

Autonomous Aerial Sensing

Fast Response and Personalized

by

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Overview

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- 3. Accuracies**
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Introduction



With the increase of miniaturisation in the high tech environment unmanned or robotic systems are in use for defence, safety, economic and fast response applications.

**As aerial sensor platforms they are known as
drones
unmanned aerial vehicles (UAV)
unmanned aerial systems (UAS)**

**Their size, weight and technology varies extremely
weight: 1 kg till several 100 kg
Technology: paraglide, airships,
fixed wing, rotor wing**

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Introduction



**The presented UAV is a so called flying wing, i.e.
a fixed wing airplane without tail.**

**It is an ultra light airplane with less than 1,1 kg which
avoids many restrictions during the flight operations.**



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The Concept



PAMS = Personal Aerial Mapping System



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PAMS System Components



SmartOneB UAV

- electric engine (ca 35 minutes)
- GPS-equipped autopilot
- flight navigation system
- bi-directional radio modem
- 7 Mpix calibrated camera (RGB)

Ground Station

- bi-directional telemetry
- remote control
- notebook

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SmartOneB UAV
autopilot
(triggering image exposures by location)

Ground Station
mission planning
mission control
automated image processing
automatic geo-referencing of images
image mosaic

Digital images (GSD 5 – 20 cm, 150 – 600 m AGL)
direct geo-referenced
indirect geo-referenced (GCP, AT, Internet service)

Typical block sizes:
500 * 500 m², 700 * 350 m², 1000 * 250 m²

First level data (in the field)
QuickMosaic
AirMosaic

Second level data (Internet service)
Digital Surface Model (DSM)
OrthoMosaic

Accuracies



| Mode | GSD [cm] | Planimetry [cm] | Height [cm] | Planimetry [pixel] | Height [pixel] |
|------|----------|-----------------|-------------|--------------------|----------------|
| A | 7 | 3 | 5 | 0,5 | 0,7 |
| B | 10 | 7 | 12 | 0,7 | 1,2 |

Mode A: RMS values from signalised check points

Mode B: RMS values from natural check points

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Applications



Single aerial image, geo-referenced

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Applications



Single aerial image, geo-referenced Construction documentation



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Applications



Quarry, QuickMosaic



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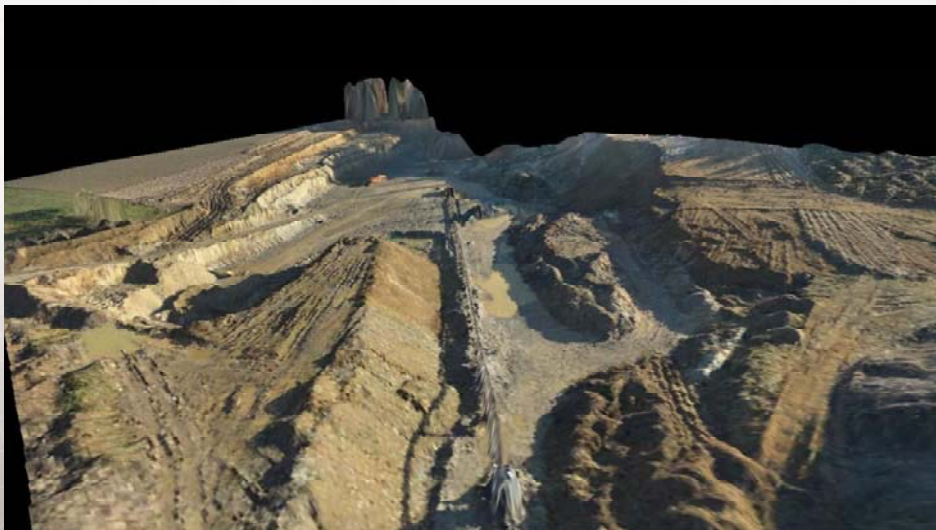
Applications



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Applications



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Applications



Environment, natural preservation of a river bed, OrthoMosaic

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Applications



Golf course
OrthoMosaic

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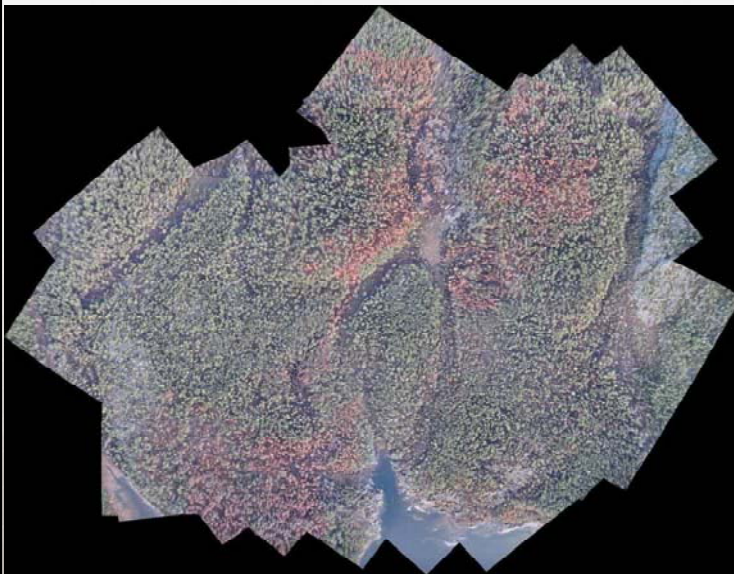
OrthoMosaic
31 flight missions
7.306 images



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Applications



Forestry
CIR
OrthoMosaic
Test applic.

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UAV Mapping - Outlook



- Extension of endurance
- Higher resolution of camera
- Colour Infra Red (CIR)
- Thermal sensor

More information under

www.germatics.com

www.smartplanes.se

www.blomasa.com

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Thank you for your attention