STRATO FLIGHTS



Datalogger STRATOmini

Altitude logger for stratospheric flights



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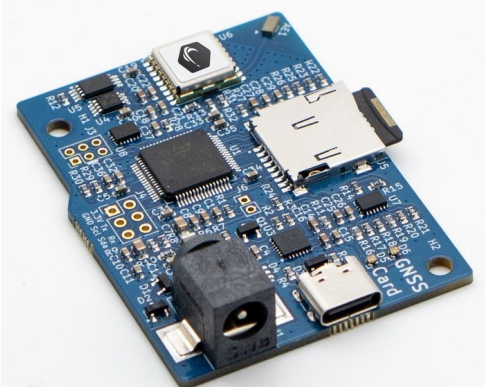
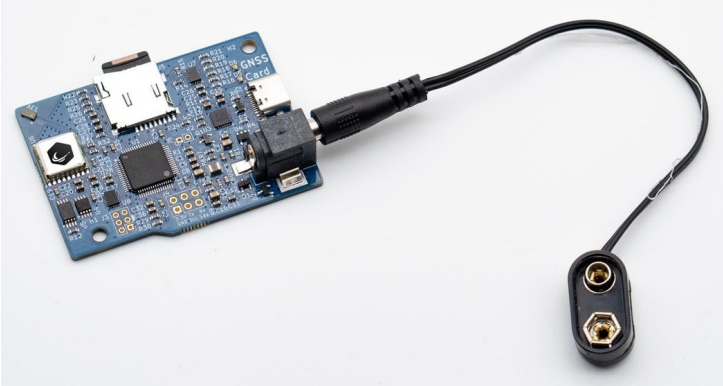
1 General Information

1.1 Introduction

This GPS Datalogger was specially developed for recording measurement data during stratospheric flights. The data is stored on a microSD card and can be evaluated on a computer after the flight. Its particularly lightweight design makes the Datalogger ideal for being sent up to maximum altitudes with a weather balloon.



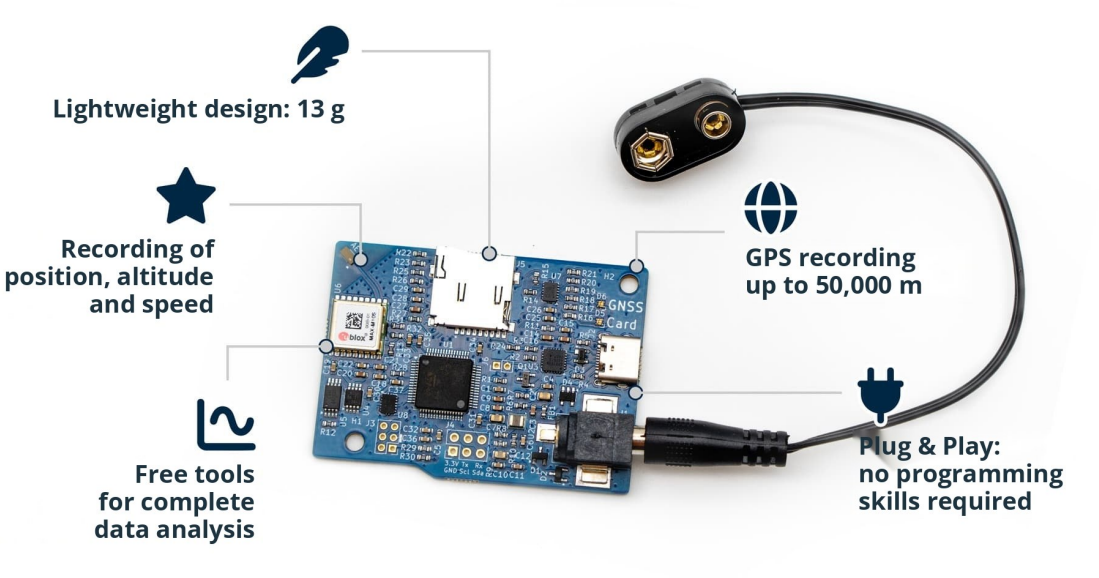


The data can be evaluated here:

https://www.stratoflights.com/en/tutorial/weather-balloon-tools/datalogger-evaluation/

1.2 Features

The Datalogger STRATOmini offers the following features:



- Records flight altitude, GPS coordinates, speed over ground and internal temperature
- Unlocked GPS module: stores data up to an altitude of 50,000 m (31 miles). Most GPS modules stop working at an altitude of 18,000 m (11.2 miles).
- Data storage on a microSD card
- Easy evaluation by reading out the microSD card
- Online tool for creating graphs
- Online tool for displaying the flight path in 2D and as a 3D flight path in Google Earth
- Easy to use, no programming skills required
- Lightweight design in credit card format (13 g / 0.46 oz)
- Battery-powered (9 V)

1.3 Quick Start

Insert a microSD card and connect a 9 V block battery. The device switches on automatically and starts recording measurement data right away. There is no switch. The Datalogger stops recording when the battery is disconnected.

