MEETING REPORT

COLLARIS' First Plenary Meeting

Stalowa Wola, Poland | September 1, 2023

Background

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

This report is about COLLARIS' first Plenary Meeting which took place after the ATM Trial held in Stalowa Wola, Poland between August 30 and September 1, 2023, during a field exercise dedicated to flood response. The meeting was an important step for the network, setting the scene for the upcoming months and years. It was attended by the Strategic Group members (representatives of core consortium partners, and associated partners from Sweden, Poland and Finland) as well as other participants from Sweden and Poland.

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

Project duration
01/2023 – 12/2024

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1. Background Context and Scope of the Plenary Meeting

The main objective of the COLLARIS Plenary Meeting is to promote the project activities and maximize the impact of achieved results. The first Plenary Meeting took place on the 1st of September 2023, directly after the ATM Trial held in Stalowa Wola, Poland between 30.08. and 01.09.2023, during the Regional Crisis Management field exercise, *SW HCP 23,* dedicated to flood response.

The aim of the exercise was to test the ability of the Podkarpackie Province to respond to the arising flood, with the operational involvement of representatives of all emergency agencies and services.
A significant part of the activities was focused on evaluating the capabilities of the participating forces, although it also included space for inter-institutional alignment activities and testing of promising new technical solutions.

The special operational component of the exercise concerning the development of an optimal model for conducting drone operations (ATM Trial) during flood risk included two key elements. The first one was focused on testing the ability of drones to monitor the condition of embankments and detect damage symptoms (based on realistic means of simulating deformation of the embankment body, hydraulic punctures and seepage, as well as water stagnation resulting from them), carried out by UAV pilots from RZGW Rzeszów (Regional Water Management Authority in Rzeszów). The second element included the use of the FlyEye airframe, operated by the 3rd Subcarpathian Territorial Defense Brigade, to test the platform's suitability for detecting such incidents and its use in support of the activities of the State Fire Service, the Provincial Crisis Management Center and the RZGW. Since the activities were conducted by multiple aircraft, the Air Operations Manager was joined by a qualified Polish Air Navigation Services Agency (PANSA) controller. The conventional airspace management was mirrored into the Search&Help software (implemented by PANSA as the ATM solution for Rescue & Emergency Management institutions). The software, dedicated to the task of coordinating unmanned flights over the incident area, is currently in its test phase.

On the second day of operations, after the implementation of the field episodes, an additional TTX episode took place, during which Air Operation Manager and UAV pilots were able to practice an advanced scenario on flight coordination, including flights of manned aircraft. The ATM Trial is subject to a separate report (D5.1), where it is described in detail.

The Plenary Meeting after the exercise was attended by the Strategic Group members (representatives of core consortium partners: CIK CBK, MSB, DCNA and KIOS, with the exception of Valabre due to project travel budget constraints, and associated partners from the Swedish Police, the Polish Air Navigation Services Agency and the Ministry of the Interior of Finland). Other participants included representatives of the RISE Research Institutes of Sweden, the Södertörn Rescue Service from Sweden and Polish stakeholders involved in the ATM Trial: State Fire Service (Central Headquarters and several regions), Territorial Defence Forces, Regional Water Management Authorities, regional and district crisis management centres, National Police Headquarters.

The Plenary Meeting was divided into three separate sessions. The first part was focused on discussing the recent exercise from the perspective of the key actors involved in the activities – State Fire Service, Regional Water Management Authorities, Air Operation Coordinator, Polish Air Navigation Services Agency, Territorial Defence Forces. The second session was devoted to COLLARIS' ongoing and planned activities, preliminary thematic reports already available as well as the potential involvement of interested stakeholders in COLLARIS (like the questionnaire, feedback on analyses, participation in the upcoming trials etc.). During the last part of the Plenary Meeting, the invited guests from abroad were invited to share their reflections and

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observations about the ATM Trial and current use of drones for crisis management purposes in their respective countries. Details of each intervention and resulting discussions are described in the following sections of this report.

Fig. 1. COLLARIS Network team and invited guests visiting the SW HCP 2023 Exercise.

