



COLLaborative network on unmanned **AeR**ial **S**ystems

MEETING REPORT

COLLARIS' Second Plenary Meeting

Skövde, Sweden | May 24, 2024

Background

The COLLARIS project is financed by the European Commission through the DG ECHO Union Civil Protection Knowledge Network. Its goal is to establish a multidisciplinary network focused on Unmanned Aerial Systems (UAS) to connect, share, and grow knowledge among European actors.

This report is about COLLARIS' second Plenary Meeting (PM) which took place after a trial with live and virtual simulations held in Skövde, Sweden on May 22 and 23, 2024. The meeting introduced the main objectives of the project, and an expert workshop gathered the key benefits and biggest challenges of drone use within emergency response. The PM was attended by the Strategic Group members (representatives of core consortium partners, and associated partners from Sweden and Norway) as well as other participants from Sweden, Denmark, Croatia and Portugal.

Core partners

CBK PAN (PL), Entente Valabre (FR), MSB (SE), DCNA (AT), KIOS (CY)

Project duration

01/2023 – 12/2024

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- the UCPKN platform
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COLLARIS partner organizations:



1. Background Context and Scope of the Plenary Meeting

Like the first COLLARIS Plenary Meeting (PM) held in September 2023, the main objective of the second PM was to promote the project activities and maximize the impact of achieved results. The meeting was also used to discuss challenges and opportunities of the use of UAS in emergency management, and to give an idea of what the coming years might (and should) bring. The second PM took place on May 24, 2024, after a COLLARIS trial with live simulation and virtual simulation exercises for emergency management, focusing on the use of UAS (Unmanned Aerial Systems). The trial was held at the Hasslum training grounds in Skövde, Sweden on May 22 and 23, 2024.

The focus of the trial was to address the challenges of UAS use on the multi-agency managerial level and to explore the supplemental values and possibilities of different training and exercise formats (i.e., live simulation, conducted in the morning of both trial days, and virtual simulation, conducted in the afternoons). The scenarios of the trial were designed to necessitate the use of several UAS and thereby enhance training related to air traffic management (ATM), safety, and collaboration between the different organizations involved. The evaluation focused on how the challenges related to use of UAS were addressed in the two training formats.

The scenario of the live simulation was a fire in an apartment, necessitating the deployment of several first responders from different organizations. This exercise focused on grey area problems and handling unexploded ordnance (UXO). In the afternoon, the focus shifted to a war/grey zone scenario, with a virtual scenario in XVR created by Cecilia Wijkmark Hammar (MSB). The scenario involved a terrorist attack and the release of a gang criminal at Skövde Hospital.

The trial was planned and conducted by MSB in collaboration with the Fire and Rescue Service Skaraborg (RS), the Region of Västra Götaland (RVG), and the Swedish Police. It was integrated into annual live simulation exercises. Three teams of firefighters, their team leaders (incident commander level one), the commanders at levels two and three, as well as police and EMS personnel, participated in these exercises. By integrating the COLLARIS trial into this annual exercise, the trial took place within the live simulation exercise and also added a virtual simulation exercise. Additionally, COLLARIS and RS collaborated with the RVG-led project Previs 2 which is exploring the use of first responder UAS. In the trial, the Previs 2 first responder UAS arrived first on scene. The EMS participated with several ambulances with crews, managers and an EMS helicopter. The Swedish Police participated with their local police crews, officers, and UAS resources. The trial is subject to a separate report (D6.2) where it is described in detail.

The Plenary Meeting after the trial was attended by members of COLLARIS' Strategic Group (representatives of core consortium partners: CIK CBK, MSB, DCNA and VALABRE, except for KIOS due to other urgent commitments, as well as the Swedish Police and the Western Norway University of Applied Sciences (HVL) as COLLARIS' associated partners). Other participants included representatives of the Södra Älvsborg Rescue Service Association (SÄRF) from Sweden, the Fire and Rescue Service Skaraborg (RS) from Sweden, the Södertörn Fire Protection Association (SBFF) from Sweden, the Danish Emergency Management Agency (DEMA), as well as the Croatian Directorate of Civil Protection and the National Firefighters School of Portugal (ENB).

