



ICARUS

INTEGRATED COMPONENTS FOR
ASSISTED RESCUE AND UNMANNED SEARCH OPERATIONS

ICARUS RPAS

AND THEIR OPERATIONAL USE IN BOSNIA

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- Disasters disrupt our society
- Disasters are very difficult to manage



Source: Wikimedia Commons

- Search & Rescue actions:
 - Labour-intensive
 - Slow



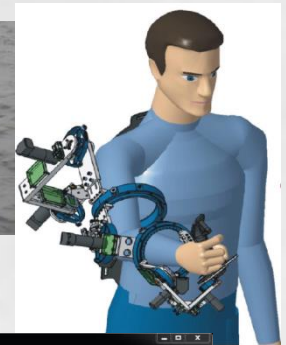
Source: B-FAST

- Integrated Components for Assisted Rescue and Unmanned Search operations
- Participants:
 - 24 partners
 - 10 countries
 - 2 end-users:
 - B-FAST
 - Portuguese Navy
 - 3 large industrials
 - NATO / CMRE
- Total Budget: 17.5 M€

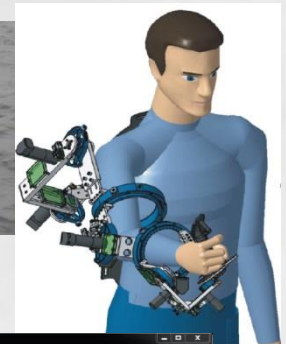


Source: Wikimedia Commons

- Victim Detection Sensor
- Unmanned Aerial Systems
- Unmanned Ground Vehicles
- Unmanned Maritime Systems
- Heterogeneous Collaboration
- Communication
- Command & Control
- Training & Support



- Victim Detection Sensor
- **Unmanned Aerial Systems**
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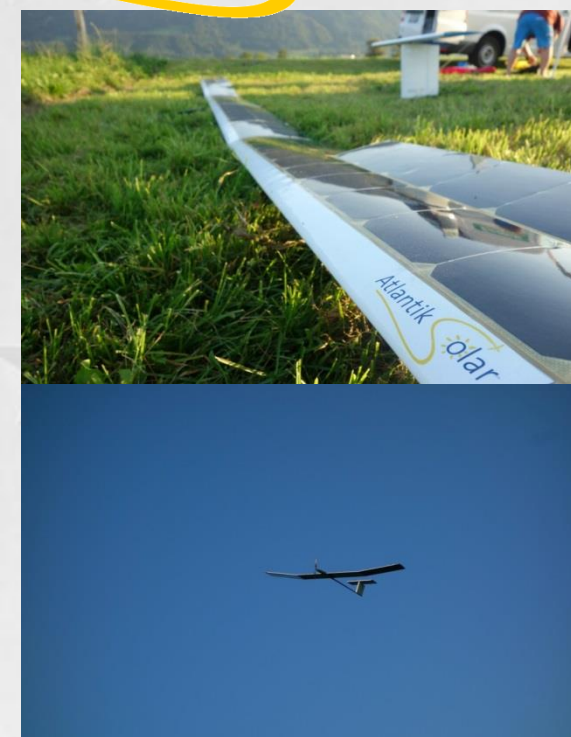
- Fixed-wing solar airplane for endurance-operations

sense *Söar*

Atlantik *Solar*



Source: ETHZ



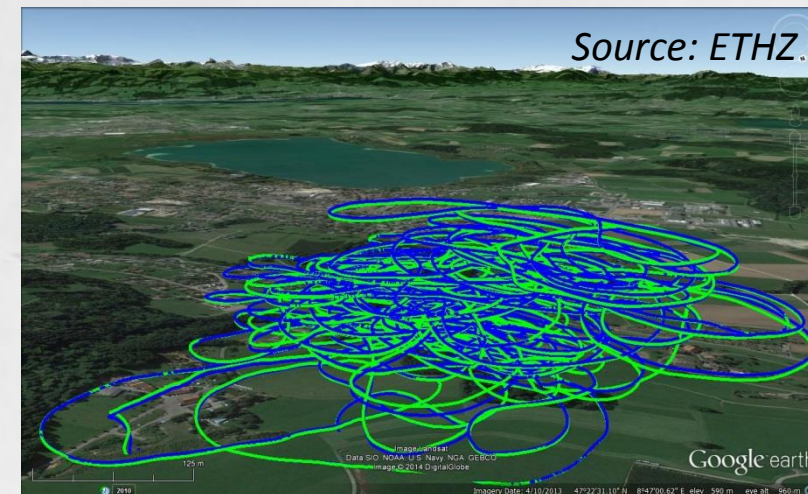
Atlantik olar

Design Goals:

- Prolonged endurance (24h continuous flight – virtually endless flight)
- Rapid deployment and easy hand launch
- Increased robustness
- Easier manufacturing techniques

Implementation

- Design of the aerodynamics and manufacturing of several prototypes
- Integration of Solar Panels and validation of efficiency
- Integration of identical flight control and navigation units
- Currently improving the motor/propeller configuration for further improvement



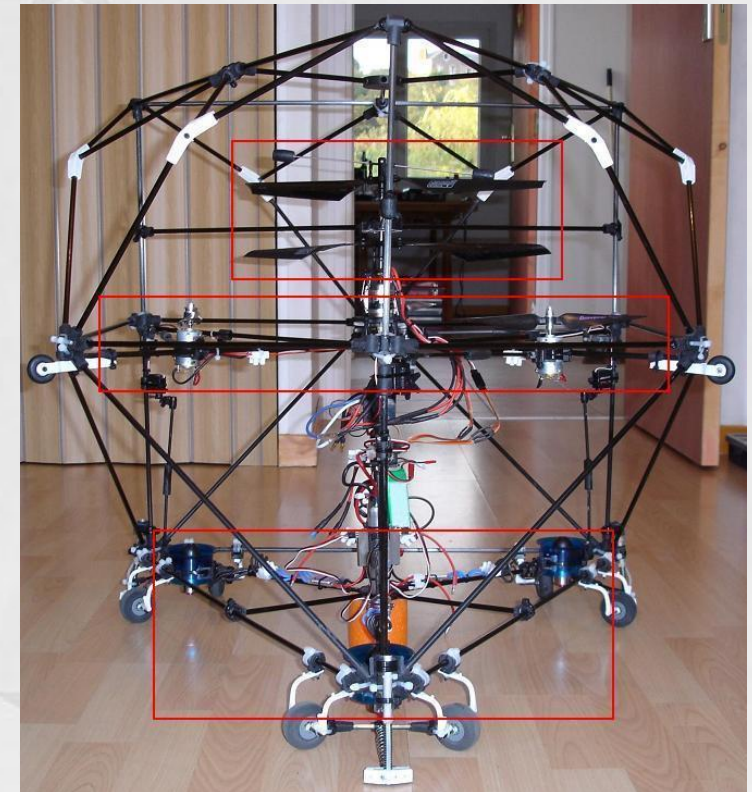
- Quadrotor for low-altitude operations



Source: ASCAMM



- Gyro-pendulum for harsh-weather operations
- Full 3D Carbon Cage Exoskeleton



Source: JTH

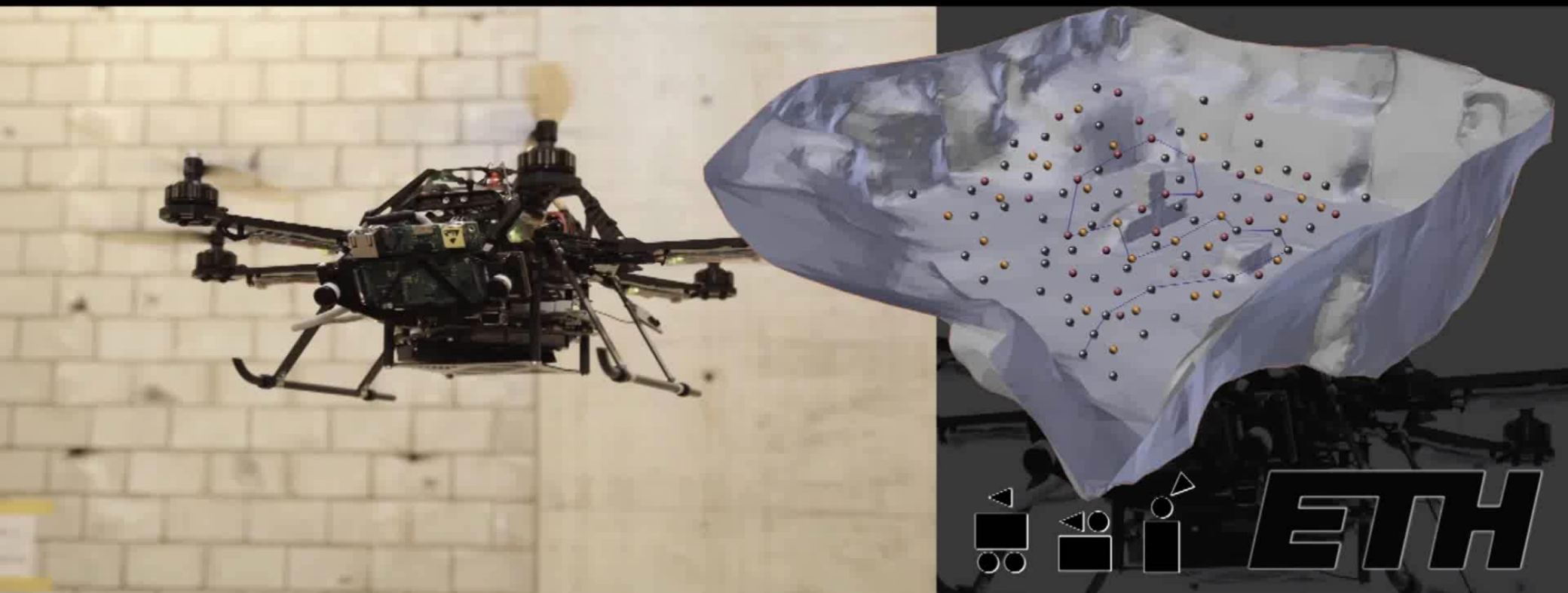
- Small quadrotor for indoor operations



Source: ETHZ , SBX

Efficient Full Coverage Sampling-based Inspection Planning: Analysis and Experiments

Andreas Bircher, Kostas Alexis, Ulrich Schwesinger, Sammy Omari, Michael Burri and Roland Siegwart