2. Session I: SW HCP 2023 Exercise and ATM Trial

2.1 State Fire Service of Poland

The State Fire Service of Poland was represented by Tomasz Flak and Artur Bernaziuk. In the presentation entitled „Air Operations Coordinator Concept“, they described the tasks, responsibilities and role of the Air Operations Coordinator (AOC) before and during an emergency situation.
The main activities to be carried out before the event are as follows:

- familiarization with the general situation, the area of the incident, designation of zone R (Restricted) and being in touch with PANSA;
- identification of operating conditions – nearest airport, establishment of neighbouring areas and other key aspects of airspace, telephone communication with the appropriate FIS (flight information service), verifying current and forecasted weather conditions;
- verification of available rescue resources (pilots, aircraft, number of aircraft) and deciding whether there is a need for an extra support.

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The operational importance of a dedicated briefing before flights was underlined in order to set all necessary rules (who is who, who is in charge), establish a contact list, priority and backup communication, conducting initial introduction to the tasks.

General tasks of the coordinator include:

- ensuring effective implementation of the tasks entrusted by the incident commander (after verification of their feasibility),
- dispatching aircraft in the correct order depending on the task,
- having all the resources that the coordinator has (with a well-thought-out time for the task due to the need to charge the battery),
- ensuring adequate spatial separation of aircraft to avoid collisions,
- establishing a contingency plan for various types of emergencies,
- documenting current aircraft activities (task, position, altitude, energy),
- informing the commander about key findings from the scene of the incident.

Activities carried out by the Flight Operations Coordinator during the exercise were as follows:

- enabling "low" imaging using multirotors (working together in the zone or independently),
- facilitating "high" imaging using the FlyEye drone from the Polish army,
- ensuring safe entry of manned aircraft into the working zone of unmanned aircraft,
- using aircraft adequately to their capabilities.

Conclusions and requirements for the Flight Operations Coordinator:

- giving special attention to the surroundings of the areas in which aircraft operate (intrusion of aircraft without consent, emergency situations),
- maintaining several communication channels (radio, telephone, internet, gesture),
- thinking 15 minutes ahead in order to avoid dangerous situations (communication breakdown, pilot dysfunction),
- controlling meteorological conditions,
- monitoring of the zone for the presence of foreign aircraft (UFOs),
- maintaining regular contact with FIS (flight information service) in the sector or sectors next to the area of crisis operations.

2.2 Territorial Defence Forces

Michał Małyska from Territorial Defence Forces spoke about „The use of UAV in crisis situations“.
In his presentation, he gave a brief but comprehensive overview of purposes and equipment of the Imaging Reconnaissance Group, design and parameters of FlyEye 3.0, and several examples of its practical use in crisis situations.

IRG (Imaging Reconnaissance Group) are able to support regional crisis management centres in the event of crisis situations with the FlyeEye 3.0 UAV which can fly up 1000 m AGL and in a 30 km range for about 2,5 hours and can provide different forces with visual and thermal imaging data.

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2.3 Regional Water Management Authorities

For the purposes of the exercise, State Fire Services simulated the breakthrough of the dyke by transferring water from the river with a pump to the other side of the dyke where a standpipe had previously been prepared.

Before and during the SW HCP field exercise, UAV pilots from Regional Water Management Authorities were flying their drones and comparing obtained results in order to verify whether it is possible to find the breakthrough only with the UAV help.

As a result of the analysis carried out, it was possible to determine the location of the embankment breakthrough using a thermal imaging camera, based on the observation of change in ground temperature at the foot of the embankment, suggesting the appearance of colder water from the river on the outside.