The Plenary Meeting started with opening remarks from Pär Hagbohm (RS) and Cecilia Wijkmark Hammar (MSB) and was divided into two separate sessions. The first part consisted of two presentations on the COLLARIS project – its thematic lines, activities, expected outputs and the small-scale foresight study conducted within the project (see D3.3) – as well as a presentation on using drones for hazard detection and for improving safety. The second part of the Plenary Meeting was a UAS expert network workshop. During

this workshop, participants were invited to answer the following questions: What is the main added value of using drones in your organization (now and in 3-5 years?) What are the biggest challenges/obstacles you face (now and in 3-5 years)? After the presentations, the speakers were asked to provide feedback on the aforementioned foresight study and reminded that expressing problems in terms of drone use in emergency management is crucial in order to ensure improvement in EU regulations. Details of each intervention and resulting discussions are described in the following sections of this report.



Fig. 1: Live and virtual simulation exercises during the first trial day in Skövde.

2. Session I: COLLARIS Network and foresight study

2.1 COLLARIS general presentation: Anna Kobierzycka – Crisis Information Centre, CBK PAN (POL)

In her opening presentation, Anna Kobierzycka from CIK CBK (the COLLARIS project coordinator) focused on the six thematic lines of the project:

- operational procedures, lessons learnt and best practices using UAS
- air traffic management challenges, solutions and operational practices
- solutions for data analysis and data sharing
- auxiliary support systems (e.g. databases, simulators)
- development of methods of increasing end-users' competences
- small foresight study of new developments and future use case scenarios

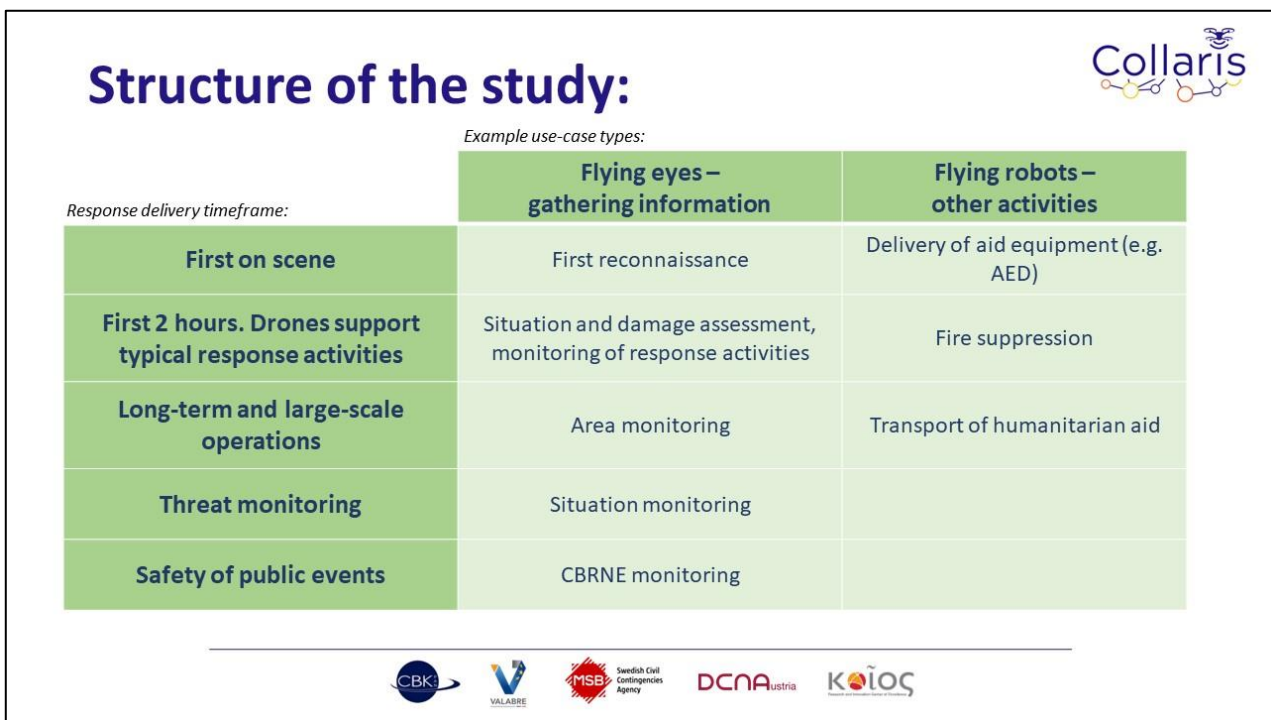
She also presented the activities within the network (trials, the small foresight study, thematic workshops and webinars, amongst others) and the expected outputs of the project. Furthermore, the next steps and activities planned within COLLARIS were presented, with particular emphasis on COLLARIS' participation in the Union Civil Protection Forum in Brussels and the presentation of the small foresight study at the CERIS Annual DRS Event (both in June 2024) as well as the remaining three trials (one in Austria in mid-June 2024, one in Cyprus in September 2024 and the final one in Poland in October 2024). The participants of the PM

