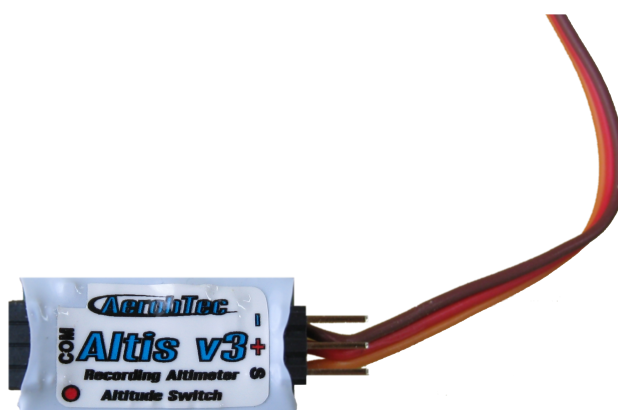


# ***AerobTec Altis v3***

***Recording / Competition Altimeter***



## **Table of Contents**

1.Specifications.....	3
2.Introduction.....	3
3.Principle.....	3
4.Hardware description.....	4
Main measuring unit.....	4
Mounting in the aircraft.....	4
Connection for competitions .....	4
Connection for sole logger function.....	5
USB adapter and its connection.....	6
Light indication.....	6
5.AerobTec Altis Flight manager PC application.....	6
Requirements.....	6
Installation.....	6
Application.....	6
USB Driver.....	7
.NET Framework.....	7
User interface.....	7
Main window.....	7
Graph functions.....	7
Flight description tab.....	9
Flight properties frame.....	9
Flights Comparer.....	9
Program settings.....	10
Altis v3 window.....	10
6.Warning.....	12
7.Product Registration.....	12
8.Revision History.....	12

## 1. Specifications

- Memory: 128kB (approx. 3 hour record with 0.1s sampling)
- Sample time: 0.1 – 25.5s (user selectable with step 0.1s)
- Dimensions: 27 x 14 x 6mm (1.07x0.55x0.24inches)  
Cable length 20cm (7.84 inches)
- Weight: 4.5g with JR cable (0.01 pounds)
- Power supply range: 4 – 12.6V
- Integrated altimeter switch
- F5J FAI rules compatible
- Temperature record
- Record of repeated motor switch on during competition flight
- Indicating LED (Indicating sample time of Switch on altitude)
- Upgradeable firmware
- USB interface with USB cable
- AerobTec Altis Flight manager software for Windows

## 2. Introduction

The AerobTec Altis v3 is a barometric altimeter designed especially to record altitude of flying R/C aircraft with additional competition functionality. It has very small dimensions and a low weight.

It senses barometric pressure variations caused by changes of altitude in which the altimeter is located. The altitude is then calculated from pressure data and stored in the internal memory of the device.

It is provided with a system which connects it to a personal computer with Windows (XP or higher) operating system via USB. The supplied program cannot only read the information from the device and save it to the computer in various formats but it can display it in an advanced graph and process the flight information in many ways.

This altimeter has functions based on rules of F5J FAI and Altitude limiting competitions, so it can be used for them.

The device and the software also provide some other complementary functions such as temperature measurement and records.

## 3. Principle

Altis v3 uses a modern fast digital pressure sensor which allows sensing the lowest pressure differences corresponding to approx 13cm altitude resolution with sample time up to 0.1s.

Since the atmospheric pressure changes in time, these changes affect the measuring. Which is the reason why long term measurements may not be precise enough. However, altitude in short term flights, which are common in R/C aircraft, can be recorded very precisely. **It is recommended to set the initial**

altitude before each flight by disconnecting and connecting to power supply.

The measured altitude is then stored in the internal memory with high capacity which allows around 3 hours of recording with the fastest sampling.

## 4. Hardware description

Hardware of the device consists of 3 parts: the main measuring unit, USB adapter and USB cable. Only main measuring unit is used for the flight. Photo of the USB adapter and the main measuring unit is shown in Fig. 1.



Fig. 1. Altimeter unit + USB interface unit

### Main measuring unit

The main measuring unit consists of 3 connectors. The communication connector connects to a computer via USB adapter.

