

Demonstration of U-space testing capabilities at DLR's National Experimental Test Center for Unmanned Aircraft Systems

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The implementation of U-space as a digitalized airspace is a milestone to enable business operations within society by the drone sector. Only the intelligent automated coordination of drone flights enables viable commercial flights of numerous unmanned aircraft systems (UAS) in a safe and secure manner. However, prior to the successful operational integration of U-space into existing airspace structures, its operability should be validated in an experimental environment, where technical requirements can be clarified at an early stage and selected use cases demonstrated in a desired digitalized airspace structure.

There are several U-space projects across Europe focusing on the detailed consideration of one or more aspects in the implementation of U-space. One example is the project U-AGREE [1], dealing with an integrated risk model to support the European U-space regulation and to amend the SORA method for quantitative risk assessments of specific UAS operations. Another example is the project U-ELCOME [2], which had the objective to develop concepts and guidelines for establishing harmonized U-spaces in multiple European countries that comply with EU regulations.

Complementary to a deep analysis of single aspects of U-space, a comprehensive approach is necessary to ensure that different scenarios, uses cases as well as technical issues can be investigated in a realistic environment in a safe, secure and methodological manner. For this reason, the German Aerospace Center (DLR) decided to implement an experimental U-space environment at its National Experimental Test Center for Unmanned Aircraft Systems in Cochstedt until the end of 2026.

In DLR's AREA U-space project [3] a combination of mandatory and advanced levels of U-space services (USS) are brought together, with the mandatory USS covered by an external U-space service provider, and selected experimental USS with an advanced level developed in-house by DLR. Both categories of USS, mandatory and experimental, serve as technical enablers for the experimental U-space environment in Cochstedt. The available airspace for the U-space environment covers an area of several hundred square kilometers, made accessible for UAS test flights through an authorized and published geozone.

This experimental U-space environment extends the testing possibilities at the DLR test center in Cochstedt, which is located at an active airport, providing an ideal location to investigate the integration of U-space into existing airspace and the interaction between

manned and unmanned aviation. Beyond the physical realm, a virtual U-space environment further expands the testing possibilities at DLR.

To assess the performance of the experimental U-space environment, different validation campaigns were conducted between the spring and summer of 2026 with simulated as well as real flying drones. The results of these campaigns are the basis for the follow-up project beginning in 2027, which will focus on the ongoing development of the implemented U-space test environment and integration of more testing capabilities.

This contribution will give insights into the conduction of UAS trials in the implemented experimental U-space test environment and will address the main challenges in building up the experimental U-space. Moreover, the main objectives of the follow-up project will be discussed to present the vision of the enhanced U-space environment for the near future.

[1] SESAR U-AGREE Project: [U-AGREE - U-AGREE](#) ; [U-AGREE](#)

[2] SESAR U-ELCOME Project: [u-elcome – we take off together](#) ; [U-ELCOME](#)

[3] DLR AREA U-space: [AREA U-space](#)

Biography

Kristin Wendt



Since 2021 Kristin Wendt is the acting head of the department “Projects and Cross-Divisional Topics” at the National Experimental Test Center for Unmanned Aircraft Systems of the German Aerospace Center (DLR). She starts her work at DLR in 2020 as project lead and as of 2023 she is the project leader of the DLR internal research project AREA U-space.