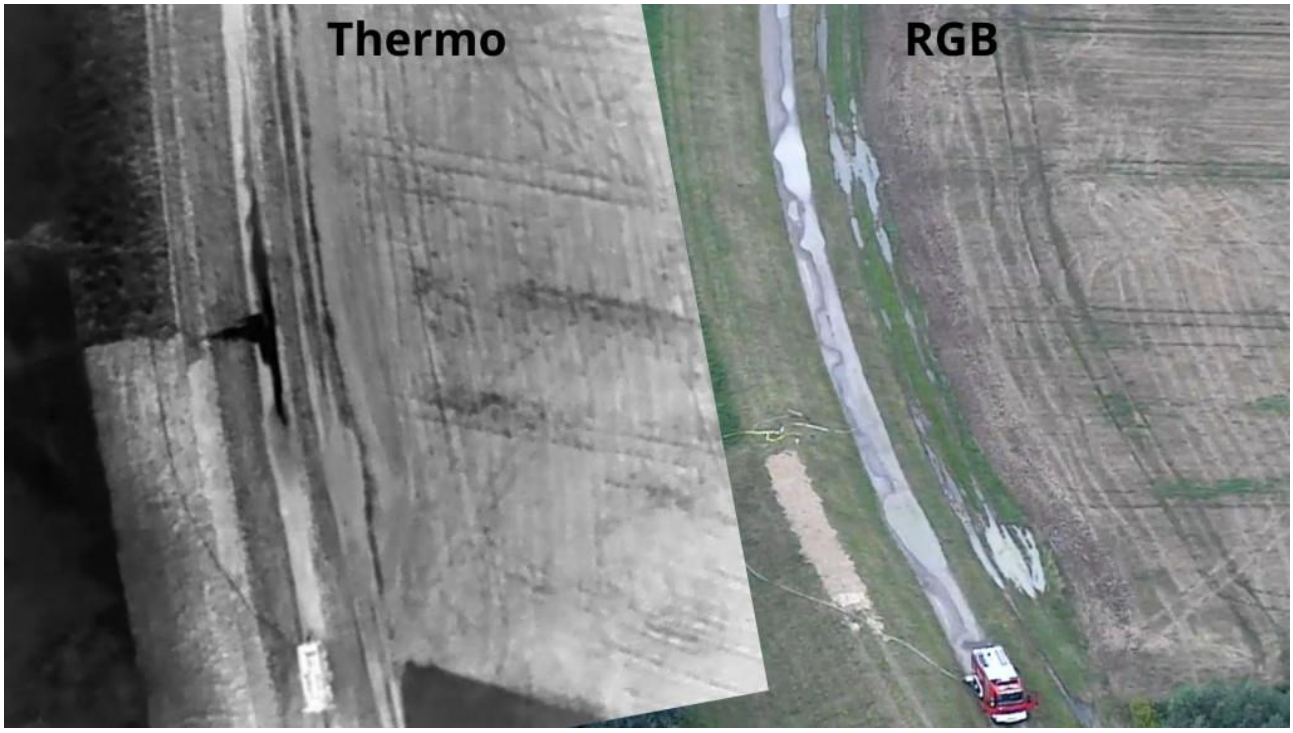

Fig. 2. Drone images made with thermal sensors and an RGB camera.

2.4 District Crisis Management Centre

During his intervention Kamil Kuśmider from the District Crisis Management Centre presented a summary of assets and resources available in the district in the event of a flood. The core activities of the district crisis management are:

- leading the hazard monitoring, planning, response and recovery activities in the district;
- managing, organising and conducting emergency management trainings, drills and exercises;
- flood protection, including the equipment and maintenance of the district flood storage facility, fire prevention and the prevention of other extraordinary threats to human life and health, and the environment.

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A case study of the flood in Bojanów in 2019 was presented as an example of recent usage of the equipment provided by District Crisis Management Centre. At the end, flood protection in the Stalowa Wola district was discussed in detail.

2.5 Polish Air Navigation Services Agency – Search&Help System

Michał Staniewski, who is the Search&Help project coordinator, together with his colleague Piotr Przeździecki (air traffic controller) presented slides titled „Air Operations Coordinator in Search&Help context".

PANSA aims at enabling and supporting efficient operations of air assets during all types of "blue light" services' activities. This includes ensuring safety of simultaneous flights of UAVs and human-operated aircraft.

There are two IT systems currently under development that will provide such functionalities: Dynamic Safety and Security, and Search&Help. The key functionalities cover:

- establishment of temporary restrictions (including R, TRA, TSA, DRA-R and DRA-P[1]);
- coordination of flights excluded from restrictions;
- establishment of common situational awareness between Air Operations Coordinator and pilots;
- facilitating increased efficiency of operations by coordinated and rapidly-communicated tasking.

The concept of support for "blue light" services' activities evolved since 2021, when PANSA facilitated coordinated UAV and human-operated flights during State Fire Service forest firefighting exercises. The appropriate methods of coordination had been initially designed procedurally and then validated during actual air operations. Building upon that experience, the detailed functionality of the Search&Help system has been defined and implemented. The Stalowa Wola 2023 exercise was used to evaluate the early-beta version of the system as well as procedures prescribing Air Operations Coordinator (AOC) actions. PANSA air traffic controllers acted as Flight Managers supporting AOC in matters related to safety and conduct of all flights.

The Search&Help system is able to provide shared situational awareness for the AOC, Flight Manager and UAV pilots participating in the operations. During the exercise, the system had been used to document AOC decisions during all flight activities as well as simulate further development of the crisis (as part of the tabletop exercise). Several observations were gathered with regard to details of IT implementation, including interface optimisation. It was a shared conclusion that the development of the system is on the right track to provide efficient support for the AOC.

