HORIZON-CL3-2025-01-DRS-04: "Advancing autonomous systems and robotics for high-risk disaster response, strengthening disaster resilience in conflict-afflicted crisis zones"

Topic Objective

This topic aims to develop and/or adapt multifunctional autonomous systems for disaster response in high-risk environments, focusing on crisis zones affected by armed conflict. The goal is to strengthen disaster resilience through innovative robotic and autonomous system solutions.

Expected Outcomes

Projects must contribute to:

- Development of multifunctional autonomous systems for disaster response in high-risk environments;
- Enhanced disaster resilience in conflict-affected areas;
- Integration of advanced robotic and autonomous technologies into disaster response operations.

Specific Conditions

- **Type of Action**: Innovation Actions (IA);
- **Expected EU Contribution per Project**: ~€5 million;
- **Indicative Budget**: €5 million;
- **Technology Readiness Level (TRL)**: Activities should reach TRL 6–8 by the end of the project;
- **Eligibility Requirements**:
    - Active participation, as beneficiaries, of at least three first responder organisations or agencies from at least three different EU Member States or Associated Countries, including Ukraine;
    - Mandatory use of Copernicus and/or Galileo/EGNOS data and services, where applicable.

Context and Rationale

Conventional Aviation vs. Unmanned Aerial Systems (UAS)

- Conventional aviation continues to play a central role in the global transport of people and goods.
- UAS have emerged as a powerful alternative, particularly due to innovations in avionics and artificial intelligence, enabling:
    - Sophisticated autopilot systems;
    - Data communication networks;
    - Electronic information management;
    - Enhanced human-machine interfaces.

Technological Gap

Despite the progress of UAS, a significant gap remains between UAS and helicopters, particularly concerning:

- Transport of medium-to-large payloads (600–1,000 kg);
- Missions requiring Short Take-Off and Landing (STOL) capability;
- Operations in turbulent or contested environments.

GYRO-LINK: An Innovative Hybrid Solution

To develop a TRL 8-9 **hybrid autogyro** (manned and unmanned) for multi-purpose defence operations, featuring:

- Payload capacity between 600–1,000 kg;
- Range of up to 600 km;
- STOL capability;
- Reliable operation in turbulent conditions.

Technical Advantages of Autogyros

- **Unpowered rotor (autorotation)** provides:
  - Fuel efficiency;
  - Slow-speed flight capability;
  - Stability in turbulence.
- Lower cost and complexity compared to helicopters.
  - High potential using autonomous navigation and control systems.

Relevance of GYRO-LINK to This Topic

The **GYRO-LINK** project, aiming to develop a hybrid autogyro for multipurpose defence and/or civil operations, aligns well with this topic by:

- Developing and integrating autonomous systems for disaster response in high-risk areas;
- Contributing to enhanced resilience in conflict-affected crisis zones;
- Applying advanced robotic and autonomous technologies in disaster scenarios.

Technological Innovation

- ✓ Autorotation as an Efficient Lift Mechanism
- ✓ Hybrid Manned/Unmanned Operation
- ✓ Modularity
- ✓ Resilience in Hostile Environments

Technological Integration Innovation

- ✓ AI and Autonomous Navigation
- ✓ Tactical Information Systems Integration

Strategic Value in Defence and Disaster Response

- Bridges the operational gap between helicopters and drones, offering a new vector of tactical mobility.
- Reduces human risk without sacrificing payload capacity or mission adaptability.
- Supports logistics, CASEVAC, ISR, SaR, EW, and special operations at significantly lower costs than traditional alternatives.
- Well-suited to conflict zones and disaster response, aligned with CL3-2025-01-DRS-04 priorities.