

## Flight Data Recorder “TRACER” DSX8001

The Tracer DSX8001 is the latest version of a **flight data recording unit** based on new generation electronics, with performance, weight and efficiency proper of a modern system. The Tracer has been designed completely by DSX adopting the new GPS chip Trimble Copernicus, which lends performance a leap ahead of the previous GPS's.

The TRACER is **FAI / IGC approved** for the maximum category, “all flights”, that includes the world records.



The TRACER **records the data in an internal memory**, permanently saving the values of **position, altitude, time, pilot's name, vehicle identification** and other parameters that are useful for the validation of the data itself, with a user selectable rate up to a maximum of 1 fix per second (1 Hz). Thanks to the presence of a USB connector and 2 serial connectors, the data can be easily downloaded to a personal computer through a USB cable direct connection (hence without the need for a USB-serial converter) and being it powered directly by PC. The data can be analyzed with software programs both freeware or commercial.

The **USB memory stick** option, allows to connect a memory stick to the system, to download all flight data directly to this comfortable memory device. Moreover, the TRACER can be completely configured and tasks declared, simply inserting the USB stick prior to take-off. In this way, every pilot flying a club plane can configure the system with his own data, effortlessly, inserting his stick.

Firmware updates are installed copying the firmware file into a USB stick, and inserting it in the system.

Through the USB module, the Tracer is totally independent from any PC direct connection, allowing it to be installed fixed onboard the plane.

The TRACER is already installed on many gliders and motor planes, lending it's services also in the World Championship competitions.

Thanks to the fact that the development of the system is totally done by DSX, it's possible to customize the product to fulfil specific needs of the customers.



### Data Recording

The recording of the flight data is performed according to the standard defined by the FAI / IGC for the use during competitions and sport performance.

The recording starts automatically when the speed of the vehicle is higher than a minimum value set and stops when it falls below another value. The data of 20 fixes before the automatic start are recorded as well. After finishing the recording, the data file is ready for downloading.

The internal memory of the DSX8001 is of 8 Mb (optionally 16 Mb), which lends a recording time of more than 200 hours (400 h), with a rate of one fix every 3 seconds. Different rates change the recording time linearly.

When the internal memory is full, automatic deletion of the oldest data takes place to make room for fresh data.

The files containing the recorded data can be validated in such a way that any modification made to the file is immediately detected, guaranteeing that no manipulation of the data can be done without noticing.

A second set of data recorded by the TRACER is a **summary file for every mission**. It contains the pilot's name, aircraft identification, time and position of engine start, take off, landing and engine shut down, hence the engine run time. Other information can be customized. These data can be downloaded by the administration and are formatted to be imported into spreadsheets and databases for accounting purposes.

The system can also record the cases of excess of maximum structural load/inverted flight/heavy landing, to perform a survey of the flight activity.

### Display of the recorded data

All data recorded by the TRACER can be displayed on a computer and analyzed with many software programs,

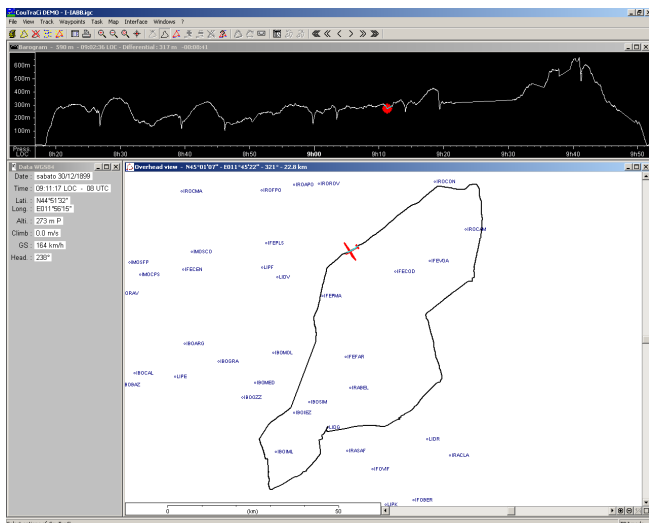


freeware or commercial. This feature is **ideal for the debriefing** activity. It's also possible to visualize and replay the recorded data with Google Earth, depicting the flight path, including the altitude, on the photographs of the terrain.

The downloading of the data, both of the flight data and the summary files, performed at the end of every flight or at the end of the day, may provide with the daily activity of the aircraft and an overview of its usage.

In case of accident, the data log with the recording of the flight path, ground speed, track, altitude, accelerations and time, can be useful for the reconstruction of what happened before the event, helping the investigation and the determination of the responsibilities.