One important organisational conclusion was the identification of a need to establish a cooperation agreement between State Fire Service and PANSA that will define a mechanism of providing support by PANSA professional air traffic controllers in case of larger crisis situations.

[1] Different geographical zones where UAS operations are restricted or excluded (R: Restricted, TRA: Temporary Reserved Area, TSA: Temporary Segregated Area, DRA-R: DRone Airspace Restricted, DRA-P: DRone Airspace Prohibited).

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Fig. 3. Presentation of the Search&Help System during the Plenary Meeting.

3. Session II: COLLARIS Network

3.1 COLLARIS Network general presentation: Jakub Ryzenko, Anna Kobierzycka – Crisis Information Centre CBK PAN (PL)

CIK CBK (as the project coordinator) presented the overall COLLARIS assumptions, objectives and scope of activities, underlining their variety (going far beyond ATM-related issues, showing all areas planned to be addressed within COLLARIS) and encouraging the participants to follow the thematic lines of most relevance and interest to them. In particular, the audience was asked to share their experience related to the operational use of of drones and related trainings by filling in a dedicated questionnaire available at https://forms.office.com/e/2ERNUCPeF7.

The next steps and activities planned within COLLARIS were presented, with particular emphasis on the Training Trial at Valabre in November 2023, a Trial in Sweden in May 2024, and an ATM Trial in Poland in 2024 (no fixed date yet).

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Fig. 4. Presentation of ATM solutions during the Plenary Workshop.

3.2 Data analysis and data sharing solutions – preliminary report: Constantions Heracleous, PhD, Panayiotis Kolios, PhD – The KIOS Research and Innovation Centre of Excellence at Universityof Cyprus (CY)

KIOS presented the scope and initial results of COLLARIS' preliminary report on data analysis and data sharing solutions. He underlined that UAS can collect vast amounts of data through multiple sensor payloads, acting essentially as sensors in the sky. For enhancing applications vital to emergency response, such as situational awareness and monitoring, the pivotal elements lie in analyzing and sharing the collected UAS data. Within COLLARIS Work Package 4: solutions for data analysis and data sharing and auxiliary support systems, Deliverable 4.1A provides an overview of currently used and possible technical solutions for data analysis and sharing, including common best practices, available commercial software, and future recommendations.

A concise overview presentation of the initial iteration of Deliverable 4.1A is available at https://civil-protection-knowledge-network.europa.eu/projects/collaris-network . Any comments, suggestions or requests for access to the complete D4.1A report are welcome and should be addressed to collaris-network@cbk.waw.pl.

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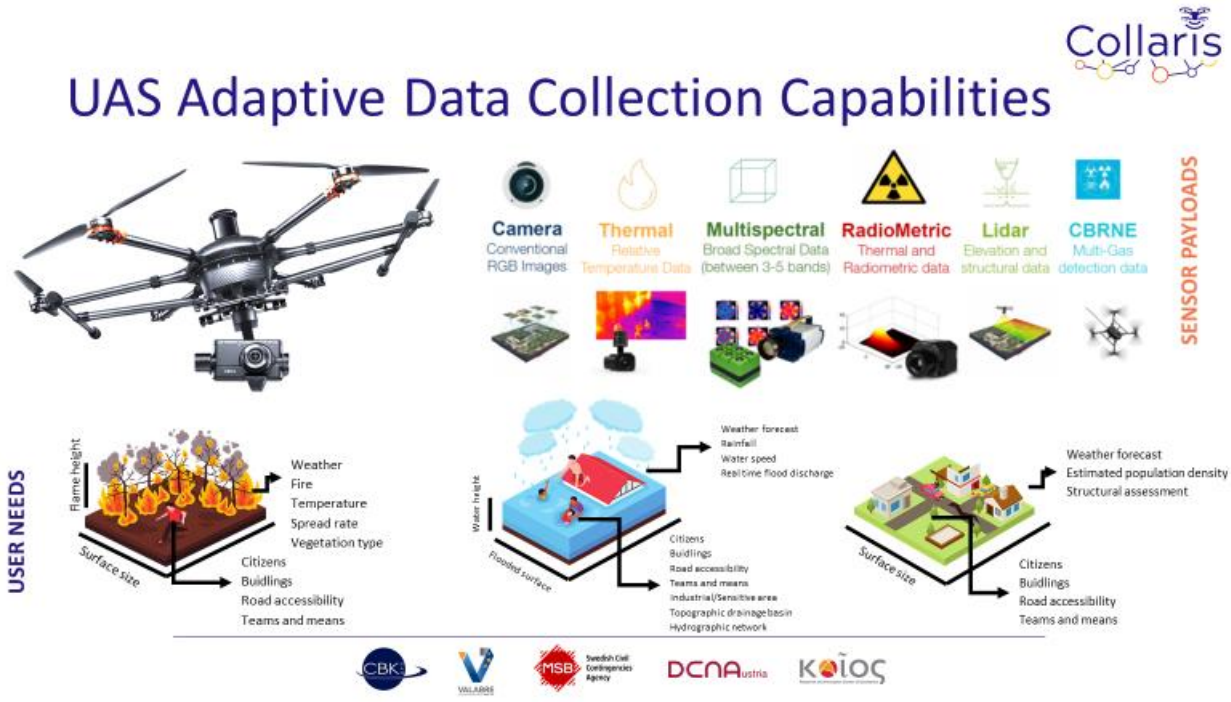

