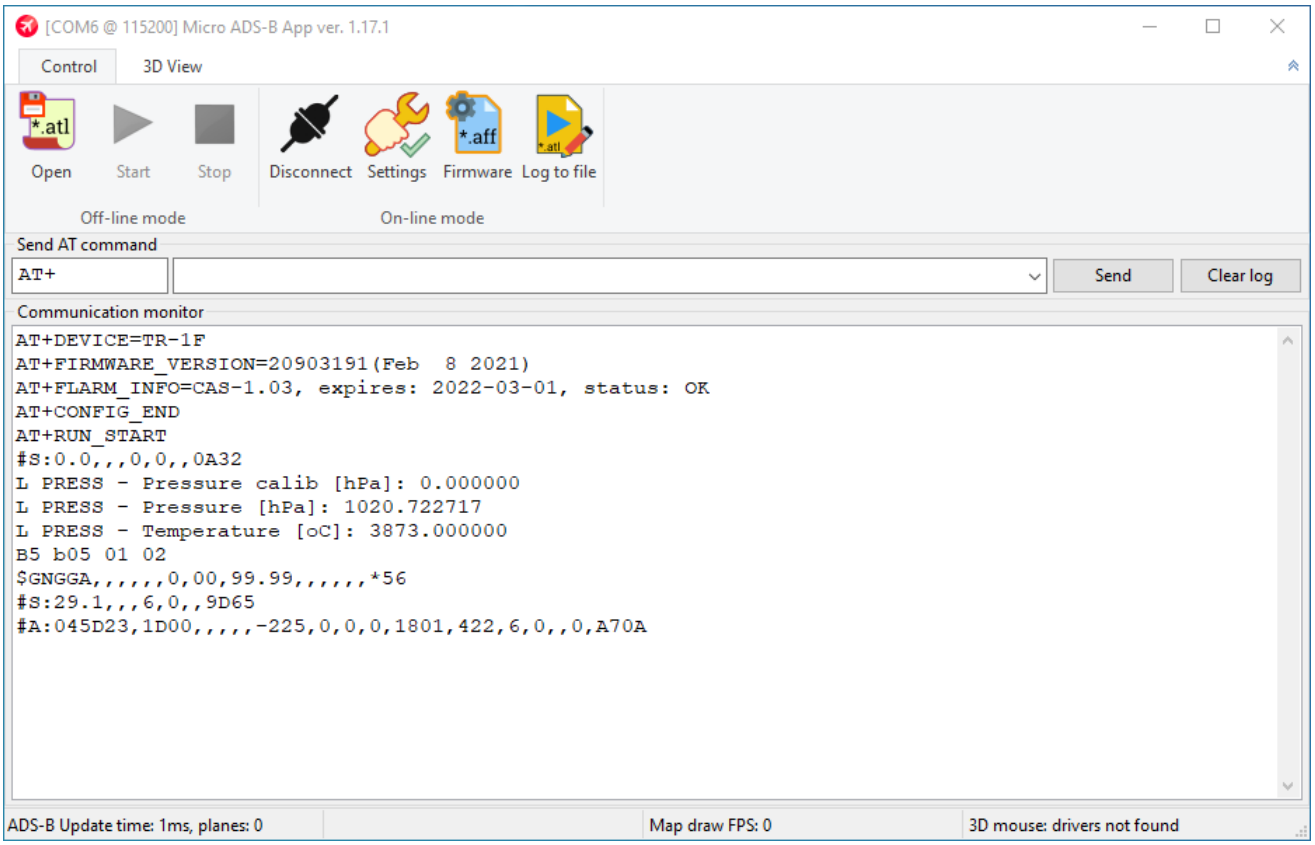


Figure 5: Communication with device

2.2.3 Settings

To change the device settings, first connect to it and then press the “Settings” button. The application will automatically download the list of available settings from the device and display it in the table, along with the description. Also, this dialog allows you to inspect the device’s serial number, firmware version, and, in more recent firmware

versions, device's model name.