Power supply and input are provided via a standard JR cable which should be connected to standard R/C receiver. Output is provided on pin connector where the main motor is connected.

### Mounting in the aircraft

Since AerobTec Altis v3 uses atmospheric pressure measurement, it has to have open access to the outer atmosphere. It must not be hermetically closed inside the fuselage or other box. Standard R/C aircraft is not hermetical, so it is usually not necessary to do any special modifications. The main measuring unit can simply be put in some free space inside the fuselage.

If the main measuring unit is mounted outside the aircraft, it must be mounted under stricter conditions. It must be mounted away from the airflow caused by the propeller.

### Connection for competitions

For competition use (like HL200m, FxJ, F5J FAI) the input JR cable has to be connected to the R/C receiver, while the ESC JR cable has to be connected to the output connector on the main measuring unit board. Connection diagram can be seen in Fig. 2. The signal polarity must be kept as shown in Table 1.

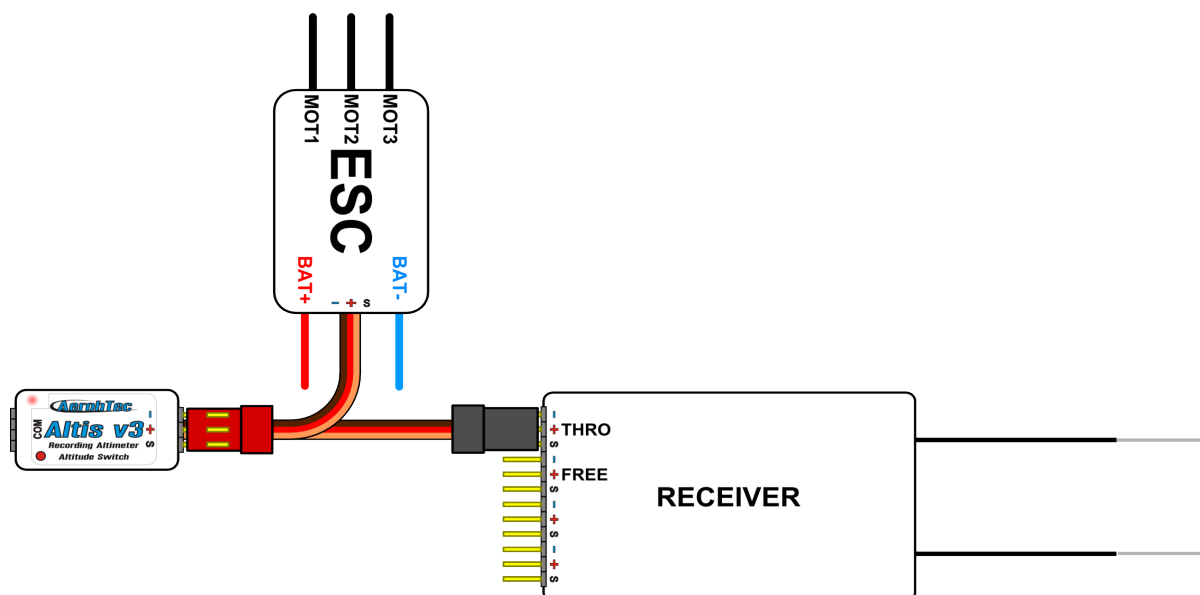


Fig. 2. Connection scheme for competition use

ESC – electronic speed controller

THRO – throttle receiver channel

Wire color	Signal
brown	Ground
red	Positive power supply
orange	R/C signal

Table 1: Connection of the connectors

### Connection for sole logger function

If the Altis v3 device is used as pure logger device, please connect device in free receiver channel as shown in Fig. 3. The signal polarity must be kept as shown in Table 1.

