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Remotely Piloted Aircraft Systems (RPAS) workshop for Civil Protection experts

Borschette Centre, Brussels - 21 – 22 January 2016

Final Report

Executive Summary

On 21-22 January 2016, DG ECHO.A5 organised a workshop for experts from participating States of the Union Civil Protection Mechanism (UCPM) to discuss the main challenges for the use of RPAS in disaster management, in particular their deployment in the context of the UCPM. The workshop was attended by over seventy participants including delegates from civil protection authorities of 21 participating States, and specialists from European and national institutions, rescue, emergency and humanitarian organisations, technology centres, service providers, research institutes and industry.



The workshop tackled the regulatory, operational and strategic dimension of the use of RPAS for disaster management, bringing together contributions and opinions of world-renowned experts on the different challenges that the civil protection community must tackle to ensure an effective use and deployment of RPAS in support of UCPM missions. In preparation of the workshop DG

ECHO.A5 distributed questionnaires to national delegates, through which participating States were invited to report on their national situation and to express their vision on the different challenges. Under the chairmanship of DG ECHO.A5 and with the support of the experts, national delegates had the opportunity to deepen their knowledge of the different facets of the issues related to the use of RPAS in disaster management, and discuss proposals for the way ahead.

At the end of the workshop, DG ECHO.A5 proposed a set of actionable proposals for follow up, which are detailed in this report.

Background

In a world in which disaster risks are becoming more and more unpredictable and more frequent, the use of RPAS has proved effective in improving capacities for data and imagery collection to support better decision making for response in the midst of emergencies and crisis, particularly in dangerous and life-threatening situation, when situation awareness from land is limited, or when operational conditions do not allow the deployment of any other systems.

At the Civil Protection Committee of March 2015, national delegates supported the deployment of RPAS in UCPM mission, referring to benefits in terms of cost-efficiency and effectiveness and voicing their interest for using them in a close future. Positive use cases in disaster management, including two deployments in UCPM missions, indicate scenarios where the use of RPAS is appropriate, but consensus has to be built on their technical and operational requirements prior to their possible integration in the European Emergency Response Capacity (EERC) to ensure a more effective and structured deployment in UCPM missions.

Today several actors are working to support the take-up of RPAS. The European Commission has put forward a legislative proposal to be adopted by the end of 2017, and is funding several projects and initiatives. The European Emergency Number association has issued a white paper framing the use of RPAS made by the emergency services, coping with the regulatory, operational, technical, safety and privacy angle. The UAViators network has developed a code of conduct for the use of RPAS in humanitarian situations, gathered best practices and lessons learnt and created a directory of UAV regulations of different countries. Several research projects are proving technologies and concepts for the operation of RPAS in disaster management.

The workshop took stock of the discussions ongoing in different fora and of the latest developments of ongoing initiatives at national, European and world level in order to inform participant States' delegates and agree on the way forward.

Workshop structure

Since the first civilian applications, technological development of RPAS and possible applications in different sectors have quickly evolved and expanded, posing challenges touching legislation, operations, business models, research, technology and ethics. The workshop was articulated along three sessions dealing with the primary challenges to use and deploy RPAS in disaster management.

1. Regulatory session: covering aspects enabling a safe, rapid, legal, effective and efficient deployment of RPAS across the EU and, to the possible extent, outside the EU.
2. Operational and technical session: discussing the concept of operation and the requirements of RPAS in the context of UCPM missions.

3. Strategic session: discussing business and operating models, ethical aspects, and the mutualisation of military assets.

Regulatory aspects of use of RPAS for disaster management

In case of an activation of the UCPM, the current fragmented and insufficient European regulatory framework for RPAS would be a hindrance to their deployment and operation Europe-wide.

The development of regulation, technology and standards for RPAS is underway. The **new regulation** on common rules in the field of civil aviation safety to be adopted by the end of 2017 proposed by the European Commission aims to simplify the current European picture. The European Aviation Safety Agency (EASA) has identified different risk-based categories of operation and proposed to standardise activities to simplify the procedures for RPAS use.

