

PODIUM conclusions & recommendations



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Given:

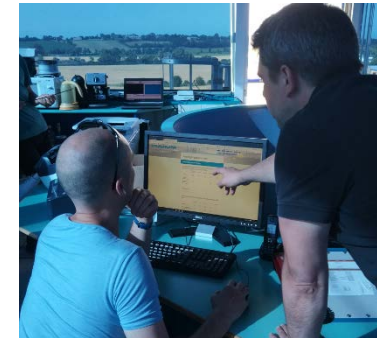
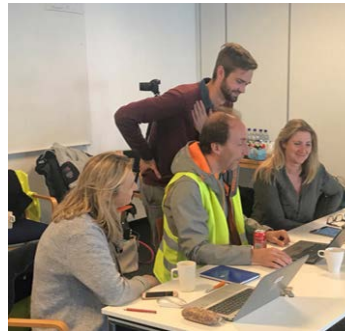
experience gained:

- 18 operational scenarios VLOS and BVLOS
- 73 actual demonstration flights/ 138 flight authorisation workflows
- 5 operational sites in Denmark, France and the Netherlands



validation:

- 41 completed questionnaires
- 5+ debriefing sessions
- Observations
- 5 on-site visitor days



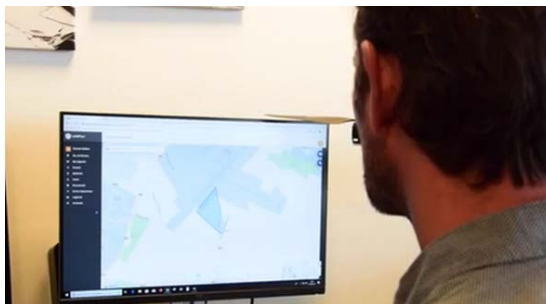
Consensus:

- Project management team review



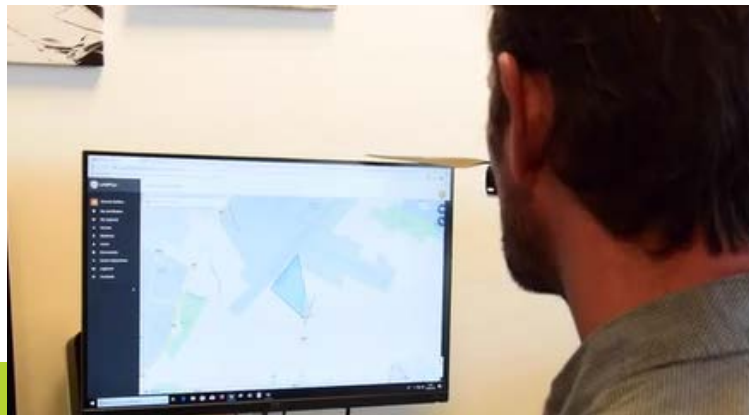
Conclusions (1) – The need! 😊

1. Drone operators strongly confirm the need and potential benefits for U-space/UTM solutions that ease the workload and reduce delays for acquiring drone flight authorisations.
2. Drone operators, air traffic controllers and supervisors strongly confirm the need and the potential benefits for U-space/UTM solutions that improve situational awareness and communications, for both the flight preparation and flight execution, to improve operational efficiency and maintain safety.



Conclusions (2) – Maturity - Pre-flight! 😊

3. Drone operators, air traffic controllers and supervisors confirm the operational and technical acceptability/feasibility of the current PODIUM U-space/UTM solution for the mission preparation phase (corresponding to U1 and some U2 services), albeit with the following remarks:
 - a) Drone operators require a positive business case to justify the take-up of a U-space/UTM solution
 - b) The UTM/U-space system must allow access to trustworthy aeronautical, national and local legislation data applicable to drone operations
 - c) The user satisfaction with U-space/UTM will be strongly influenced by the usability and accessibility of the HMI
 - d) There is a strong preference amongst professional drone operators for a single access point to all of the necessary services, and which is compatible with existing national registration systems (this implies strong interoperability requirements)



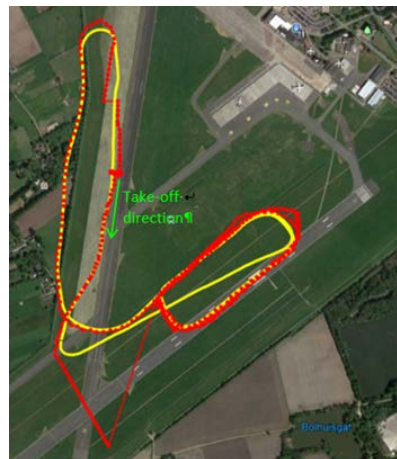
Conclusions (3) – Maturity – Flight execution 😊

4. The air traffic controllers and supervisors confirm the operational and technical acceptability/feasibility of the current PODIUM U-space/UTM solution for the flight execution phase (corresponding to some U2 services), albeit with the following remarks:
 - a) Professional drone pilots and air traffic controllers have a strong preference for an automated messaging system that reduces workload and does not occupy the tower frequency
 - b) In the absence of an automated messaging system, clear R/T communications procedures and phraseology between the pilot and the air traffic controller/supervisor are essential
 - c) It is very challenging for a “human” supervisor to respond adequately to “unexpected scenarios” involving multiple drone flights. In such cases, a rule-based and automated supervisor function is essential



