ICARUS
Integrated Components for Assisted Rescue and Unmanned Search Operations

An EU-FP7 Project Providing Unmanned Search and Rescue Tools

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

Source: Wikimedia Commons
• Disaster Phases

Disaster

Continued Humanitarian Assistance

Search & Rescue

Rebuilding

Humanitarian Assistance Relief

Recovery

Source: B-FAST
• Search & Rescue actions:
  • Labour-intensive
  • Slow

Source: B-FAST
ICARUS - CONSORTIUM

• **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 / NURC

• Total Budget: 17.5 M€

*Source: Wikimedia Commons*
Objective 1: Development of a light sensor capable of detecting human beings

- WP210
- Based on QCD technology
- Minimal levels of weight (500 g), dimensions (12x12x6 cm) and total power consumption (5 W) are being targeted
- Image and video processing algorithms for detecting human survivors will be developed and combined to obtain sufficient detection performance
- UNINE, TUV, IZM, ETHZ, RMA, UKL
Objective 2: Development of cooperative Unmanned Aerial System (UAS) tools for unmanned SAR

- WP220
- Used for:
  - Mapping of topography and scenario
  - Target observation
  - People search outdoors and indoors
  - Kit delivery
  - Communication relay
- **ETHZ, CTAE, SBX, JTH**

Source: ETHZ, SBX, JTH
Objective 3: Development of cooperative Unmanned Ground Vehicle (UGV) tools for unmanned SAR

- WP230
- Development of a large UGV which can be used as a mobile base
- Development of a small UGV which is able to enter in collapsed buildings to search for human victims

- UKL, META, AV, RMA, SPACE, BFAST

Source: META, AV
Objective 4: Development of cooperative Unmanned Surface Vehicle (USV) tools for unmanned SAR

- WP240
- Used for:
  - Sensing and perception for target detection and tracking.
  - Mission planning and control for operations with single or multiple vehicles.
  - Capsule deployment system (life-rafts).

- INESC, NURC, CAL, CINAV

Source: INESC, CAL
Objective 5: Heterogeneous robot collaboration between Unmanned Search And Rescue devices

- WP250
- Robot Interoperability
- Coordination between multiple UXV
- Heterogeneous operations UAS + UGV in a SAR context
- Heterogeneous operations UAS + USV in a SAR context

- **CTAE, ETHZ, INESC, IMM, RMA, SPACE**
• Objective 6: Development of a self-organising cognitive wireless communication network, ensuring network interoperability

• WP310
• Focus:
  • Mobile and wireless ad-hoc communications in combined land-air-sea environments.
  • Self-coordination and optimisation of spectrum resources by using cross-layer cognitive radio techniques
  • Self-managed network able to adapt to varying and extreme conditions by using power-efficient, failure-resilient protocols.
  • Flexible security scheme.
  • Harmonised management and control overlay, able to encompass several data-link technologies (WLAN, GSM).

• ISYS, RMA, QUOBIS
Objective 7: Integration of Unmanned Search And Rescue tools in the C4I systems of the Human Search And Rescue forces

- WP320
- 3 objectives:
  - Collection of data/information from the robots, operators, human teams deployed, ...
  - Collation and merging of data from different sources, including allowing for differing reliability of sources and integration with GIS information;
  - Monitoring and control interfaces that can provide high level command capabilities to appropriate users

- SPACE, ATOS, CTAE, ISYS, INESC, IMM, E-GIS, UKL
Objective 8: Development of a training and support system of the developed Unmanned Search And Rescue for the Human Search And Rescue teams

- WP330
- Development of PC-type trainers-simulators for training operators of SAR robots
- Development of an e-learning methodology
  - training tool with virtual robots
  - use of semantic information in a human-machine-interface

IMM, ISYS, INESC, ESRI
Objective 9: Communication and dissemination of results

• WP510

• Ensure that the outcomes, results and benefits of the project are made visible to the actors involved in search and rescue operations and to the final beneficiaries

• Increase overall visibility of the EC’s research and development activities among the search and rescue community.

• Support user engagement activities

• Production of printed and multimedia material;

• Networking activities among the end-users and beneficiaries

• Development and implementation of a campaign in media

• Development of a project website;

• Shooting of video material to promote the results of ICARUS

STP, ATOS, JTH, QUOBIS, RMA
• Disasters pose a huge problem for our society

• The current disaster management tools can be improved by adding technological aids

• ICARUS proposes a comprehensive solution to this end

• We’re very open to comments / advice from the end-user community
Thank you. Any questions?

Overview Presentation

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