- ICARUS tools were sent on actual missions with end-users (B-FAST, THW, BH-MAC)



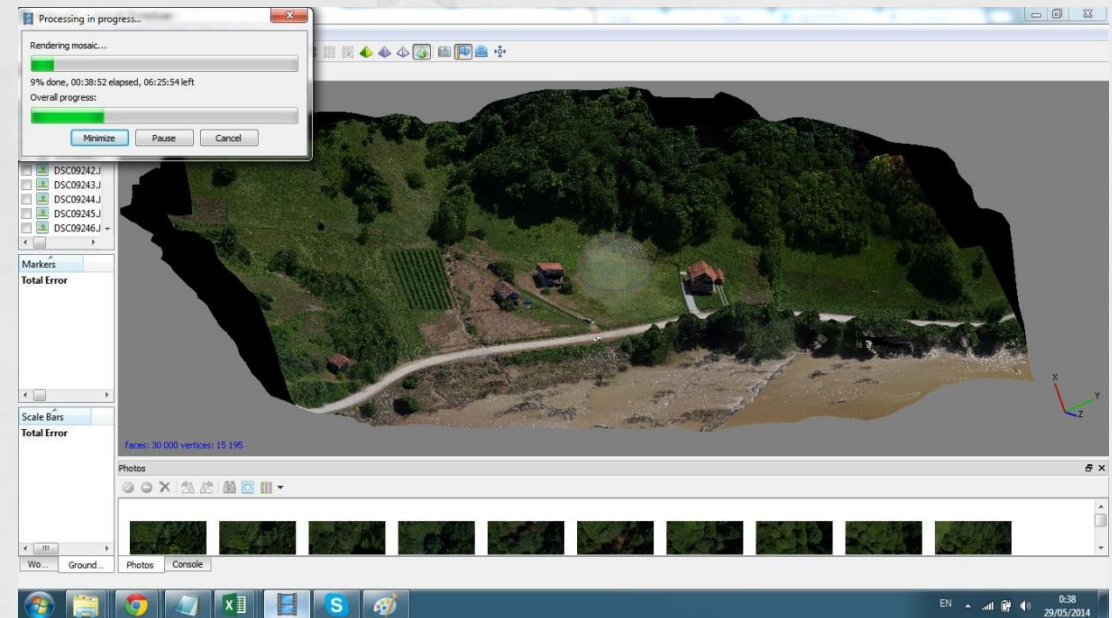
- A robotics-expert and a RPAS were deployed in Bosnia
- End users were brought into contact with the RPAS-tools

- ICARUS tools were sent on actual missions with end-users



- The RPAS provided valuable information for the end-users on dyke-breaches

- ICARUS tools were sent on actual missions with end-users



- The RPAS was used for providing 3D-maps of the environment to analyse the effects of the landslides

- ICARUS tools were sent on actual missions with end-users



- The RPAS was used for visual inspection and damage assessment

- ICARUS tools were sent on actual missions with end-users



- The RPAS was used for localizing the landmines which have been re-localized due to the landslides



THANK YOU

ANY QUESTIONS?

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 Land



Search and Rescue

 Air

 Water