Conclusions (4) – Maturity – Flight execution 😊

5. The drone operators, air traffic controllers and supervisors confirm the operational and technical acceptability, and potential benefits, of the trackers (ADS-B 1090 MHz, GSM, and L-band UNB) and the Access Point Name/Firewall connectivity, albeit with the following remarks:
- a) On a number of occasions the demonstration flights experienced problems with the accuracy (horizontal and vertical) and the availability of the tracker signal. These problems require further investigation
 - b) There must be a robust and easy to install solution for the integration of trackers on the drones



Conclusions (5) – Maturity – Flight execution ☹️

6. A number of drone operators did not confirm the operational and technical acceptability of the current PODIUM U-space/UTM solution for the flight execution phase (corresponding to U2), with the following remarks:
 - a) The use of a laptop for situational awareness “in the field” is not practical for the flight crew, and a handheld display would be a much better solution
 - b) There is a strong preference amongst professional drone operators for an integrated flight control and U-space/UTM solution



Main recommendations (1)

1. Ensure that U-space/UTM systems interact seamlessly and automatically with national systems for pilot and drone registrations, permission requests, etc.
2. Define the aeronautical data requirements and the associated authorities for drone operations in VLL airspace. Assess the suitability of NOTAMS to support drone operations (The work currently done by EASA for the development of AMC-GM to article 15 (geographical zones) of IR2019/947 is very relevant here).
3. Involve drone operators, air traffic controllers and supervisors in the design of the U-space/UTM human machine interface, with a view to maximising usability and accessibility.
 - Optimise the interactions between the flight crew and the human machine interfaces for the (drone) flight controls and the U-space/UTM system during flight execution.

Main recommendations (2)

6. Strengthen situational awareness in the flight preparation phase for professional drone pilots and supervisors (with a view to handling conflicting flight paths, eventual violations, no-fly zones).
7. Strengthen situational awareness for professional drone operators in the flight execution phase by providing information about own flight, other flights in the area, no-fly zones, and unexpected events on a mobile application.
8. Define coordination procedures, phraseology and the means for ensuring reliable communications between the flight crew and supervisors/air traffic controllers.
9. Define operational procedures for drone flights entering a controlled airspace environment (CTR, airport) and for responding to abnormal situations (e.g. areas for stacking or emergency landings in the event of traffic conflicts, equipment failure).
10. Validate U-space/UTM performance for scenarios with increasing traffic density and complexity.

Recommendations (3) – Regulation and standards

11. Ensure that U-space/UTM systems provide drone operators with access to trustworthy and up-to-date aeronautical, national and local legislation data/rules. This is on the understanding that only “official” data should be used and that “open source” data – which risks to not comply with aeronautical data quality requirements - is not sufficient.
12. Determine the areas of operation for which drone tracking is required, and define the minimum standards for the trackers (i.e. accuracy, availability and RF interoperability) and their installation on board the drone. This is on the understanding that U-space/UTM systems must not degrade existing ATM surveillance systems, e.g. no degradation of the 1090MHz frequency for the RF link technology.
 - Progress the standardisation of trackers, and allow for certifiable low power devices.
13. Perform airspace assessments to determine the level of U-space/UTM services and systems required in a particular airspace.
14. Develop a regulatory framework which maximises the granting of automated flight approvals for flights outside of manned controlled aerodrome environments.
15. Determine the rules for the safe handling of drone traffic with manned aviation, especially for BVLOS flights in uncontrolled airspace.
16. Develop standards for equipment, software and data for which failure reduces safety to an unacceptable level.

09:30	Registrations		
10:00	Welcome and introductions		 U-space PODIUM 541 followers
10:10	PODIUM and the big U-space picture	Peter Alty, EUROCONTROL	
10:20	Demonstrations		
	Flight preparation and authorisation at Groningen Airport Eelde	Matthijs van Essen, Jasper van der Vorst, NLR and Dennis Bollen, Unifly	
	BVLOS flight execution at Brétigny	Nicolas Sonnet, Aéromapper and Jean-Philippe Bonhomme, Drones Paris Region	
11:15	User experiences		
	Hans Christian Andersen airport, Odense	Janus Bill Andersen, Integra Aerial Services	
	Groningen Airport Eelde/ Netherlands RPAS Test Centre, Marknesse	Joost Vreeken, NLR	
	Drones Paris Region, Brétigny	Jean-Philippe Bonhomme, DPR	
	Rodez-Aveyron airport - the ATC collaborative interface	Alexandre Piot, Airbus	
12:00	Lunch		
13:15	If you can't measure U-space, you can't improve it! EUROCONTROL validation results	Laurence Rognin, EUROCONTROL	
13:45	Panel sessions	Facilitated by Jean-Philippe Bonhomme:	
	Operational and technical insights	Bastien Mancini, DELAIR, Nicolas Sonnet, Aéromapper, Charles Dournel, SNA-S Rodez and Jasper van der Vorst, NLR	
	Business perspectives	Ellen Malfliet, Unifly, Brad Beach, SDU UAS Denmark, Alexandre Piot, Airbus	
15:05	Main PODIUM conclusions - recommendations	Anastasiia Sobchenko and Peter Alty, EUROCONTROL	
16:00	Closing remarks/spare	Peter Alty, EUROCONTROL	