The change of a setting's value is carried out by entering it in the "Value" column of a given setting's row. Sending new parameters to the device is done when pressing the "OK" button. To discard all changes made in the dialog without commiting them to the device, press the "Cancel" button. The "Restore Defaults" button allows you to load the factory values of all settings at once.

NOTE: The "Restore Defaults" option will reset device's settings immediately after activating the button and can't be undone by selecting the "Cancel" button.

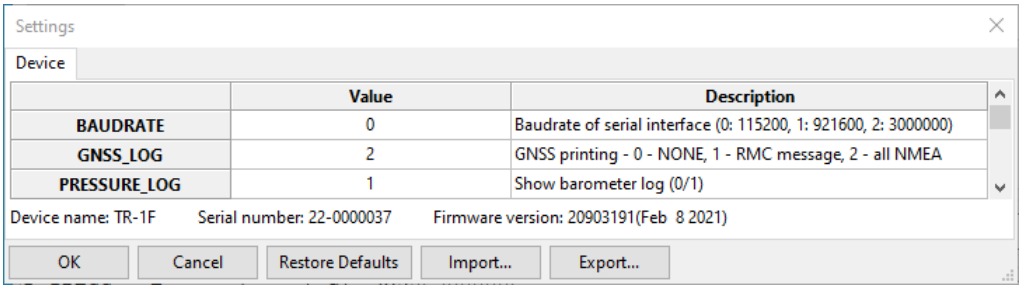


Figure 6: Overview of "Settings" window

You can also export the settings into the `.json` file format by clicking the "Export..." button. Similarly, to import stored settings from file, use the "Import..." button.

NOTE: You may use this feature for backing up settings before, and restoring them after doing the firmware update.

NOTE: After doing settings import, you still need to apply changes to device by pressing "OK" button.

For advanced usage and batch parametrization options, the description of Settings JSON file format can be found in Description of settings JSON format section.

2.2.4 Firmware upgrade

To update the firmware of the device, connect to the device and then press the firmware button. A window will appear as in Figure 5. Click "Browse" and select the appropriate file with the extension `.aff`. After pressing the "Load" button, the firmware update process will start automatically.

NOTE: After updating the device's firmware, all settings will be restored to their default values.

NOTE: Before doing the firmware update, you may want to backup your device's settings using the export feature in Settings dialog.

