

CONSORTIUM

The 5G!Drones consortium has been formed having in mind the complete ecosystem of UAV and 5G (Verticals, Providers, Manufacturers and complementary industries), and is composed of a number of partners able to tackle the challenges related with the execution of trials of UAV use cases on top of 5G infrastructures. Due to the multidisciplinary nature of the project, e.g. UAV, trial deployments, results analysis, virtualisation capabilities of network functions on 5G networks, and provision and operation of dedicated slices, the consortium is well-balanced in order to guarantee the successful achievement of the proposed project objectives. The composition of the consortium has been decided considering partners with different backgrounds and interests that can cover all the required technical expertise, including validation from the perspective of real users. Specially, the project and its use cases have been defined by Verticals and they will be executed in close collaboration with the 5G and UAV industries, along with the help of the academia. As a result, the 5G!DRONES consortium represents an excellent mixture of industrial and academic profiles from all over Europe



PROJECT OVERVIEW

The project will drive the UAV verticals and 5G networks to a win-win position, by showing that 5G guarantees UAV vertical KPIs and by demonstrating that 5G supports challenging use-cases that put pressure on network resources, such as low-latency and reliable communication, massive number of connections and high bandwidth requirements, simultaneously. 5G!Drones will build on top of the 5G facilities provided by the ICT-17 projects and a number of support sites, while identifying and developing the missing components to trial UAV use-cases. The project will feature Network Slicing as the key component to simultaneously run UAV services on the same 5G infrastructure.

The project will build a software layer to automate the run of trials that exposes a high-level API to request the execution of a trial. Thus, 5G!Drones will enable abstracting all the low-level details to run the trials using a 5G shared infrastructure, showing that 5G supports the performance requirements of UAVs with several simultaneous UAV applications with different characteristics (eMBB, uRLLC and mMTC).



Validation of 5G KPIs to support several UAV use cases via trials using 5G shared infrastructure



5G support of UAV requirements with eMBB, uRLLC and mMTC

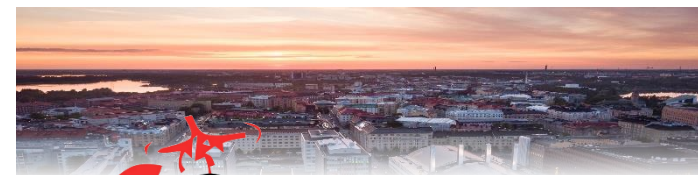


Recommendations for improvements on 5G standardization



European Commission

Horizon 2020
European Union funding
for Research & Innovation



5G!DRONES

Unmanned Aerial Vehicle Vertical
Applications' Trials Leveraging
Advanced 5G Facilities

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 5GDRONES

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 5GDRONES Project

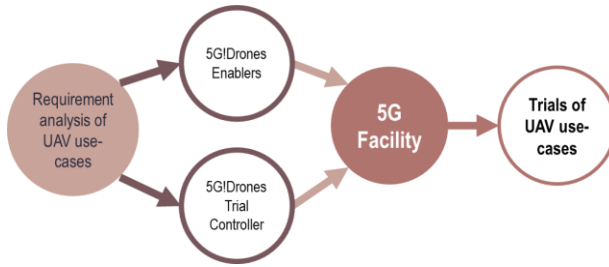
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Call: H2020-ICT-2018-2020
Topic: ICT-19-2019
Type of action: R&I
Duration 36 Months
Start Date 1/6/2019

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No85703

ARCHITECTURE



The first step is to start by analysing the requirements of the UAV use cases, which will allow for running the two other tasks in parallel, i.e., the 5G!Drones trial controller and the 5G!Drones enablers. Once these steps are accomplished, the trial starts using the 5G Facilities. 5G!Drones will execute extensive experiments over two ICT-17 5G Facilities (i.e., 5GENESIS and 5G EVE) and two additional sites (Oulu 5GTN and Aalto X-Networks) in Finland.

