# Collaris

**COLL**aborative network on unmanned **AeRI**al **S**ystems

# 2030 horizon for drones
## in civil protection and crisis management activities

COLLARIS is a multidisciplinary Network focused on Unmanned Aerial Systems (UAS). In line with the Union Civil Protection Knowledge Network objectives it brings together civil protection and crisis management stakeholders – both individuals and institutions who use their competences and experience to build and share knowledge, expertise and skills.

COLLARIS carried out a study on upcoming near-term innovations that will re-shape use of drones in the blue light sector: "2030 horizon for drones in civil protection and crisis management activities".

This leaflet contains key findings and recommendations.

**COLLARIS partner organisations:**

# Key findings and recommendations

The rapid development of drone technology represents a fantastic opportunity for first responders and crisis management professionals for better reconnaissance, increased situational awareness, improved coordination of activities as well as growing number of direct, physical actions.

> *Drones indisputably offer a very substantial potential for increasing efficiency of civil protection activities, however even as technology is developing fast, there is and will be a continuously existing gap between the recently created technical capabilities and the operational practices of civil protection not utilising them yet. Understanding new capabilities, assessing and experiencing their usefulness, identifying the way to optimally utilise them, arranging operational procedures and practices of regular use – these are only some of the challenges faced by civil protection users around the world. At the same time this effort need not to be conducted separately by different institutions – there is a clear added value of sharing experiences and learning from others. This was the underlying assumption for establishing the COLLARIS Network.*

During the course of the Network activities various representatives of the civil protection and crisis management community helped to elaborate and clearly endorsed the following general observation.

**Finding 1**   **While there is a high number of drone solutions that has already achieved technical maturity, today only a relatively small fraction of available capabilities is used operationally for rescue and crisis management. Effective use of drones is limited mainly by legal and organisational obstacles and not by pace of technology development. As a significant number of innovative solutions will become available within the coming 5 years, this gap will grow unless those impediments are properly addressed.**

The purpose of this report is to provide an overview of the use of drones in rescue and civil protection operations that can become reality before 2030. The report presents a brief description of 22 selected use cases and identifies non-technical enablers required for real operational use of these existing or upcoming capabilities.

During the coming 5 years drones will more often be able to conduct longer-range operations (beyond visual control of a pilot) effectively and safely. Their uses will expand from "flying eyes", which they are mainly today, to "flying robots" capable to conduct variety of different tasks. Increase in automatisation and autonomy will decrease effort required from pilot and more often it will be enough to task (define objectives of expected action) and not manually control all activities. Intelligent data analysis, including use of machine learning and AI, will significantly improve efficiency of reconnaissance and monitoring activities.

As a result of maturation of technology a variety of new applications will become possible. The report identifies three main groups of use cases and two supplementary ones.

"First on scene" are situations when drones can reach emergency site before arrival of first teams of responders. They will provide early reconnaissance, will be able to deliver aid equipment and in some cases may warn people about imminent danger.

"First 2 hours" cover drone support for typical response activities. Drones will provide effective information support with minimal effort from early responders and information will be easily and

rapidly available in the form of maps and 3D models. Simultaneous flights of multiple drones will be safe and coordinated, including coordination between different responding services.

"Complex operations" reflect large operations where common information environment will enable efficient analysis and sharing of drone information between all stakeholders involved (if one sees something, all can see it). Efficient coordination of flights will enable simultaneous use of drones and human-operated aviation.

Furthermore, monitoring of threats will be conducted more effectively with drones enabling rapid verification of situation, from a safe distance and with semi-automatic detection of significant information (e.g. presence of water, fire or change detection). Operations ensuring safety of public events will also benefit as drones will be able to fly safely over people providing more effective visual and CBRN monitoring.

As stated before, wide variety of promising applications demonstrate large potential of drone solutions to contribute to increasing efficiency of crisis operations. However, it is not availability of technical solutions but legal and organisational obstacles that represent today the main impediment for wider implementation of drone solutions.

The key enabler is ensuring safety of drone flights, taking into account both safety of people on the ground and avoiding collisions in the air. **Implementation of air traffic management solutions enabling safe drone flights will be the most significant factor increasing their use for rescue and crisis management.** Finding 2

**There is a universally recognised necessity for more effective communicating of civil protection needs to SESAR Joint Undertaking and EASA – institutions responsible for definition of current and future air traffic management.** Recommendation 1

It is critically important to enable simultaneous flights of both human-operated aviation and drones. Establishment of the universally recognised "blue light flight" status would be highly beneficial. Currently defined future U-space architecture needs to offer specific functionalities for "blue light flights", in particular recognition of their priority, including rapid processing and ensuring optimal trajectories. There is a need for more flexible SORA standards applicable for "blue light flights". There is also a need for universally recognised method of indicating ongoing rescue or crisis operation to third-party VLOS pilots.

Beyond issues related to air traffic management, it is institutional readiness of users that hinders uptake of innovative capabilities into rescue and crisis management operations. **Majority of civil protection stakeholders has insufficient organisational arrangements and know-how for widespread and fully efficient use of drones in their activities.** Finding 3

To ensure efficient use of drone solutions there is a need for establishment of an appropriate organisational ecosystem. It must include standard operational procedures for use of drones. Arrangements for coordination of complex drone operations must be implemented, including cooperation with national air traffic management agencies. There is a need for appropriate training system addressing not only pilots, but also commanders and analytical personnel. An important element is also establishment of GIS systems and appropriate procedures for data processing, sharing between all stakeholders, and their inclusion into analytical and command processes.

**Recommendation 2** Addressing those challenge may be significantly facilitated by cooperation between institutions in exchanging experiences and sharing relevant know-how. For this purpose **establishment of the "Observatory of best practices of use of drones" should be considered.**

The Observatory would gather and share information about preoperational and operational implementation of drones in specific use cases as well as national practices related to all organisational aspects mentioned above. Additional aspect of the Observatory activities would be promoting European interoperability, in particular related to use of drones and exchange of drone-derived data during operations of UCPM modules

**Recommendation 3** The efficient introduction of innovative solutions requires demonstrations, technology validations and pilot implementations. Undertaking such activities always represents a significant challenge and it is also the case for uniformed services. Therefore, **there is a high need to establish an ecosystem supporting introduction of innovative uses of drones**, bringing together the scientific community and crisis management practitioners to enable effective transfer of knowledge, sharing experience and peer-to-peer learning.

The mechanism should include three main forms of support, depending on the needs of users and the level of their technical and organizational capability to absorb innovation. It should be able to: provide the competencies, know-how and knowledge needed for preparation and conduct of pilot activities; organize or help to organize Trials – experiments demonstrating operational usefulness of new solutions, evaluating their benefits and eliminating identified weak points; and support conduct of pilot activities aimed at confirming over longer time systemic benefits of a new solution and/or procedure.

The mechanism should operate in synergy with the Observatory (recommendation 2). It should be flexible enough to support both "pathfinding users" and assist the "second wave" followers. It should also support the uptake of results of EU-funded development activities, in particular Horizon projects.

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