2 Using the Datalogger

2.1 Power Supply

The Datalogger requires a 9 V battery for its power supply. We recommend using a 9 V lithium battery. Lithium batteries perform better in cold conditions than, for example, alkaline, NiCd or NiMH batteries. A suitable 9 V block battery is available in our shop: **www.stratoflights.com/en/shop**

2.2 Mounting the Datalogger

For optimal operation, the temperature around the Datalogger should not fall below 0 °C (32 °F). The Datalogger should therefore be protected inside a Styrofoam probe. A Styrofoam wall thickness of about 30–40 mm (1.2–1.6 in) is no problem for the reception of the GPS module. For easier mounting, the Datalogger has a mounting hole in one corner.

IMPORTANT:

- Make sure that the Datalogger does not touch any metal surfaces or metal parts. There is a risk of a short circuit.
- In addition, the Datalogger must not come into contact with water, oil or other liquids.
- The Datalogger should be positioned so that the GPS antenna points upwards during the flight (the side of the circuit board with the mounted components).
- The sensor board should be mounted so that it is protected from splash water.

2.3 Logging

A standard microSD card is required to store the data. Cards with a storage capacity of up to 32 GB have been tested.

Always test before the flight whether your microSD card is compatible, whether data is being recorded and whether it can be read by your computer. You wouldn't want to fly up to 40,000 m only to find out afterwards that no data was recorded.

The Datalogger records a measurement every two seconds. Even with a 2 GB microSD card, data could be recorded continuously for more than 360 days. That should be sufficient for most applications.

2.4 Operation

To rule out operating errors, the Datalogger starts recording measurements automatically and immediately after the battery is connected. This way, it cannot happen that a flight takes place without the Datalogger running.

The measurement data is stored in files starting with “F_”, followed by a number and the file extension “.log”. At startup, the Datalogger finds the next available file name and continues the numbering from there for each data set.

Note: The GPS module has various manufacturer-defined modes that can be configured depending on the application. Since we use the loggers for stratospheric flights, we use the “Airborne Mode”, which unlocks the module at high altitudes and therefore enables altitude recording up to 50,000 m. However, this mode is slightly less accurate in stationary applications. If small jumps occur while recording on the ground, e.g. in Speed over Ground or Course over Ground, this is due to the Airborne Mode. As soon as the Datalogger lifts off, it is used in its ideal environment and the GPS signal can be used optimally.

3 Data Analysis

The measurements of the Datalogger are saved as .log files and can be evaluated with various programs. Copy the log file from the microSD card to your computer.

Important: Before opening the file, we recommend making a backup copy in another location. If the data is accidentally overwritten with programs such as Excel, it may become unusable for the online tool. Therefore, only work with copies of the unopened original file.

You can now evaluate the data in any way you like.

3.1 Recorded Measurement Values

The Datalogger records the following data in detail:

Measured value	Meaning
Up-Time	Current runtime
UTC	Coordinated Universal Time
Date	Date
RMC Valid	Validity of the GPS data
Sats in use	Number of satellites in use
Latitude	Latitude
Longitude	Longitude
Speed over Ground [knots]	Speed over ground in knots
Speed over Ground [km/h]	Speed over ground in km/h
Course over Ground	Course over ground in degrees
Altitude NN [m]	Altitude above sea level
Board: Temp [C]	Temperature of the board sensor
Extern: Temp [C]	*(only available with model STRATO4)*
Extern: Hum [perc]	*(only available with model STRATO4)*
Extern: Press [hPa]	*(only available with model STRATO4)*
Batt Voltage [V]	Battery voltage
Logger Status	Logger status for error messages

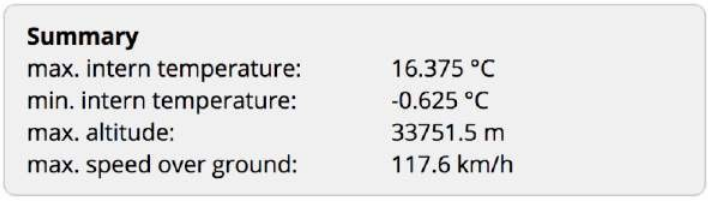
3.2 Online Tool for Creating Graphs

To evaluate the flight data in a clear and vivid way, we have developed an easy-to-use online tool.