Today it is essential to know regulations in force in the stricken countries to ensure that the deployed capabilities comply with local requirements. To enable the flight of RPAS in countries other than the country of origin, EUROCONTROL has proposed the creation of an "RPAS passport", a mutual agreement between countries to recognise regulatory, technical and operational requirements. To ensure that participating States can access the mapping of existing national regulations, to the EU-funded "DRONERULES.eu" project, whose aim is to become the reference resource in Europe for RPAS rules and regulations and related matters, can represent a resourceful tool. Starting from May 2016, it will collect country-specific information on RPAS rules and regulations including contact details and documents needed to be used for flight operation.

Conclusions

- An **overview of national regulations** in place covering aspects related to the operation of RPAS in a UCPM mission is needed to understand the extent to which RPAS can be timely and effectively deployed. The project "DRONERULES.eu" can provide an overview of the existing national RPAS regulatory landscape. However, it is of paramount importance to focus on those regulatory aspects and national procedures in place relevant for disaster management purposes, covering special procedures in place. For the purposes of supporting UCPM missions, the relevant regulatory elements per country could be part of the "Civil Protection EU Vademecum".
- For the civil protection community it is important to **exploit synergies with the current RPAS European legislative process**. Regulatory aspects enabling RPAS operations in disaster management need to be assessed with the competent services of the European Commission. The feasibility of a Europe-wide fast-track for RPAS operation by emergency services is one among them.
- The **exchange of good practices** in the use of RPAS for disaster management related to governance and operational aspects is encouraged among participating States. The annual work programme for Prevention and Preparedness represents an opportunity to support the exchange.

Operational and technical aspects of use of RPAS for disaster management

In a disaster context, RPAS are beneficial to gather information through optical, electro-optical, infrared, thermal and other sensors. At **strategic level**, they can gather data to be used to provide

information at decision-making level in support of the assessment phase. For example to determine what are the consequences of a major disaster and what assistance is needed. At **tactical level**, when targeted intervention is crucial or lives of victims and rescuers are at risk in emergency situations, they can provide essential information to take better, faster and safer decisions increasing the impact of operations. For example, in a disaster scenario RPAS can support the determination of when and where to send which team or operator, and how to provide specific assistance.

However, without good **information management**, that is, prioritisation of data collected and a robust analytical system, RPAS will not improve disaster response. For instance during the initial rapid assessment after a disaster, RPAS can record videos and images, but the more the data collected, the greater the capacity needed to analyse and turn it into information to take decisions. In this respect, live-streaming during an emergency operation and an analysis group processing images in real-time can provide timely intelligence to the operations command.

The session showcased several undergoing **activities at European and national level** using RPAS in support of disaster management. The European Commission Joint Research Centre is running a pilot project using RPAS together with satellite imagery for rapid mapping for post-disaster recovery and reconstruction needs assessment. Other EU-funded projects focus cover different aspects of the use of RPAS in disaster management: interoperability and integration of the RPAS in the standard toolkit of search and rescue teams (ICARUS); development of a situation awareness toolbox for the management of crisis over wide area taking based on a set of RPAS, balloons and satellites (AIRBEAM); development of a generic ground station to orchestrate operations of diverse unmanned vehicles (DARIUS); use of RPAS applied to alpine search and rescue (SHERPA); use of RPAS for handling marine incidents (BERISUAS). Participating States' delegates also reported on RPAS uses in civil protection. There are applications it in support of fire-fighting situation, both urban and non-urban, for small and large scale fires, day and night, including the monitoring of controlled burning or hot spots post forest fires and moorland fires. Use cases illustrated at the workshop include also application for situational awareness in post-storm or post-earthquake scenarios, flooding, industrial pollution, hazmat leaks, inspection of unsafe structures including collapsed buildings, gas explosions, water incidents including mud and ice, urban and wide-area search and rescue, and CBRN incidents. Several examples suggest that the use of RPAS is better suited for **situation awareness** - for instance structural inspection and damage assessment tasks - instead of victim search.

In view of an effective integration of RPAS into the EERC as other response capacity, the workshop had the ambition to set quality and interoperability requirements covering also the integration with other assets and modules available to the UCPM. In order to define requirements, given the broad range of applications, capabilities and scenarios, DG ECHO.A5 asked participating States to prioritise them via a questionnaire. However, the discussion showed that the definition of the RPAS platform, its features - including the payload - and operational requirements strongly depend on the **mission profile**. A more thorough discussion on requirements needs to take place to define requirements.