were invited to join whenever possible and to stay up to date about the project activities through following COLLARIS’ social media accounts and its news stories on the UCPKN platform.

2.2 COLLARIS’ small-scale foresight study: Jakub Ryzenko – Crisis Information Centre, CBK PAN (POL)

Jakub Ryzenko from CIK CBK spoke about the “2030 horizon for drones in civil protection activities”, i.e., the small foresight study conducted within the project – in particular, the study’s goals and structure as well as its findings and respective recommendations. The study is subject to a separate report (D3.3) where it is described in detail.

The main goal of the study is to introduce the potential areas of application and relevant technologies for drones in civil protection before 2030, and to discuss key enablers for operational implementation. In terms of structure, the study divides the use of drones in different delivery timeframes (i.e., using drones first on scene, within the first two hours after an incident, for long-term and large-scale operations, for threat monitoring and for the safety of public events) and in two main use-case types (i.e., using drones as “flying eyes” for gathering information, and using drones as “flying robots” for other activities such as the delivery of aid, fire suppression etc).



Structure of the study:

Example use-case types:

<i>Response delivery timeframe:</i>	Flying eyes – gathering information	Flying robots – other activities
First on scene	First reconnaissance	Delivery of aid equipment (e.g. AED)
First 2 hours. Drones support typical response activities	Situation and damage assessment, monitoring of response activities	Fire suppression
Long-term and large-scale operations	Area monitoring	Transport of humanitarian aid
Threat monitoring	Situation monitoring	
Safety of public events	CBRNE monitoring	

Logos at the bottom: CBK, VALABRE, MSB Swedish Civil Contingencies Agency, DCNA Austria, KOLOS

Fig. 2: A slide showing the structure of the small foresight study conducted within the COLLARIS project.

In his presentation, Jakub Ryzenko explained that – in the coming years – drones could more and more be used **first on scene** (before a team of first responders arrives) and, thus, enable sending resources such as a defibrillator, a survival pack for people stranded in the mountains etc. Using loudspeakers and/or microphones, drones could also be deployed for population warning (for instance, during rapidly moving fires) or for communicating with people while help is on the way. According to the study, the key enablers for these uses to become possible in reality are:

- The ability to conduct BVLOS flights – where the drone is operated beyond the direct line of sight of the pilot
- Priority for “blue-light flights”
- Rapid clearance for flights (<2 minutes)