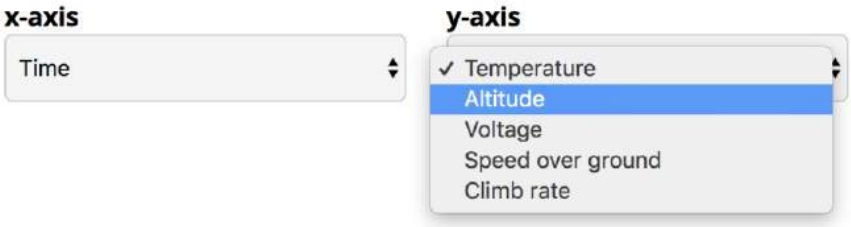


https://www.stratoflights.com/en/tutorial/weather-balloon-tools/datalogger-evaluation/

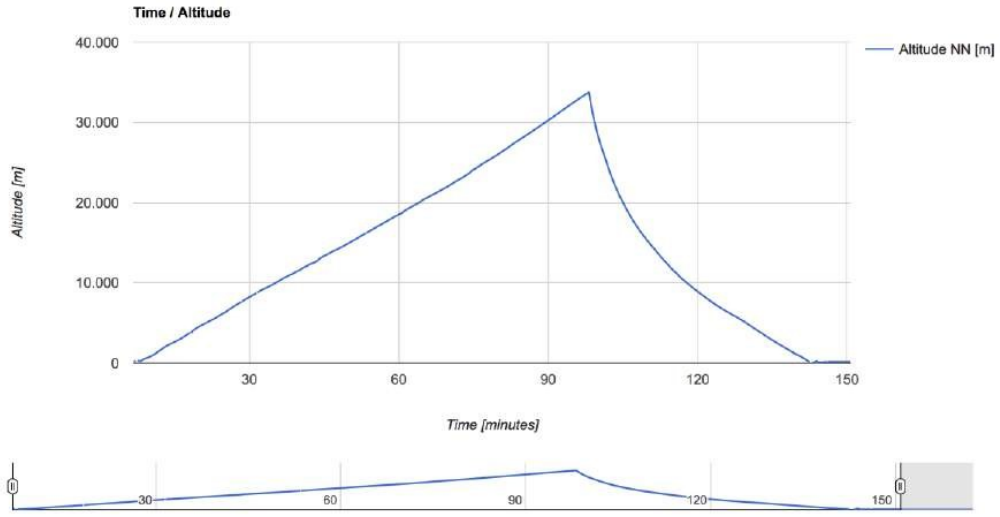
Procedure: First select the desired units of measurement (metric or imperial). Then upload your recorded LOG or CSV file using the "Choose file" button or via drag & drop. The upload starts automatically, and a few seconds later you will receive the results. The tool immediately creates a list of various extreme values:



Creating graphs: Below the extreme values you will find the corresponding graphs. You can select the measured values for both the x-axis and the y-axis. You can choose from the following measured values and combine them as you like. Optionally, smoothing of the curves can be switched on and off.



The graphs are then created automatically, including all labels. In the measuring range below, the measured values can be trimmed at the beginning and end so that only the relevant data of the flight is displayed. The graphics can then be downloaded as PNG files.



3.3 Flight Path in 2D and 3D

Below the graphs, the tool also automatically displays the flight path of your weather balloon: as a 2D flight route on a map and as a 3D flight path in Google Earth. Converting or manually editing the log file is no longer necessary.

Tip: If no GPS coordinates were recorded, no flight path can be created. Therefore, place the Datalogger outside under open sky for about 10 minutes before the flight and switch it on so that it acquires GPS reception.

3.3.1 2D Flight Path on the Map

Under the heading “Flight path of the weather balloon”, your flight route is displayed directly on a map based on the recorded latitudes and longitudes.