Fig. 5. A slide from the preliminary report on data analysis and sharing presentation.

3.3 Currently used auxiliary support systems and available capabilities, including common practices – preliminary report: Jasmina Schmidt – Disaster Competence Network Austria, DCNA (AT)

DCNA presented the scope and initial results of COLLARIS' preliminary report on currently used auxiliary support systems and available capabilities, including common practices: assessment and recommendations for future use.

An auxiliary support system for UAS can be anything that is added to the UAS and that helps in its operability. These different auxiliary support systems are especially valuable for disaster management. Within COLLARIS' Work Package 4, Deliverable 4.3A provides an overview of currently used auxiliary support systems and available capabilities, including common practices in disaster management. This report focusses mainly on different sensors as well as delivery platforms: visual RGB-cameras, thermal imaging (or infrared) cameras, multispectral cameras, laser scanners / lidar, radars, chemical sensors, search lights, microphones, loudspeakers, delivery platforms, and RTK base stations. A concise overview presentation of the initial iteration of Deliverable 4.3A is available at https://civil-protection-knowledge-network.europa.eu/projects/collaris-network. Any comments, suggestions or requests for access to the complete D4.3A report are welcome and should be addressed to collaris-network@cbk.waw.pl.

4. Session III: International perspective

During the Plenary Meeting, COLLARIS Network representatives and invited guests were invited to share their impression and reflections from the ATM Trial, as well as observations about the situation in their respective countries.

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From the perspective of Finland, the main reason for flying drones is the rapid deployment and gathering data for situational awareness for improving decision making abilities for incident commanders. Drones equipped with suitable sensors can provide real-time data for adjusting used tactics and strategies for different incidents, which is the key advantage of using UAVs. However, in order to be used effectively, drones have to be adapted for all needed incident types with updated SOPs (standard operational procedures). Unfortunately, currently there is no feedback on usage of drones, even though they fly often. Development of drone usage should be included to SOPs. Also, the research on the need for the algorithm -> what sensor/in what situation would be beneficial and could provide better effectiveness for drone usage at Rescue Services.

There are already existing modules the in EU voluntary Pool of UAS. There are some discussions about how to enhance UAV modules for EU capabilities, including ideas of one app for crisis management for all countries. However, it could be asking too much if we are wishing to have one united system for UAS usage to all EU countries.

The representatives of Cyprus in their intervention focused on various problems with sharing information, both on the national and the European level. They underlined that - throughout the EU - various agencies are involved in large scale disasters. Currently, these agencies have no or limited ICT platforms to share information in the field in order to improve situations awareness and enable better-informed decision-making capabilities. They still rely on walkie-talkie communication and hard-copy maps. With regards to digital communication, there seems to be a proliferation of satellite links that are reliable and of adequate throughput to provide multi-media exchange. On the other hand, edge platforms facilitating easy cross-agency and cross-state information exchange of teams, means and the disaster data are still missing. Nevertheless, individual technologies already provide good insights on what such platforms should look like. For instance, drone systems are already heavily deployed and, even though these devices are capable of collecting video feeds using different camera payloads, there is a consensus that a single picture (geo-referenced and timestamped) provides enough information to make good decisions without overloading incident command centres. IoT devices are another example of technologies that can be rapidly deployed to track dynamic changes, but simple visualisation of time-series raw data provides close to zero support to decision-making unless fed into, for example, modelling tools that can estimate changes and predict evolutions. Hence, a coordinated effort should be made to identify, design and implement ICT tools and platforms that are widely supported by the disaster management community in order to assist them with their needs.