When it comes to using drones within the **first two hours** after an incident (for supporting response activities), some of the use-cases are already being implemented. However, they are expected to become more advanced and efficient in the coming years. Typical use cases in this timeframe include situation/damage assessment, SAR operations, chemical detection (using drones as “flying noses” which is not very common yet), fire suppression, transport of specialized equipment/vehicles etc. The identified enablers for using drones like this are:

Air traffic management:

- Priority for “blue-light flights” (including effective priority in VLOS flights – where the pilot has visual contact with the drone throughout the entire flight)
- Rapid establishment of air traffic restrictions (DRAR, restricted zone for aviation)
- Coordination of drone flights

Arrangements for effective use of drone data in response coordination:

- Operational practices (including dedicated staff position for drone/aerial operations coordination)
- Incident commanders training (ability to request relevant information)
- GIS systems prepared for drone-derived data

For **long-term and large-scale operations** that go beyond typical response activities, drones open additional possibilities in terms of monitoring an affected area (e.g., change detection, detection of looting), transport (e.g., humanitarian aid, rescue logistics) and evacuation efforts. Identified enablers for these uses are:

- Coordination of drone and human-operated aviation flights (dedicated to emergency response)
- Implementation of IT systems for data access and data sharing among civil protection users

In addition, Jakub Ryzenko also talked about the use of drones for **threat monitoring** before a crisis (e.g., for monitoring flooded dykes, smoke in very dry forests, or critical infrastructure) which is not common yet and for enhancing the **safety of public events**. As of today, flying drones over the heads of people is not common as the risk for drone failure is too high. This use-case, thus, still requires technology that ensures high safety.

General enablers for emergency-related drone use that were identified in COLLARIS’ foresight study are:

- Public acceptance (e.g., in terms of noise)
- Privacy and data security (since a lot of sensitive information is involved in these operations)
- Resilience to GNSS distortion (at the moment, all drones for civilian use – other than for military use – depend on GPS etc.)
- Specialised training (including [virtual] simulation)

The presentation ended with a summary of **general challenges** identified during the end-user workshop that was conducted for the foresight study, for instance, the fact that only a fraction of capabilities of drone technology is used operationally. A number of support activities might improve the situation, e.g., conducting trials and actively representing civil protection needs in the process of developing U-space¹ and European legal regulations for drones.

The main finding of the foresight study is that the **effective use of drones is mainly limited by legal and organisational issues, not technical matters**. Thus, the implementation of ATM solutions enabling safe drone flights will be the most significant factor increasing use of drones for rescue and crisis management. Another finding is that most civil protection stakeholders do not have sufficient organisational arrangements and

¹ “U-space” is a set of new services and specific procedures designed to support safe, efficient and secure access to airspace for large numbers of drones. The European Commission has published the U-space regulatory framework (EU 2021/664) to kick-off implementation of U-space.

know-how for widespread and fully efficient use of drones yet. Therefore, one of the recommendations of the foresight study is the establishment of an “Observatory of best practices of use of drones”, possibly conducted by the COLLARIS Network.

2.3 IEDO and Aerobotics7: Stefan Haggö – Swedish Civil Contingencies Agency, MSB (SWE)

Stefan Haggö (who is an executive officer for technology and development at MSB) shared his experience at the IEDO CONF 2022 in Paris, an emergency robotic conference organized by [IEDO](#) (the International Emergency Drone Organization). At the conference, several innovative approaches in drone use were presented – for instance, officers from Texas shared their solution for using drones in CBRNE incidents and how drones can improve the safety of fire fighters. Besides that, a method for detecting radioactive material through drones was presented as well as an approach for air monitoring in confined spaces (having drones fly inside instead of letting fire fighters enter a potentially dangerous building). Drones can also be helpful in creating a better breathing environment for victims in a burning house by creating airflow, and for assessing the risk of fires in propane facilities.

