

Project partners

The CLASS project is spearheaded by Airbus Defense and Space. International partners Aveillant, ENAC, NTNU and Unifly join forces to research and evaluate the ground-based technologies' potential to monitor and separate drone traffic in a real-time unmanned aerial system traffic management system (UTMS).

AIRBUS

www.airbus.com

 AVEILLANT

www.aveillant.com

 ENAC
ECOLE NATIONALE DE L'AVIATION CIVILE
www.enac.fr/en NTNU

www.ntnu.edu

 UNIFLY
www.unifly.aero

Airbus Defence and Space is an integrated company composed of four Programme Lines: Military Aircraft, Space Systems, Communication Intelligence and Security and Unmanned Aerial Systems. Airbus has been involved in the Air Traffic Management business as a system integrator of critical components. In this frame, Airbus' engineers have been working for decades on conflict detection and resolution algorithms.

Aveillant specialises in the development and production of innovative radar products. The company was created as a spin-off from Cambridge Consultants in 2011 to take to market the ground-breaking Holographic Radar technology. The team includes some of the world's leading experts in radar design and signal processing.

ENAC, the French Civil Aviation University, is a public institution under the supervision of the French Ministry of transport. Its mission is to provide ab-initio and further training for the executives and main players of the civil aviation world and do research in a variety of air transport related domains.

The Norwegian University of Science and Technology (NTNU) in Trondheim is the largest and most prominent Norwegian university in engineering and technology. The Department of Engineering Cybernetics (ITK) is part of the Faculty of Information Technology, Mathematics and Electrical Engineering (IME) at NTNU.

Unifly is the leading provider of UAS Traffic Management (UTM) software in Europe. Not only active in research projects, Unifly's platform is a deployed product that is currently in use by prominent European air navigation service providers.



Ground-based technologies for a real-time unmanned aerial system traffic management system (UTMS)

Drone technology is on the rise and the number of drones in the air increases at a rapid pace. Unfortunately, drones are hard to detect and they often fly literally below the radar. As a result, the chances of conflicts between drones and manned air traffic (or between drones themselves) would rise without the current restrictive regulation. However, the different stakeholders are pushing to ease this regulation. This can only be allowed if a sufficient level of safety can be guaranteed.

CLASS is the acronym for CLear Air Situation for uaS, and is part of a Horizon 2020 SESAR-1-2016 call. The CLASS project will merge existing technologies to build the core functions of an Unmanned Traffic Management System (UTMS). This research increases the maturity level of the main technologies required for surveillance of Unmanned Aerial System (UAS, also known as drone) traffic.

This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 763719. More information on www.class.aero.

Objectives & deliverables of the CLASS project

Functionalities include real-time tracking and display of both cooperative and non-cooperative drones. Whether a drone is cooperative or not has no bearing on whether that drone is flying rogue at its current location. Drones that transmit their location themselves are called cooperative, whereas for non-cooperative drones the locations are observed and tracked by the external system. In both cases, relevant aeronautical data is aggregated and the data from multiple trackers (both on the drones and on the ground-based systems) is merged through data fusion so that the location of all drones in the airspace can be known and displayed.

Based on these functionalities, a real-time centralized UTMS will be developed. This platform will propose an overall view of both the planned and the current real-time UAS traffic situation.

This information will be centralized in real-time in a UTMS to create an overall solution with advanced functions.

CLASS' goal is to provide all stakeholders, from drone operators to Air Navigation Service Providers (ANSP's) and authorities, with services tailored for each end-user's specific needs.

Advanced functions include geo-fencing (where the drone pilot is warned automatically if he trespasses into an unauthorised zone), geo-caging (where the drone pilot is warned that he is leaving a pre-defined zone), conflict detection and resolution.

The performance of these cooperative and non-cooperative drone detection and tracking technologies will be assessed through live experimentations.

Horizon 2020: European Research and Innovation programme

Horizon 2020 is the biggest EU Research and Innovation program ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

Coupling research and innovation, Horizon 2020's focus is on Europe's competitive edge in the global market.



The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

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. These services rely on a high level of digitalisation and automation of functions, whether they are on board the drone itself, or are part of the ground-based environment.

The CLASS project complies with services U1, U2 and U3 as defined in the U-space initiative. U1 foundation services provide e-registration, e-identification and geo-fencing. U2 initial services support the management of drone operations and may include flight planning, flight approval, tracking, airspace dynamic information, and procedural interfaces with air traffic control. U3 advanced services support more complex operations in dense areas and may include capacity management and assistance for conflict detection.

Indeed, the availability of automated Detect And Avoid (DAA) functionalities, in addition to more reliable means of communication, will lead to a significant increase of operations in all environments.

One of the most innovative infrastructure projects ever launched by the European Union, SESAR's role is to define, develop and deploy what is needed to increase ATM performance and build Europe's intelligent air transport system.

SESAR is the mechanism that coordinates and concentrates all EU research and development (R&D) activities in ATM, pooling together around 3,000 experts to develop the new generation of ATM by defining, developing and delivering new or improved technologies and procedures.

The vision of SESAR builds on the notion of trajectory-based operations and air navigation services so aircraft can fly their preferred trajectories without being constrained by airspace configurations environment.