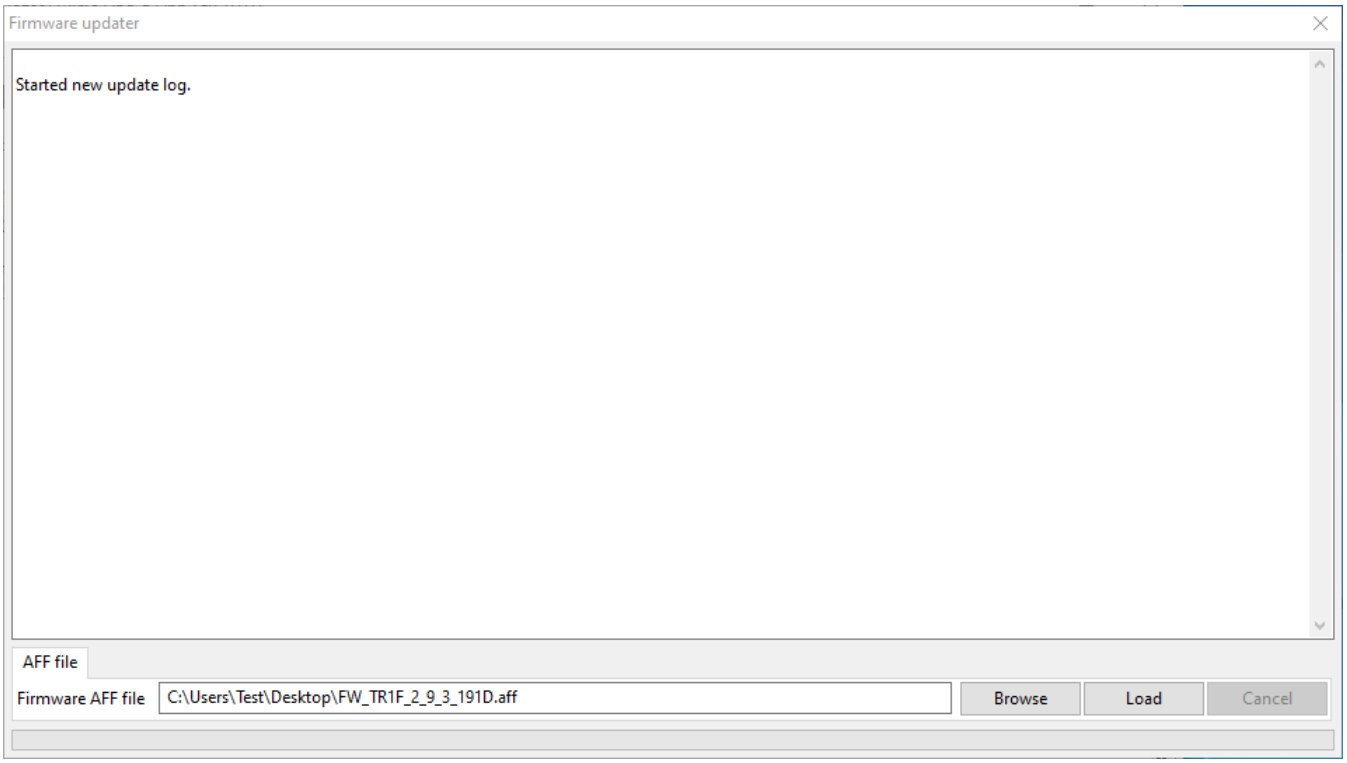


Figure 7: Firmware upgrade window

After few minutes, a message as seen in Fig.8 will appear to confirm the firmware upgrade process has finished. It is required to reconnect to the device after upgrade.

