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SUSI
SWISS U-SPACE IMPLEMENTATION

UAS flight Authorisation Operator Experience Journey

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1. Executive Summary

On 22 October 2021, the Federal Office of Civil Aviation (FOCA) organised a “UAS Operator Experience Journey” in the framework of the Swiss U-space Implementation (SUSI) partnership. Four U-space service providers (USSPs), all members of SUSI, and eight UAS operators participated to the event. The initiative aimed to conduct a technical and operational test of the UAS flight authorisation service described in the U-space Regulation (EU) 2021/664 using the ASTM F3548-21 Standard.

The USSPs successfully demonstrated that they were able to share operational data and to approve or reject requests based on the “first come, first served”' principle described in the regulatory text (the first operator to file a request reserves the volume). Several tools used in the national implementation of the Network remote identification service (Net-RID) were used without issues for the UAS flight authorisation service, showing how a single technological stack can support various services.

On the operators’ side, the journey provided several insights into the implementation of the service. One major comment related to the lack of interoperability with existing operational approvals, such as the Specific Operation Risk Assessment (SORA). Although the ability to replan a flight is a core feature of the service, operators might not be able to modify a mission that is constrained by an existing approval.

2. Goals and Scope

The event had three main goals: First, members of the SUSI had reached a sufficient level of technical maturity to demonstrate the software implementation of the UAS flight authorisation service. Their work was based on an ASTM standard that was nearing completion at the time of the event (since approved as ASTM F3548-21: New Specification for Service provided under UAS Traffic Management).Second, gathering early feedback from operators regarding the use of the service itself is key at this stage. Finally, the FOCA used the opportunity to perform a manual checkout and testing of service providers to inform the development of future automated onboarding and oversight processes.

The UAS flight authorisation service is a strategic deconfliction tool described in Article 10 of the U-space Regulation (EU) 2021/664. It strictly enforces separation between UAS flights in U-space airspaces, meaning that two aircraft are never allowed to share the same volume of airspace at the same time. The test event was focused primarily on the ability of USSPs to exchange flight authorisation data and on the experience of operators using the service for strategic deconfliction. The complete list of flight authorisation data is covered in Annex 4 of the U-space Regulation but only data on the 4D volume (space and time) and the priority of the operation were considered necessary to share among providers for safe operations. USSPs also shared an unique authorisation number identifying each request (Art. 10.11).

The UAS flight authorisation service used an underlying Discovery and Synchronization Service (DSS) that supported data exchange among different service providers. The DSS is a distributed capability that can be provided by several entities based on specifications from the ASTM F3548-21. The DSS concept is already used for the national implementation of the Net-RID service using the related specifications described in the ASTM F3411-19 standard. The event did not cover checking the request for UAS flight authorisations against U-space airspace restrictions and temporary airspace limitations (Art 10.7), nor giving priority to UAS conducting special operations (10.8).

3. Set-up

A. Participants

USSPs: ANRA Technologies, AVISION, DroneTag, INVOLI

UAS operators: ANAVIA, Federal Office of Civil Aviation, Matternet, SBB CFF FFS, Schweizerischer Verband Ziviler Drohnen (SVZD), SenseFly, Swiss Post, RigiTech

DSS providers: Wing using the InterUSS Platform, an open-source project by the Linux Foundation which implements the DSS.

Authority: FOCA, coordinating the event and provider of the authorization server, a capability required for data exchange among USSPs which is also used for the Net-RID.

B. Manual onboarding of service providers

The onboarding of USSPs was performed manually a week before the event. It was based on several scenarios developed to test relevant requirements of the service, in particular the ability to share requests among USSPs and to approve or reject them adequately.

Some aspects of the flight authorization request, described in Annex 4 of the U-space Regulation, are standardized. This is the case for the UAS Serial number per the ANSI/CTA-2063-A standard, or the Operator Registration Number per the EN4709-02 standard. It must be noted, however, that other portions of the flight authorisation request are not yet harmonised; for instance, when it comes to identification technology or expected connectivity methods. This made it difficult to develop tests related to Article 10.2.a, requiring USSPs to check if the UAS flight authorisation request is complete and correct.

The manual process gave insights into developing a fully automated process that will be released in its first version before the end of the year.

4. Main lessons learned

A. Data exchange among USSPs was successful

USSPs were able to exchange data without any significant issues using the mechanism and the API described in the ASTM standard (ASTM F3548-21). DSS, a similar mechanism, had previously been successfully implemented as part of the national deployment of Net-RID in Switzerland.

B. The scope of conflicting flight plans to share should be defined

As USSPs did not have any guidance regarding the extent to which they were expected to share conflicting flight plans when rejecting a request, some refrained from implementing this function. It was, therefore, challenging for operators to replan their missions.

C. The service conflicts with operational approval processes

Operators stressed that it is not always possible to change a flight request when the flight path is based on a SORA approval. Overall, the relationship between U-space and SORA requires attention.

5. Next steps

SUSI will continue to work on developing the flight authorisation service, adding the missing regulatory requirements, such as geo-awareness data, and developing an automated onboarding and oversight infrastructure in the framework of the open data InterUSS platform. The subsequent step will be to implement the Conformance monitoring service described in Art. 13 of the U-space Regulation (EU) 2021/664. The Conformance monitoring service makes use of both the UAS flight authorisation and the Net-RID services.

6. Conclusion

The U-Space Regulation brings new tasks to competent authorities. They will have to establish certification and oversight programmes for USSPs and to monitor operational performance of U-space services. Deploying a couple of U-space services has highlighted the need for highly automated onboarding and oversight processes. With that aim, open source provides the best venue for transparency and collaboration between industry and authorities. Regarding access to the network, FOCA has gained confidence in operating an authorisation service based on the Auth standard (RFC 6749). The service is an efficient way of managing access to a local U-space network, as only certified and conformant USSPs are granted access to the system by FOCA itself.

FOCA also plans to investigate closely, in 2022, the link between U-space services and operational authorisations, like SORA, in collaboration with other European authorities.

Looking further ahead, the development of U-space services like the UAS flight authorisation service provides an opportunity to move into the field of data-driven regulatory processes. The question of fair access to airspace, for instance, will be much better understood once USSPs start collecting reasons for rejecting requests. FOCA is in the process of strengthening its internal competencies in the field of data management.