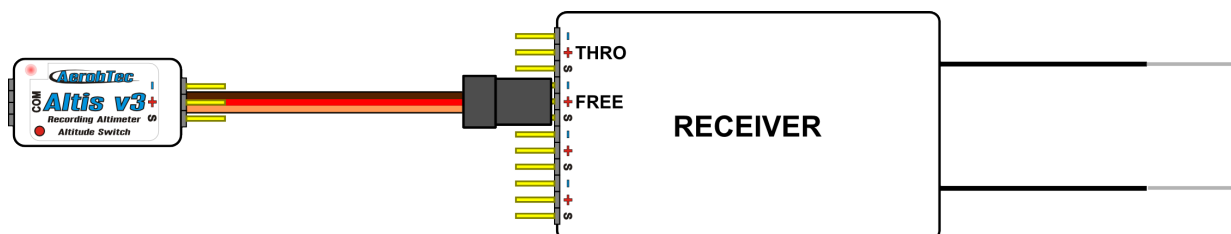
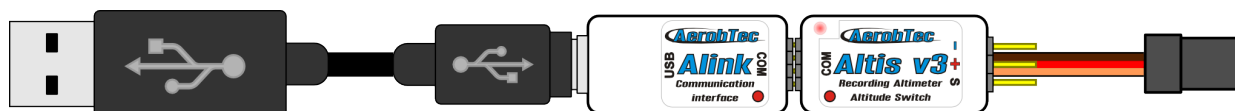


Fig. 3. Connection scheme for pure logger use

FREE – free receiver channel

### USB adapter and its connection

When the measured data need to be read or when new configuration is to be set, the main measuring unit has to be connected to computer according to *Fig. 4*. Please, note the spot on the package on both main measuring unit and USB adapter. Both of them must be on the same side. Provided USB cable is connected in the USB connector on the USB adapter.



*Fig. 4.* USB adapter connection scheme

### Light indication

There is a red LED on the AerobTec Altis v3 device. When the device is turned on, the LED indicates changes in its state for every sample. If the sampling time is 0.5s, the LED turns on and off within 1s.

If F5J FAI mode is set, the LED indicates F5J start altitude in the following form. Each digit is indicated by a corresponding number of short blinks. Zero is represented by a long blink. Digits are separated by a short pause, while the altitude is repeated permanently and separated by a long pause.

See the following examples:

--	--	--	--	--	--	--	--	--	--	--	246m
-	—	--	--	--	--	-	—	--	--	--	107m

## 5. AerobTec Altis Flight manager PC application

The AerobTec Altis Flight Manager is a PC application which serves to communicate with the device and to display and process the flight data recorded by it.

### Requirements

- Windows XP or higher
- 256MB RAM or More
- min 20MB of free disk space
- free USB port
- .NET Framework 2.0. or higher (can be installed from enclosed CD)
- 1GHz Pentium III or Athlon, or better
- 1024x768 pixels screen resolution

### Installation

#### Application

The AerobTec Altis Flight Manager installation program is available on the enclosed CD in **Application**

folder. Please make sure that an older version of application is correctly uninstalled. For AerobTec Altis Flight Manager installation execute installation program and follow the installation instructions on the screen.

### USB Driver

The provided USB adapter serves as a virtual serial port and requires a USB driver. An installation program for USB driver for Windows (XP or higher) is available on the enclosed CD in **Driver** folder. For proper installation on your PC please execute this program and follow the installation instructions on the screen.

### .NET Framework

The AerobTec Altis Flight Manager application also requires .NET Framework 2.0 or higher to be installed on the computer. It can also be installed from the enclosed CD. User can find .NET installation file in **dotNet\_Framework** folder. Please follow the installation instructions on the screen.

## User interface

### Main window

The main window contains several parts. There is a main menu, toolbar, flight list, flight description frame and flight properties frame with information about the selected flight.

The flight list can be loaded from a file from the menu *File* → *Load* or from Start tab. Edited flights can be saved by *File* → *Save* or new file can be selected by *File* → *Save as*. A new file or recent files can also be loaded.

### Graph functions

The recorded flight data can be seen visually in a graph. The chosen flight is displayed in the Graph tab.

Altitude, vario, temperature and markers can be shown according to the properties selected in the Graph menu (*Fig. 5*).