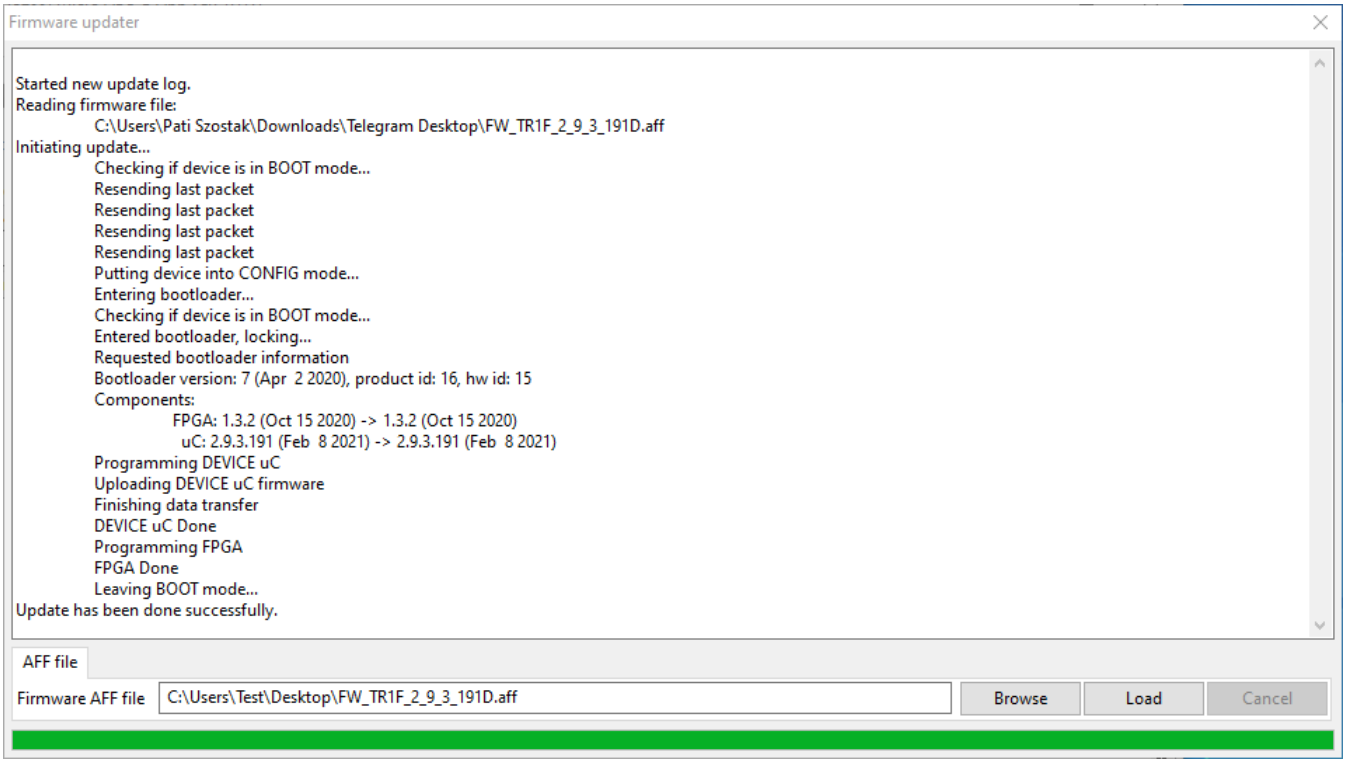


Figure 8: Firmware upgrade finished successfully

2.2.5 Recording air-traffic

In order to start recording air traffic, during the operation of the application, press the “Log to file” button and select the destination where the data will be recorded. After confirming the location, the data will be recorded until the “Stop logging to file” button is pressed.

Figure 9: Aircraft traffic record warning

NOTE: Please make sure recording aircraft traffic is allowed in your country before click *Yes*/*Tak* button.

2.3 Off-line mode

In the “Off-line mode” section, press the “Open” button to play the recorded air traffic, and select the file with the extension `.atl`. After confirmation, the application will start to play the recorded data. This will be visible both in the communication preview window and data visualization on the “ADS-B” tab. To stop the replay, click on the “Pause” or “Stop” button.