In the second part of his presentation, Stefan Haggö focused on how drones can be used to identify landmines and ERW, and introduced the PM participants to [Aerobotics7](#) which develops an autonomous AI-powered platform (EAGLE A7) for threat detection and neutralization. This American company aims to be faster, more accurate, and safer than traditional approaches as it usually takes a very long time to detect, locate and clear mines. For instance, it took almost 40 years to clear the landmines that were laid during the ten-week Falklands War in 1982.² A7 is at TRL6 level and needs more tests to value its accuracy of detections. It is possible to use the Aerobotics7 system in Europe (or Ukraine) to make new tests, but its needs clearance as it is classified as war material.



Fig. 3: The break after the first part of the PM was used for a drone-group photo of all participants.

² <https://www.bbc.com/news/uk-wales-54894171>

3. Session II: UAS Expert Network Workshop

3.1 Marcus Aronsson – Södra Älvsborg Rescue Service Association, SÄRF (SWE)

At the beginning of the second part of the PM, a UAS expert workshop, Marcus Aronsson from the Södra Älvsborg Rescue Service Association (SÄRF) invited the speakers to share their thoughts on the **value of drones** in their respective organizations and the kinds of **challenges/obstacles** they face. SÄRF uses drones as often as possible, not just for common UAS missions such as building fires, forest fires, and chemical accidents. SÄRF has found that drones are very useful even in everyday accidents, e.g., to check whether a fire alarm in a building is triggered randomly or not, to identify and search for the source in the event of an oil spill, and to search for people on railroad tracks. This requires the drone to be on the first responding vehicle so that it is available at an early stage.

The biggest challenges for the coming years identified by SÄRF are the implementation of 2D/3D mapping as well as airspace coordination (e.g., when drones are also used by the police). Another challenge is the identification of unexploded ammunition and the execution of BVLOS flights.

3.2 Rasmus Frid – Fire and Rescue Service Skaraborg, RS (SWE)

Rasmus Frid who is a fire protection engineer and fire incident commander at the Fire and Rescue Service Skaraborg (RS) talked about the use of drones as part of the method to puncture gas cylinders in a fire by shooting at them with a rifle (most other participants of the PM had never heard of this method before). The idea behind it is to increase safety, and to avoid long shutdown-times because the cylinders would pose a threat if no action was taken. A video was shown to explain how the method works: The drone flies above the cylinder providing light for the shooter. Furthermore, the drone's thermal camera is used to see where the bullet will hit as well as sound to convey warning information for potential surrounding people.

In the future, RS would like to see more drone technology that is affordable (for instance, to detect UXO), more simple equipment for local fire departments and more resources for drone organization within fire departments.

3.3 Magnus Mikkelsen – Danish Emergency Management Agency, DEMA (DEN)

In his presentation, Magnus Mikkelsen from the Danish Emergency Management Agency College pointed out that DEMA has been using drones since approx. 2015 and that within their education for crew commanders and incident commanders for fire brigades, drone pilots are seen as service providers – especially in fire, HazMat and rescue operations. However, in search missions, for example, drones get to be more of a self-sufficient unit. DEMA considers drones as a support and validation tool for incident commanders, in order to improve their decision making. In the coming years, DEMA hopes to see quicker, easier, more precise and cheaper drone technology as well as more CBRNE sensors integrated in existing systems. Furthermore, AI-powered drones (“somewhat thinking for themselves”) are seen as a potentially huge step forward.

Since DEMA is part of the Danish Defence, one of its main challenges is not using drone equipment coming from China (DJI³ products, for instance, are de facto banned within DEMA). Thus, DEMA will start using drones built by a Danish company soon. Another challenge is keeping the interest in drones: “Our leaders need to be constantly shown the effects and added value of drones. They need to be given the idea that drones are

³ DJI accounts for a large amount of the world's consumer drone market and its products have also been used by military and police forces. However, the company has drawn concerns over privacy and security.

an important tool.” Keeping drone pilots up-to-date in terms of new technology is also important – pilots should not just fly the drones and get fairly familiar with their cameras etc., but become experts with these tools. Another challenge is that most fire-fighters in Denmark work part-time, and it is therefore hard to keep up with new technology and training.