In Austria, UAVs are used mostly after a crisis event, or to monitor the situation a few moments before, but not directly in the moment of the incident. This is the perspective of public authorities: UAS are mostly used for damage assessment in cooperation with different departments (e.g., geological survey) after a crisis or disaster event. In urban areas, regulation is strict and therefore, no flights are conducted there. Fire brigades handle things a bit more openly. However, this is a grey area and only "works" as long as nothing happens.

In Sweden, the Police is a clear leader in UAS-related matters since 2016. The Swedish Police is Europe’s biggest UAS Air company with several hundred UAS and a well-established manual for flying and Traffic Management that other institutions like MSB, regional Rescue Services, SOS-alarm and the Railway and Road Authority may use together with them. For other crisis management services, teaming up with the police has proven to be a big success as they started earlier and have a functional concept up and running that the others could “piggyback on”.

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The representatives of Sweden noted that the Droneradar app seemed to be a really good tool both for the authorities and laymen, and a good step also to anticipate U-Space [2]and getting ready for what lies ahead. Currently there is no such solution applied in Sweden. There is a third-party app called Drone Request that might fill some of the void, but since it is not mandatory (yet) to register UAV flights in the app, it is really only a mean for crisis management services like firebrigades to make their operations seen, without counting on seeing others. There is some work carried out on the provision of cybersecure and augmented positioning data through the mobile cellular communication systems and intended to be used in further UTM systems and announced to other air traffic, authorities and the public.

It was also observed that there is a lot of uncertainty concerning the law and that rules and regulations from the 60. or 80. XX are not applicable any more. There are laws that prohibit intrusions in restriction zones and hindering blue light operations with several years in prison as the highest penalty. However, hardly anybody has been found guilty of violating air traffic regulations, since the court usually decides that it is too complicated for the general public to read and understand the rules. Most of the people do not want to break any laws and, therefore, it should be easy to do the right thing. However, they should have access to technical solutions enabling them to comply with the rules, like the Droneradar app in Poland. There are some new regulations being prepared, but the consultations with different stakeholders and other authorities in this matter are not sufficient and the process of establishing a geographical UAS zone is time-consuming and expensive. Therefore, cooperation with other countries and European players to suggest new modern procedures for the chain of Flight Planning – Flight Clearing – Flight Operation – Post Flight reconstruction is very welcome.

In Sweden, there are not a lot of events with many UAVs flying together (with exceptions like the UAS Forum Sweden with several demonstrations of UAVs and also flying with swarms, see: https://www.dronecup.se/, or Agtec2030 with UAVs and UXVs for farming, forestry and forest fire fighting). There is a tendency to ground either the manned or the unmanned flights instead of working together. Polish Air Navigation Services Agency has the capability to send out ATM crews on big events that involve several flying units which is not the case (yet) for the PANSA equivalent in Sweden. The collaboration of CIK with PANSA seems to have had a very positive effect on the outcome for the first responders' possibilities to conduct air operations with UAV, whereas in Sweden crisis management services sometimes feel that the authorities do not understand their situation and needs, and tend to raise unnecessary obstacles.

Having the overall understanding that everybody working for the benefit of the general public could benefit from having an eye in the sky should be able to overcome these obstacles at the end. We have the technological and methodical know-how and should use it to make sure that we can cooperate in the air like we already do on the ground, in a safe way.

[2] 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. European Commission has published the U-space regulatory framework (EU 2021/664) to kick-off implementation of U-space.

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Fig. 6. Table-top exercise during the ATM Trial.

5. Conclusions

The Plenary Meeting was deemed successful by its participants from Poland and abroad who – apart from learning more about COLLARIS' activities in all thematic lines and being able to discuss issues related to Air Traffic Management – also appreciated the informal networking opportunities offered by the event. It is important to ensure that this approach is continued for the next Plenary Meeting which should also be synchronized with a relevant conference/exercises/trial, thus, ensuring optimal possible interest of involved stakeholders and maximizing the outreach impact. It should be noted that the initially planned Amsterdam Drone Week is not suitable for these purposes due to financial constraints, and that COLLARIS Network is currently looking for alternative options.

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