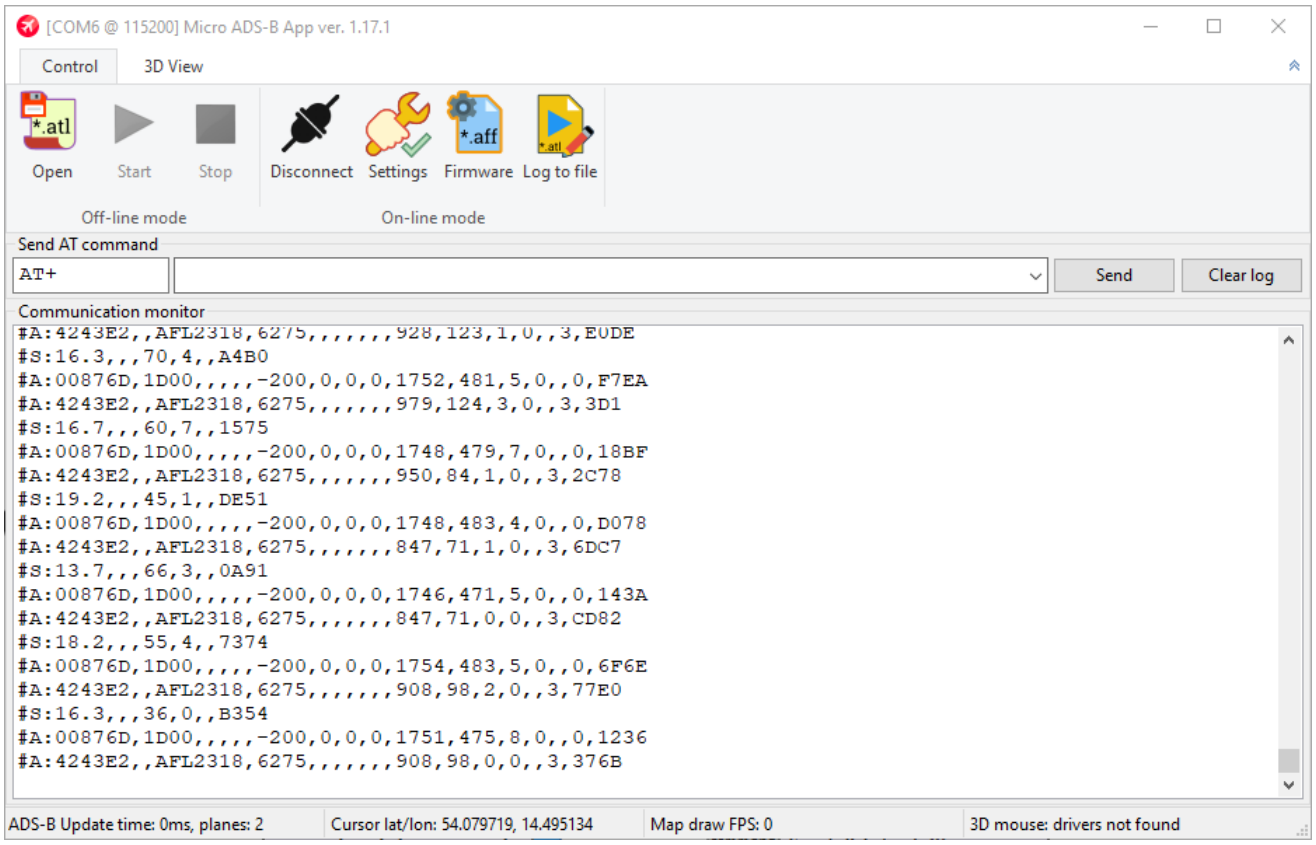


Figure 10: Replay of recorded Air-traffic

2.4 3D Visualization

To enter the data visualization mode (On-line or Off-line), click the “ADS-B” tab. This window is divided into 2 parts. The left visualizes air traffic in the 3D form. The right shows the flight parameters of all tracked units. To close / open the table, click on the “Toggle table” button. The “Reset view” button allows the camera to return to the default position. Disabling drawing of protective spheres and trajectory of objects is carried out using check boxes. In Off-line mode, it is possible to speed up the playback using the “Playback Speed” slider. Moving the map is done by moving the mouse with the left mouse button pressed, while the camera rotation with the right mouse button pressed. Mouse wheel can be used to zoom in and out view. Single click on aircraft on 3D form center view on it. Double click on the aircraft highlights corresponding row in table form. One can set maximum number of fps using appropriate slider.

