# Fidas® Fly 200

## Combination of ultra-light real-time dust monitor and HORUS flight robot

The Fidas® Fly 200 is a combination of ultra-light real-time dust monitor made by Palas® and flight robot made by Airclip Service GmbH & Co KG. As a drone it is able to approach different waypoints. The high-quality construction enables a continuous application even in longer measuring units with more than 100 flight hours. Necessary stopovers for changing battery or data loggers take less than two minutes. The Fidas® Fly 200 simultaneously measures $PM_1$, $PM_{2.5}$, $PM_4$, $PM_{10}$, and TSP environmental mass fractions or respirable, thoracic, and inhalable mass fractions as per DIN EN 481.

In addition, it measures the particle number and particle size distribution (upon request) in up to 64 size classes within the particle size range of 0.18 – 18 µm or 0.4 – 40 µm. The time resolution can be adjusted from one second to hours for continuous measurements.

Fidas® Fly 200 is equipped with a data logger with 4 GB Compact Flash storage. The firmware supports complete remote access with remote maintenance and optional data storage at www.palas.de/user.

For longer quasi-stationary measurements in indoor areas we recommend our Fidas® 100 with integrated filter holder and a volume flow of 5 l/min. For stationary measurements outdoors, we recommend Fidas® 200/200 S and Fidas® 300/300 S.

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# Fidas® Fly 200
## Quality in detail

**Setup and principle of operation:**

Fidas® Fly 200 measures aerosol particles based on Lorenz-Mie scattered light analysis of single particles. The particles move individually through an optically defined measurement volume (see Fig. 1) that is homogeneously lit with polychromatic light.

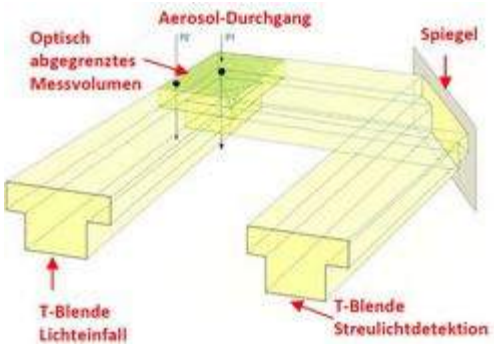


*Fig. 1: Schematic diagram of scattered light detection with the patented T-aperture*

The use of the patented T-aperture leads to an exactly defined optical measurement volume and allows particle measurement without border zone errors and therefore precise size determination. The new and fast digitalized signal processing electronics allow coincidence to be recognized and, if necessary, to be corrected.

Each particle generates a scattered light impulse that is detected at an angle of 85° to 95° degrees. The particle quantity is detected based on the number of scattered light pulses. The pulse amplitude is a measure of the particle diameter.

The use of a white light source and 90° scattered-light detection results in an unambiguous calibration curve with none of the ambiguities as with laser light, which leads to an extremely high size resolution (see Fig. 2).

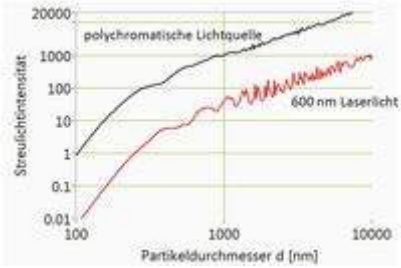


*Fig. 2: Scattered light intensity of a white light source compared with a monochromatic light source (angle 85° – 95°, respectively; m = 1.59 + 0i)*

In order to convert the measured particle size distributions into mass distributions, each value is multiplied by a correlation factor, which reflects that the environmental aerosol is composed of particles of different material densities depending on the particle diameter.

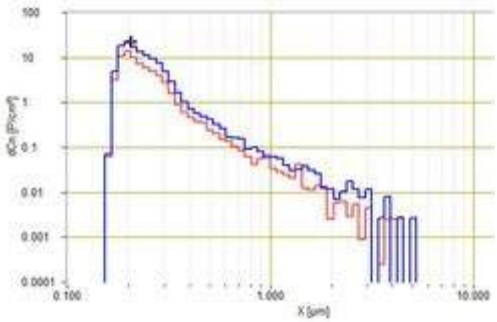


*Fig. 3: Two typical particle size distributions* measured at a 2-min. time interval. Measurement duration: 2 min.

In addition, the software provides data management with the integrated data logger, export capabilities, and network support. The measured data can be displayed in many available modes.