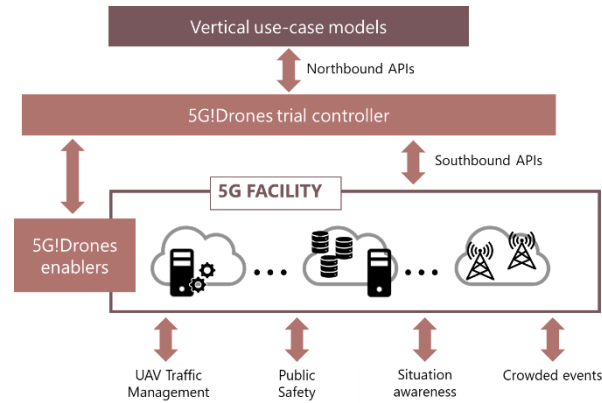
5G FACILITIES

5G!Drones will use the 5G facilities provided by:

- 5GEVE, EURECOM (Sophia Antipolis, France)
- 5GENESIS, NCSR Demokritos & Municipality of Egaleo (Athens, Greece)
- 5GTN platform, University of Oulu (Oulu, Finland)
- X-Network facility, Aalto University (Espoo, Finland)



CONCEPT AND APPROACH

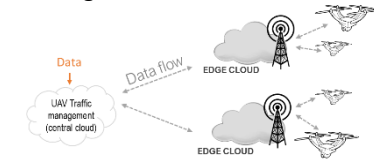


5G!Drones derives from the need to support and validate UAV use cases, by running trials on top of 5G systems, leveraging ICT-17 5G facilities and modern test methodologies and advancements. Indeed, for actual experimentation of UAV use cases, highly-complex setups are required in order to validate the vertical KPIs when investigating for example: a) enhancements required in the LTE and 5G networks in order to support the “moving cell” concept or emerging scenarios of public-safety, b) how fog and edge computing design principles fit into the integrated environment, or c) what network enhancements are necessary in both the data and control planes of multiple wired/optical/wireless technologies in order to support IoT/M2M/D2D. This list is indicative and can be quite extensive.

5G!Drones will build a software layer that allows UAV verticals to describe, using high-level APIs, the trial scenarios and the 5G KPIs to test as well as the application performance characteristics to monitor. The high-level APIs will abstract and hide the complexity and level of detail to access to the 5G facility and run the trial. The 5G!Drones software layer, namely 5G!Drones trial controller, will be in charge of building and securely running the trial scenarios.

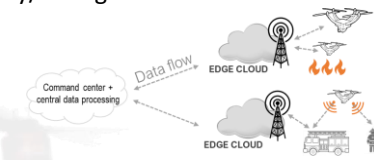
USE CASES

UAV Traffic Management



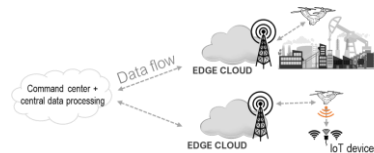
Given the increasingly high number of drones in the airspace, a command & control application is needed to manage a high number of drones (included for BVLOS operations). Supporting visualization and analysis software for UTM also leverages on UTM applications, to support drone operators and flight planners.

Public safety/saving lives



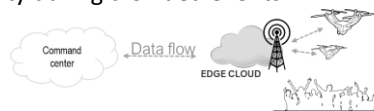
Natural and human-instigated disasters destroy environments and put public safety at risk. Measuring damage and providing relief must be swift and effective. UAVs can play a vital role as they can do what relief workers and manned vehicles fall short.

Situation awareness



UAVs equipped with IoT and other monitoring devices can enhance situation awareness, for scenarios such as infrastructure inspection of collection and relay of data from sensing devices deployed on the ground.

Connectivity during crowded events



During crowded events, cellular networks face an extremely high demand for communication capacity with often degraded connectivity. Using an on-demand swarm of UAVs equipped with 5G small cells can solve this challenge.