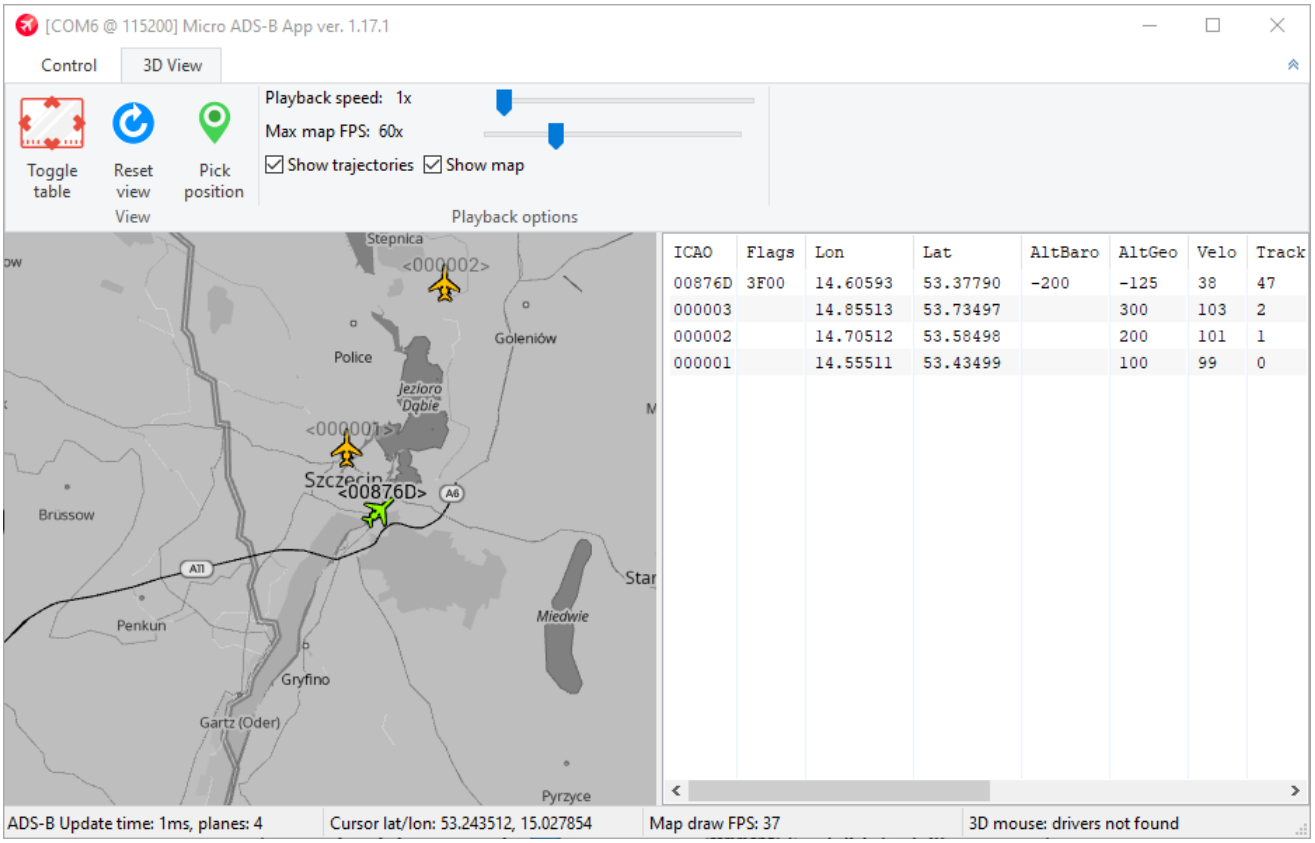


Figure 11: 3D visualization of air-traffic

3 General information

3.1 Description of settings JSON format

The Settings JSON file format simplifies configuration of multiple devices in predefined manner. It can be used to restore the same configuration to multiple devices, with exceptions defined for ones with given serial numbers. The example syntax of Settings JSON file is shown below:

```
{
  "settings": {
    "device": {
      "any": {
        "PROTOCOL": "2",
        "SUBPROTOCOL": "0"
      },
      "07-0000001": {
        "PROTOCOL": "1"
      },
      "07-0000002": {
        "SUBPROTOCOL": "2"
      }
    }
  },
  "version": 1
}
```

- When loading settings from file, the values from “any” group are applied onto device’s current settings.
- Then, the file is checked for settings group named with device’s serial number. If it exists, its values will be applied onto device’s current settings.
- Not all values have to be specified in any setting group - if a setting is missing in file, the current value in device won’t be changed.

In the example above:

- All devices will have the “PROTOCOL” and “SUBPROTOCOL” settings set to “2” and “0”.
- Additionally, device with serial number “07-0000001” will have the “PROTOCOL” setting overwritten to “1”.
- Similarly, device with serial number “07-0000002” will have the “SUBPROTOCOL” setting overwritten to “2”.

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