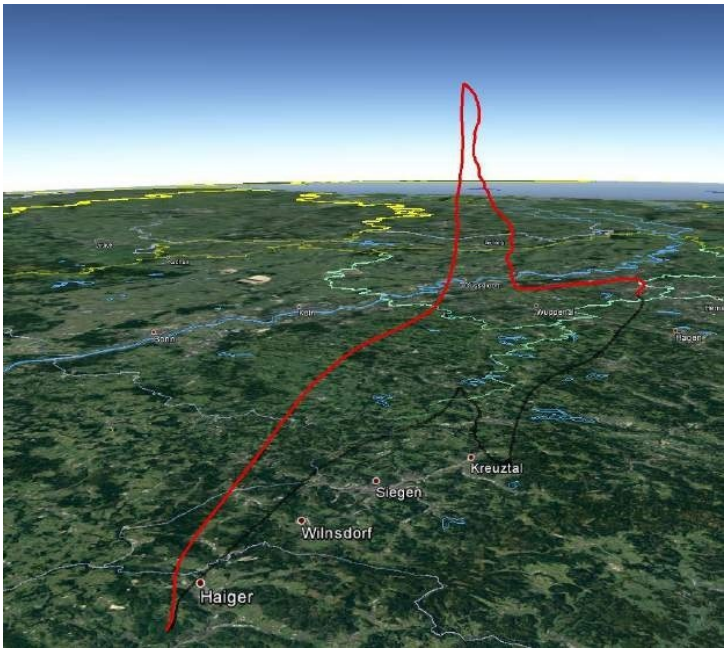
3.3.2 3D Flight Path in Google Earth

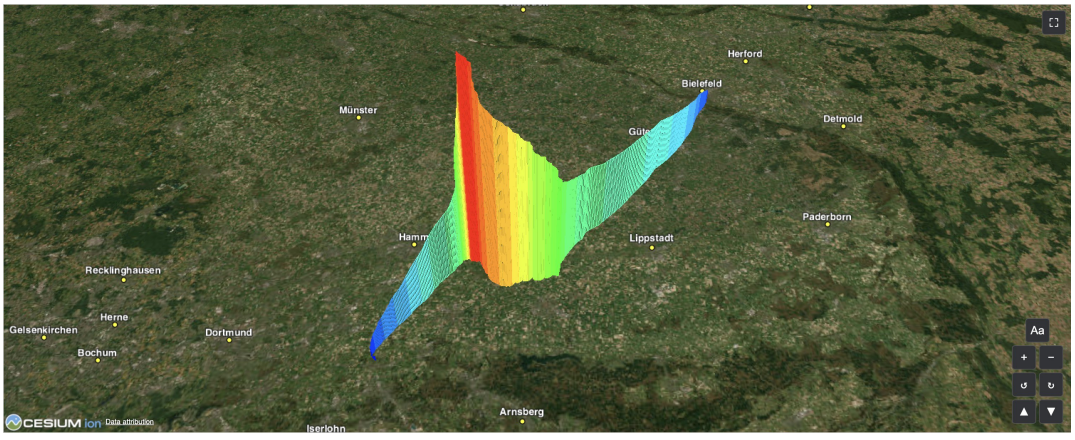
In the “3D flight path in Google Earth” section, you can download your flight data using the “Download GPX file” and “KML for Google Earth” buttons. The KML file can be opened in Google Earth. Double-clicking the file opens the flight path directly in Google Earth (if installed); alternatively, you can upload the file to Google Earth in your browser:

https://earth.google.com/

You can now rotate the map freely and view the flight route from every perspective.

Data Analysis





4 Specifications

The Datalogger STRATOmini has the following technical data:

Product name	Datalogger STRATOmini
Item number	100910
Model	STRATOmini2 V1.0
Dimensions	58 x 42 x 13 mm
GPS accuracy	5 m *Sensor: u-blox MAX-10S*
Maximum altitude	50,000 m
Temperature measuring range (internal)	−40 °C to +85 °C *Sensor: NXP LM75B*
Recording rate	0.5 Hz
Power supply	9 V battery
Runtime at room temperature	approx. 48 hours
Weight	13 g / 67 g (with battery)
Storage temperature	−40 °C to +55 °C
Operating environment	−10 °C to +55 °C
Scope of delivery	Datalogger STRATOmini; instructions/manual as PDF document; 16 GB Kingston microSD memory card
Manufacturer	Stratoflights GmbH & Co. KG

Note: The specifications of the components and their system limits have not been fully tested, but are based on the manufacturers' specifications.

We wish you a good flight!

Everyone needs an adventure.

www.stratoflights.com/en/tutorial



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