Besides that, the “bucket training” method developed by NIST (the US National Institute of Standards and Technology) for training drone pilots with buckets and geometrical patterns was presented. This method can be used to improve accuracy and to control the skills of the drone pilots of a particular emergency organization. Using this method, DEMA has developed a test and training facility for drones. Furthermore, DEMA’s three-year project “Drones in SAR”⁴ was presented which resulted in a textbook and action cards on how to use drones when searching for missing people.



Fig. 4: A short introduction to the new drone training facility at the DEMA College.

3.4 Rickard Henningsson - Swedish Police (SWE)

Rickard Henningsson (Accountable and Flight Operations Manager for the Swedish Police) pointed out that over the last few years, drones have been rolled out in great scale and that they have become more and more important for carrying sensors (instead of helicopters carrying them). Approx. 1 percent of the force (350+ people) are drone pilots which is a lot compared to other countries. In 2023, the Swedish Police conducted approx. 14.000 individual drone missions (compared to less than 800 in 2000) with approx. 10.500 hours of airtime. BVLOS flights make up only a very small part of the flights, mainly because of air space regulations and because the Swedish Police is using quadcopters. 70 percent of flights are operational, 30 percent are for training only. The Swedish Police values drones for improving officers’ safety – for instance, in the event of an ambush while responding to an alarm.

Addressing the issue of using/not using Chinese drone equipment, the path chosen by the Swedish Police is to slowly “fade out” the use. The problem, however, is that there is a lack of alternatives at a similar price

⁴ See this webinar: <https://www.youtube.com/watch?v=M283-orbmzU>

point (and quality). Therefore, the participants of the PM concluded that there is a need for clearly communicating what characteristics “Western” drones should have, and for providing more data on what drones are used for (not only on a national but also on a European level)⁵. For instance, in 2023, there were 65 SAR missions when a drone helped to find a missing person in Sweden alone.

At the moment, the Swedish Police is conducting tests with BVLOS operations (i.e., with eVTOLs and “Drone in a box”⁶). For instance, during the Eurovision Song Contest in Malmö in 2024, the Swedish Police used 8 of these boxes, in addition to manual teams and helicopters, with no accidents reported. Furthermore, the implementation of tethered systems (i.e., UAVs connected to the ground by a tether or cable) has started but the operational value for the Swedish Police seems small because of the dynamic situations the force has to deal with. However, these systems might be interesting for fire brigades. eVTOLs, on the other hand, could be interesting for border surveillance, SAR missions etc. – when the drone’s camera needs to be in the air for a long time and far away.

In sum, there is a paradigm shift in the use of drone technology – from analogue to fully digital. The main challenges for the Swedish Police are: all weather operations, air space availability, air coordination, air time, AI (including ethical questions, e.g., who is responsible in the event of an accident), funding, staff, and automated flying. All of these challenges are interconnected.

3.5 Jonas Fröjmark – Södertörn Fire Protection Association, SBFF (SWE)

SBFF has trained 12 drone pilots and conducted 150 UAS missions in 2023. In his presentation, Jonas Fröjmark acknowledged the many advantages of UAS – e.g., commanders making better decisions faster. However, these advantages are hard to quantify (e.g., how much time was saved in a particular incident). A method to calculate the efficiency of the use of drones would, thus, be very useful – also to secure more resources for drones. Besides that, “we feel that we only use 10 or 20 percent of the potential”. SBFF’s main challenge is having enough personnel: At the moment, only one pilot can respond to alarms. Ideally, there would be one person flying the UAV and another person observing.⁷ Another difficulty mentioned was finding a software platform to combine live streaming from drones, and having the possibility to save these videos to come back to later, as well as seeing where the drone is on a map and where pictures were taken (and from what angle). SBFF would also like to enable two-way communication between dispatch and the pilot while drawing on a map, and to have a non-American fleet management system (to monitor flights, flight hours, batteries, pilots etc.) because the currently used system comes with some data protection issues.