Here are shown some screenshots from available software programs displaying flight data recorded with the TRACER



The flight path can be displayed together with the barogram showing the altitude, and every position of the plane can be associated to the instantaneous flight parameters (ground speed, altitude, climb speed, coordinates).

## Positioning and Vehicle Dynamic Systems

For the data regarding the time of the start up and turn off of the engine and take off and landing, of the peaks of accelerations, heavy landings and all these data that can be recorded with the Tracer, a file created, separated from the one with the coordinates. This second file is of limited size and in plain text, hence can be easily edited or imported into any software program for analysis (like Excel).

### Data output for the pilot

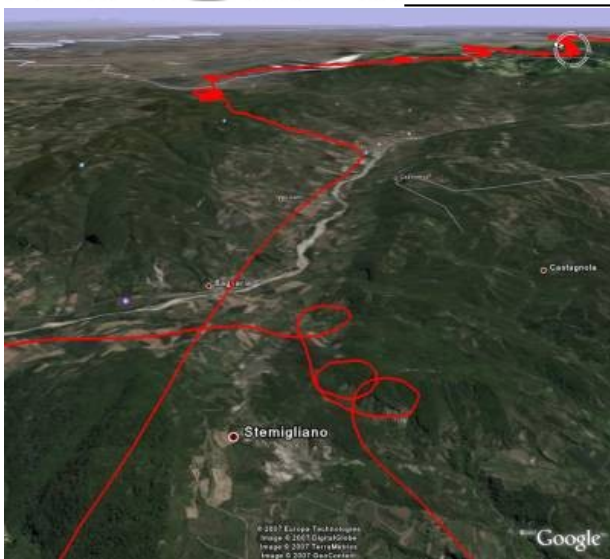
The TRACER has a serial port for outputting the navigation data during its operation; in this way it can be connected i.e. to a PDA running a navigation software. This feature allows to offer a service to the pilot, and not only the data recording.

The flight path can be studied in relation to predefined waypoints and altitude (with some programs, different colours of the path correspond to different altitudes).



### GSM/GPRS tracking and S.O.S. module

This optional module, to be installed in the same DSX box, takes care of transmitting position and distress signals in an automatic manner, or after a manual activation, to a predefined list of cellular phones or internet servers, containing the call sign of the vehicle, the coordinates and the time.



## Positioning and Vehicle Dynamic Systems

- 5) automatic transmission of the **S.O.S. signal** to cellular phones or server user-defined, in case of deceleration with intensity higher than the pre-set one;
- 6) **software DSX-Win** for PC (Windows XP) for performing the set-up of the TRACER, downloading the data and performing the firmware updates; (these functions can be performed with the USB stick, if USB module is present);
- 7) **USB module** to download automatically, on a USB memory stick, the data of the flight activity and perform the set-up of the system and firmware updates.

This configuration allows for the future expansion of the system with other DSX components (other boards with the DSX standard dimension of 8x10 cm and the internal pass-through connector).

### Batteries

The TRACER can operate autonomously for some days, powered by small batteries, thanks to its very low power consumption (about 30 mA at 12 V).

This allows the system to remain active without the intervention of the pilot and, if the GSM/GPRS module is installed, be ready to any enquiry from a remote control station.

To satisfy this minimum power requirement, a small battery is enough.

The **TRACER PLUS**, is a version of the TRACER available with an internal Li-Po battery and power module. It is a fully self contained unit, with an endurance of 30 hours or more (depending on the battery chosen) and it can be recharged with any CC with voltage between 8 and 30 V. It can also work connected to the power source and keep the internal battery as an emergency power supply.

### Configurations and options offered

To perform the function of data recording of the flight activity, the TRACER is offered in the following configurations and options:

- 1) **unit in aluminium box**;
- 2) **GPS antenna** with a cable of 3-5 m;
- 3) optional **external battery** for autonomous operation (continuous operation for the required time is feasible, in a range of up to some days); the TRACER model with the internal battery is the **TRACER PLUS**;
- 4) coupling with a GSM/GPRS board for **automatic data transmission** (according to criteria to be defined by the user, i.e. at the end of the day or a fixed time or following an event like a hard landing) with ftp protocol; possibility to respond automatically to a request received by SMS, with the chance of selecting different sets of data to be received;

### Specifications

Power supply	:	8 – 30 V
Power consumption	:	~30 mA @ 12V
GPS engine	:	Trimble Copernicus
Pressure sensor	:	Intersema MS5534
Internal memory	:	8 Mb (optionally 16 Mb)
Recording time	:	>200 h (>400 h)
Dimensions	:	110 x 93 x 26 mm
Weight	:	150 gr + GPS antenna
Interfaces	:	USB slave (1), serial (2), USB master (1, optional)
Data output	:	NMEA 0183 standard RMC, GGA, VTG, RMZ navigation data (on one serial port)