Also, the session aimed to outline some basic **principles of deployment and operations** of RPAS in disaster management, which can be summarised with the following set of recommendations:

- It is crucial to dialogue with local authorities and to get the necessary **permissions** for the introduction of the RPAS in the country, for its operation and for the use of radio-frequencies as soon as the decision of deploying an RPAS is taken.

- The status of "**state aircraft**" for an RPAS operation is possible if the necessary authorisations are released. To this extent, prior to deploying and RPAS in any country and to avoid major problems and delays linked to regulatory barriers, it is crucial to prepare all necessary documents including technical handbook, safety handbook, operational handbook, proof of insurance, and export documents.
- **Risk assessment** and **risk management** are essential components of the preparation of RPAS missions. In particular, risks linked to the interaction with other disaster management activities must be clearly assessed and mitigated to avoid jeopardising them. In particular, **de-conflicting with manned or other unmanned aircraft** during a disaster response is a big issue, as RPAS represent a severe hazard to, for example, helicopters and water-bombers. The fly-zone coordination aspect is hence imperative as RPAS must not share the same airspace of other aircrafts within the same timeframe.
- **Resilience** and **autonomy** are important. Flying conditions could be extreme, increasing the risk of failure and accident. Power or data connection could not be widely available during deployments. GPS signal and data link could be easily lost during operations. RPAS could be easily damaged during an emergency operation and spare parts are needed for continuity of operation's sake.
- RPAS **pilots** need to be specially trained and certified to operate in disaster scenarios,. Flexibility, resistance to stress, capability to fly in difficult environment are crucial. Also, given the large amount of stress for pilots, RPAS units should be manned with enough pilots to guarantee sufficient time for rest.
- Establishing a **data policy** for the collected imagery is important to avoid incurring into ethical and data protection issues. Collected material might need to be ruggedized. A chain of custody policy is critical as it is impossible to predict how the data will be used later.

The Code of Conduct developed by the UAViators network, which aims to inform the safe, coordinated and effective use of RPAS in a wide range of humanitarian settings, contains guidelines that could also be applicable to civil protection operations.

Conclusions

- DG ECHO.A5 and participant States should reflect on most likely RPAS uses in UCPM missions, so to assess pragmatically which applications are most needed. The **support of assessment missions of the EU Civil Protection team** for situation awareness is an area where the benefits of the use of RPAS are tangible and feasible, thus it will be the first application to focus on. To support the registration of RPAS units for assessment missions in the EERC, DG ECHO.A5 will prepare a proposal for quality and interoperability requirement to be discussed with participating States experts in the relevant forum.
- Participant States are invited to check whether **existing RPAS units are available** and could be committed to the EERC.
- For all future UCPM missions, the European Response Coordination Centre (ERCC) will systematically **consider the need to include a RPAS unit** in the mission.

- RPAS units need to be introduced in future **training and exercises**, both at European and national level.

Strategic aspects of use of RPAS for disaster management

Today there is no clear **business case** suggesting whether RPAS should be rather assets owned, leased, or services should be purchased from services providers when needed. In some places, it is critical to have experience on the emergency operation, which only trained specialised personnel has, in order to be able to operate a RPAS. For other less critical operations, hiring an external operator would be useful. Other cases also exist: authorities can procure RPAS and outsource their operation and management. The mission and its circumstances define the operational model.

Potential partnerships with other organisations were also investigated. By the end of 2016 the **European Maritime Safety Agency (EMSA)** will have developed multipurpose RPAS services for maritime surveillance focussed on three cases: emission monitoring, pollution monitoring and detecting and general surveillance. Procured services may also be of interest for particular civil protection missions. Further analysis of the potential of the EMSA capacity for the UCPM is needed.

Finally, the session looked into **mutualisation of RPAS**, that is, the use of military RPAS for civilian purposes. The EU Military Staff (EUMS) within the CSDP framework has developed a list of situations/scenarios for Medium Altitude Long Endurance (MALE) RPAS development, opening also to disaster relief. Also at participating States' level there have been cases of mutualisation of RPAS for disaster management purposes.

Conclusions

- The potential for a **partnership with EMSA** to use the upcoming RPAS services needs to be further assessed in relation to the possible scenarios and missions relevant to the civil protection community.
- The **dialogue with military actors** both at national and European level needs to be maintained to explore future potential synergies.