**System Design:**

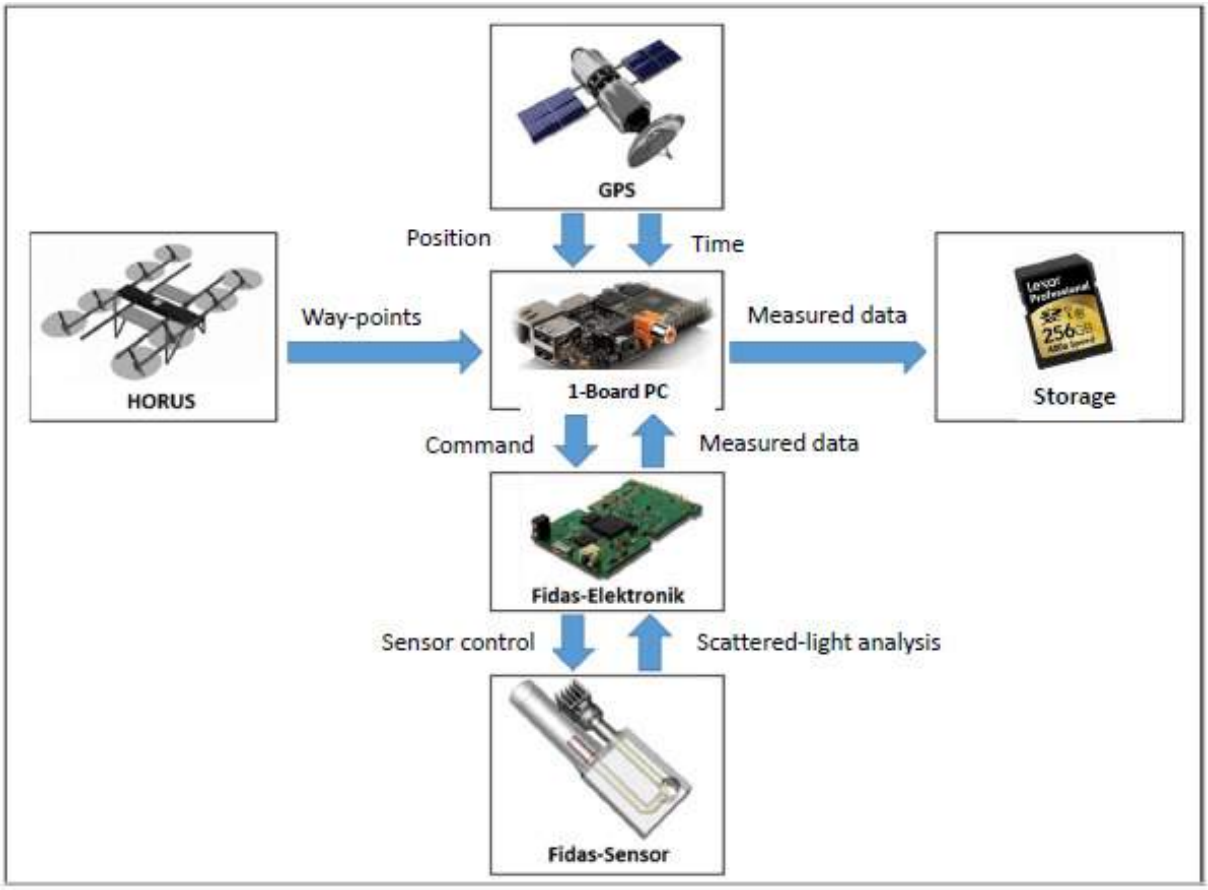


*Fig.4: Basic system design*

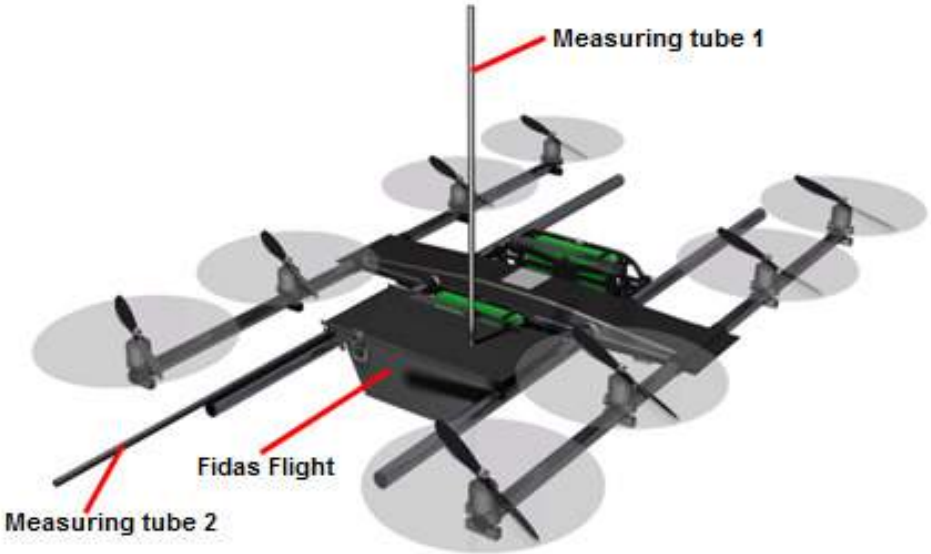


*Fig.5: Fidas® Fly 200*

**Advantages:**

- Online display of dust values and particle size distribution
- Counting measuring method, highest resolution
- Real-time measurement
- Light source: LED
- Up to four hours measuring time with battery operation
- Live transfer of all relevant flight data and control data
- Flight mode: manual control with stabilization of position, automatic stabilization of height, dynamic stabilization of GPS position, automatic following of GPS routes, automatic taking off/landing
- Fidas® data analyzer software for individual analysis of your measurement data on an external PC
- 8-propellers-platform
- Little maintenance required
- Easy to operate
- Reliable functioning
- Reduces your operating expenses!

**Applications:**

- Particle measurements: roadsides, quarries, coal tips, lignite opencast mining, etc.
- Indoor air quality studies in factories
- Exhaust gas characterization in high chimneys
- Immission / emission measurement

**Datasheet:**

| | |
|---|---|
| **Measurement range (size)** | 0.18 – 40 µm (2 measurement ranges) |
| **Size channels** | 64 (32/decade) |
| **Measuring principle** | Optical light-scattering |
| **Measurement range (number concentration)** | 0 – 20000 particles/$cm^3$ |
| **Time resolution** | 1 s – 24 h |
| **Volume flow** | 1.4 l/min |
| **Dimensions** | 10.5 • 37.5 • 17.5 cm (H • B • T) |
| **Weight** | Approx. 4 kg, tare weight: 1.9 kg |
| **Data logger storage** | 4 GB |
| **Measurement range (mass)** | 0 – 1500 µg/$m^3$ |
| **Reported data** | $PM_1$, $PM_{2.5}$, $PM_4$, $PM_{10}$, TSP, $C_N$, particle size distribution |
| **flight time** | Approx. 20 min. |
| **maximum useful load** | 5 kg |