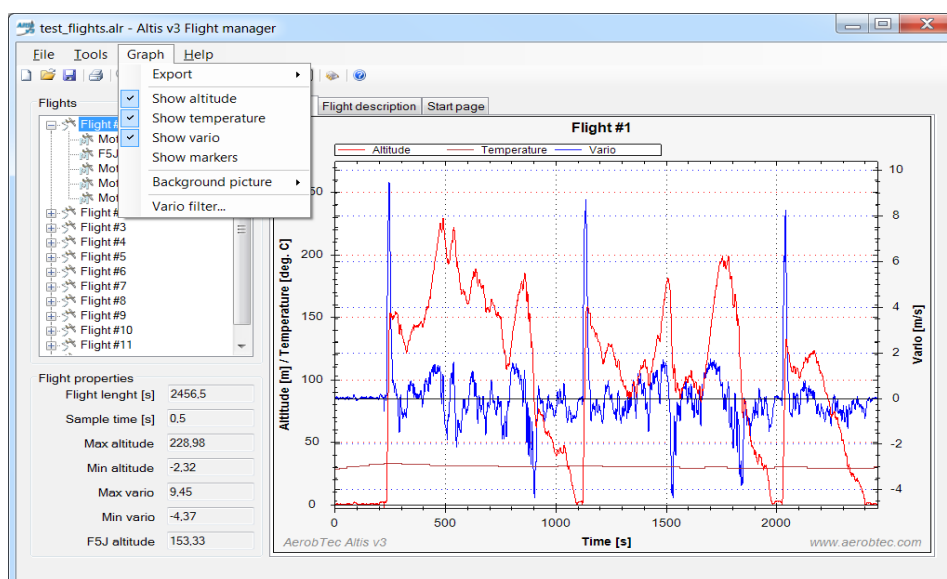
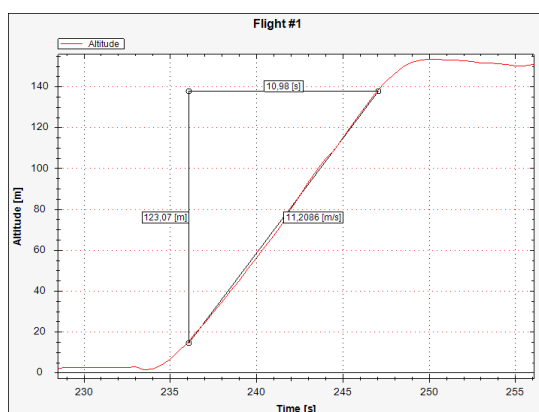


Fig. 5. AerobTec Altis Flight manager PC application main window

The graph can be zoomed in and out or set to basic scale by buttons in toolbar or tool menu.

When the Zoom in function is on, user can also use the middle mouse button for advanced graph zooming and moving. When the middle button is pressed and user moves the mouse, the graph moves while the mouse wheel zooms in and out.

The program also offers a graph measuring function available in the Tools menu or in the toolbar. When the function is activated, user clicks on the graph at the chosen time and moves the cursor. There is a triangle connecting the graph point at the start time and a graph point at the cursor time. Time difference, altitude difference and average climbing are shown on the graph. This is shown in *Fig. 6*.



*Fig 6.* Measuring function

When a flight is recorded, there may be some parts in the beginning and in the end of the flight which are not interesting for the user or user wants to split the flight into two or more flights. User can discard these parts by using **Trim Graph Start** tool and **Trim Graph End** tool and split flight using **Split Graph** tool available in the toolbar and Tools menu.

Each flight recording begins in the reference altitude, which is always 0m. However, user might know the altitude the aircraft starts in. This altitude can be set in the graph by the **Set Zero Altitude** tool, which is also available in Tools menu and the toolbar.

Since the vario data is very noisy, there is a filtering feature available in *Graph → Vario Settings...* Filter value can be selected manually. The filtered graph is shown online. The difference of the same value with a different filter value is shown in *Fig. 7*. The displayed graph can be exported to an image file, csv file or html page via *Graph → Export*.