A discussion on the problem of illegal drone flights in restricted areas arose (e.g., private drones flying nearby during a rescue operation also using a drone) and there was a consensus that most of these flights do not have a criminal nature (e.g., criminals trying to track the police or drones being used for smuggling items into prisons). Rather, the participants agreed that many private pilots simply do not know (or ignore the fact) that they cannot fly everywhere, and that this phenomenon might become a bigger issue in the future. Rickard Henningsson from the Swedish Police commented that there are three types of rogue flights: flights conducted by curios, careless and criminal people. More information and legislation could help to fight the first two types, leaving more resources for the third type.

⁵ For its Rescue Services, Sweden has good data about drone use since sending a report to MSB after every incident is mandatory.

⁶ This term refers to an emerging form of autonomous UAV technology that uses self-contained landing “boxes.”

⁷ Magnus Mikkelsen from DEMA commented that their drone teams usually consist of two people – one pilot and one technician. However, both should be capable pilots so they can swap roles. He thinks that one pilot should fly no longer than two hours before swapping.

3.6 Kristjan Vuković – Civil Protection Directorate of Croatia (CRO)

Kristjan Vuković is an employee at the Ministry of the Interior, Civil Protection Directorate, working as the Head of the Operations and Analytics Service, which serves as the national contact point. Additionally, he performs the duties of a coordinator for remote pilots within the Civil Protection Directorate. Since the Civil Protection Directorate is responsible for locating missing persons through mobile device location requests made by the Police Directorate, in order to reduce the number of people involved in searches and speed up the search for a missing person, they wish to acquire an IMSI catcher (international mobile subscriber identity-catcher) to be able to find a missing person in areas without base stations. Additionally, the Civil Protection Directorate aims to procure a mobile vehicle equipped with a device for detecting unmanned aerial vehicles and remote pilots, as well as a radar to see all aircraft in the air. This way, the aircraft coordinator on site would have a better overview and ensure the safety of everyone in the field.

3.7 Marco Martins – National Fire School of Portugal, ENB (POR)

The PM ended with a presentation by Marco Martins (Director of the National Fire School of Portugal, ENB, who is also commander of the Óbidos Fire Department and a drone pilot). The main ENB center in Sintra (near Lisbon) specializes in training command staff, fire officers and trainer training, with a training center in Lousã (central Portugal), specializing in forest fires which represent the main use case for drones – 90 percent of drone flights are conducted for wildfire operations. In September this year, a project focused on fighting forest fires directly with drones will begin. There are specific training teams for forest firefighting missions and reconnaissance and evaluation missions, and two levels of training within ENB: a) for certification of pilots by the National Civil Aviation Authority, ANAC, and b) a practical training model of pilots (not yet implemented).

ENB's "wish list" in terms of drones is an operating standard, specific regulations for the use of drone equipment in civil protection missions, more training for pilots since there are many training opportunities that should be used more, as well as continuing the COLLARIS project.

4. Conclusions

Anna Kobierzycka from CIK CBK closed the PM by thanking all the participants for their input and expertise, invited them to participate in the upcoming trials and other project activities if possible and asked them to provide feedback on COLLARIS' foresight study. Jakub Ryzenko from CIK CBK reminded the group that expressing challenges in terms of drone use in emergency management is crucial in order to ensure improvement in EU regulations. The Plenary Meeting was deemed successful by its participants from Sweden and abroad who – apart from learning more about COLLARIS and the small-scale foresight study, and being able to discuss ATM issues – also appreciated the informal networking opportunities offered by the event.