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Safer drones over cities: Telespazio tests new satellite technologies

- **The tests of the Full Flight View project in an urban environment have been successfully completed**
- **Asset management and urban security scenarios have been field-tested**

Telespazio, a joint venture between Leonardo (67%) and Thales (33%), has successfully carried out, within the purview of the **Torino City Lab/DORALab initiative**, promoted by the Piedmontese capital in collaboration with ENAC, TIM and the Turin Polytechnic, a campaign of experimental flights (Full Flight View) with several RPAS (Remote Piloting Aircraft System) platforms. The tests have been carried out using the aircraft of our partner ADPM Drones, equipped with technologies provided by Telespazio, e-GEOS, DBW Communication and MPB.

Full Flight View (F2V), a project entirely funded by the companies of the industrial team led by Telespazio, has been conceived for public utility purposes, in particular to test new safety procedures for drone operation - a subject of interest for ENAC - and to develop innovative applicative products and services aimed at territorial control for the city of Turin, with state-of-the-art utilisation and accuracy modes.

“The demonstrative activities carried out within the purview of the F2V project have allowed highlighting the role and potentiality of the satellite segment in the development and realisation of services making use of RPAS platforms - explains **Marco Brancati**, CTO of Telespazio –. The use of a high-accuracy reference system with images taken by satellites and aircraft, the real-time transmission of the integrity information of the drone position GNSS navigation signal and, for the first time, the remote control of the drone also taking place thanks to the transmission of the position and of commands through a satellite communication system, have proven the capability of introducing safety levels higher than the actual standards. Telespazio, through the F2V project, confirms its role in the development and realisation of services in which *unmanned systems* play a significant part, even in view of the future 5G market”.

The flight campaign involved drones of different typologies (fixed- and rotary-wing types, with weight ranging from 2 to 8 kg), equipped with **Iridium satellite terminals**, which guaranteed aircraft control in a BVLOS (Beyond Visible Line Of Sight) operational scenario where ground communication networks have failed. The peaceful drones made by ADPM Drones, the lightest of the fleet (less than 300 grams) have also been used for two different asset management and urban security scenarios.

Telespazio, a Leonardo and Thales 67/33 joint venture, is one of the world's leading operators in satellite services. Its activities range from the design and development of space systems to the management of launch services, from in-orbit satellite control to Earth observation, from integrated communications, satellite navigation and localisation services to scientific programmes. Telespazio plays a leading role in the reference markets harnessing technological experience acquired over the years. Since its establishment, the company has participated in major European space programmes such as Galileo, EGNOS, Copernicus and COSMO-SkyMed. In 2018, Telespazio generated sales of EUR 493 million while employing approximately 2,500 people worldwide.

In the first scenario, e-GEOS, through a satellite interferometric analysis capable of detecting areas and structures affected by deformation phenomena, has identified, by means of the drones, a "**Provincial Road Viaduct**" providing real-time high-quality photo shoots and thermal TV camera images to the operation centre. Requests for prompt intervention - if required - are automatically generated by the system.

In the second case, the "**I Run Safe**" scenario has been tested. In this scenario, any individual practising sports in the city parks can, in case of need, draw the attention of a drone capable of transmitting real-time videos and data to the operation centre. The performance of such operation is completely automated, with no pilot intervention.

For applicative purposes, the F2V project has integrated new generation instrumentation for the measurement of the electro-magnetic field (SEP sensor provided by MPB) and a 4k 360° camera, provided by DBW Communication. DBW Communication has specifically developed a real-time Virtual Reality environment to display the 360° videos, the measurement of the electro-magnetic field intensity and the drone position integrity information, all of them in a 3D precision environment provided by e-GEOS. The data collected by onboard sensors, moreover, can be used by the e-Geos AWARE platform and integrated with multi-source and multi-time data (satellite, aircraft, IoT, laser scan, municipal cartography, etc.).