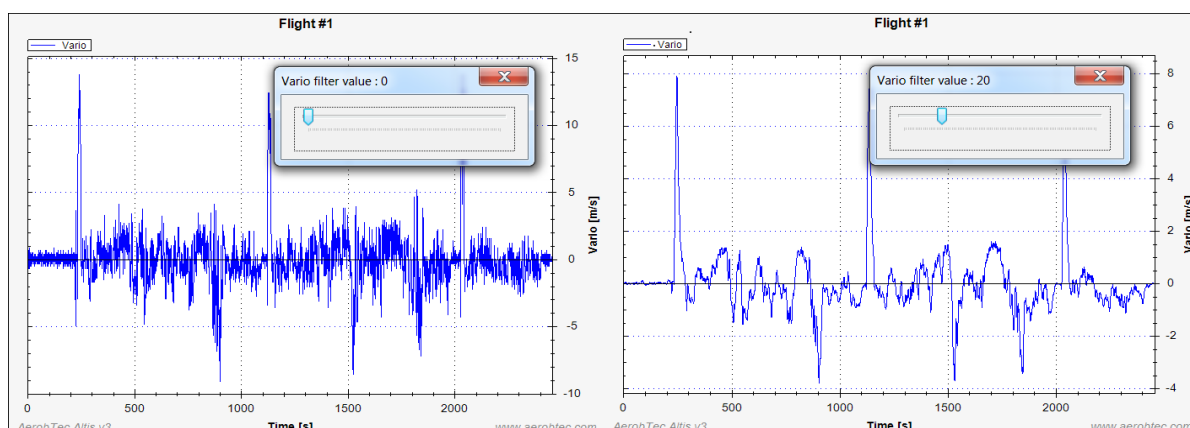


Fig. 7. Comparison of vario signal filtered with different filter settings

### **Flight description tab**

User can add a note to each flight and each marker of the flights. This is possible in the Flight Description tab. Information such as Pilot Name and airport name can be added too. User can also edit the time and date of the flight in Flight Properties.

### **Flight properties frame**

This statistical information is shown in this frame:

- Flight length
- Sample time
- Maximum altitude
- Minimum altitude
- Maximum vario
- Minimum vario
- F5J altitude (if available)

### **Flights Comparer**

Sometimes user might wish to compare several different flights. It is possible via Flight Comparer function available in *Tools* → *Flights Comparer*.... User opens the file with saved flights and checks the checkboxes of the files to be compared. An example of such a comparison is shown in Fig. 8. The graph can be zoomed in and out and moved using the middle mouse button. The displayed graph can be exported to an image or printed.

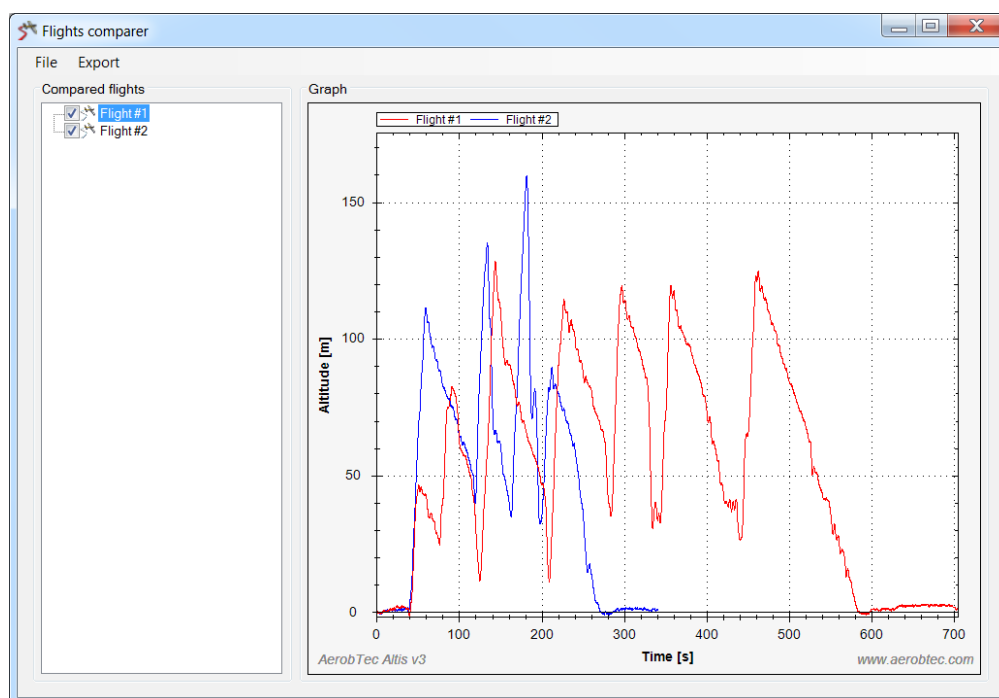


Fig. 8. Flight comparer

## Program settings

Basic settings of the program are available in the Settings window which can be found in *File* → *Program Settings*.... User can choose preferred language, length units (meters, feet and yards) and the communication port where the Altis v3 device is connected. The button Search Device checks all available Com ports and recommends user port with active AerobTec Altis v3 device.

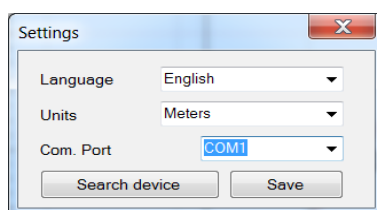


Fig. 9. Settings window

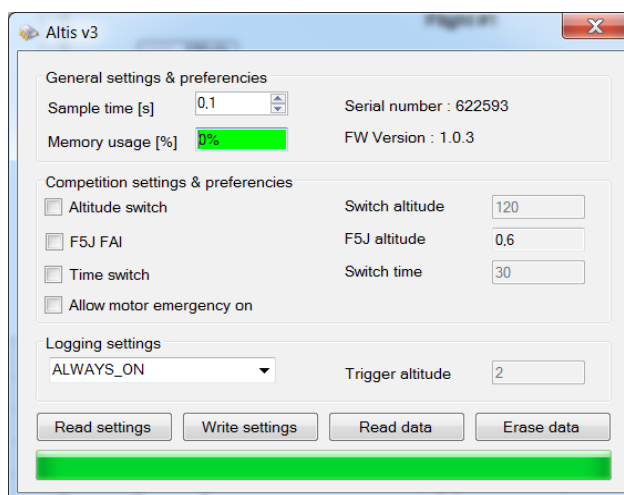
## Altis v3 window

This form communicates directly with connected AerobTec Altis v3 device. It is available in *Tools* → *Altis v3*... or in the toolbar. When opening the window, the device should be connected; otherwise it will not be opened. During the launch, the settings of the device are loaded and shown in the window. User can change the sampling time in the range from 0.1 to 25.5s with step of 0.1s. The serial number of the device as well as firmware version and actual memory usage are also shown here.

There are some settings regarding competition rules. User can select altitude switch function, time switch function or F5J FAI competition settings. In some competitions it is not allowed to switch the motor on again during the flight. However, it is desirable to have the possibility to switch the motor on again in an

emergency. User can choose to enable this or not. If enabled, the emergency switch on is recorded and can be shown on the flight graph.

User has three possibilities to trigger the recording of data. It can be triggered from certain altitude, by RC signal or the recording can be always on.



*Fig.10. Altis v3 window*

User can read the settings from Altis v3 device again and write the new settings to it. The recorded flight data can be read by button Read Data. After reading, the memory of the device can be erased to obtain more space for new flights. However, user can continue using the free memory for new flights.

## **6. Warning**

It is not recommended to supply whole aircraft via AerobTec Altis v3 device, however it is possible. The best choice is to use external BEC circuit.

Do not mount the AerobTec Altis v3 device on aircraft components which might be hot in operation (ESC, batteries)!

Do not touch the AerobTec Altis v3 device on the metal surface, as this might lead to shorting of the power supply and RC system may failed.

Do not put the AerobTec Altis v3 in water, fuel and other liquids!

Before flying with the Aerobtec Altis v3 device always check the RC system range!

## **7. Product Registration**

If you did not purchase the product directly from AerobTec please mail following information to [sales@aerobtec.com](mailto:sales@aerobtec.com). By registering your products you will be informed about updates and notifications.

*Name :*

*Address\* :*

*Country :*

*Phone\* :*

*Email :*

*Product :*

*Serial number of product :*

*Date Purchased :*

*Where did you purchased your product? :*

\* this information is not obligatory

## **8. Revision History**

Rev. 1.0. (October 2011)

- Initial release

Rev. 1.1 (January 2012)

- Added Figures
- Change in introduction chapter
- Minor corrections