



Italian approach for the development of U-Space

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Preamble

During the ICAO Drone Enable in 2017, ENAC and ENAV announced an agreement signed in August 2016 focused on:

- Registration and E-Identification
- Provide a system for web registration. ENAV is indicated as the Provider of the Registration and e-identification services for drones on behalf of ENAC
- BVLOS regulatory framework

The Agreement Sets a collaborative framework to enable BVLOS operations:

- BVLOS concept of operations (started in 2016)
- BVLOS validation campaign (ended in 2019)
- Setting of regulation and standard

Through the Agreement, ENAV committed to the development and deployment of the U-Space system infrastructure in Italy

Partnership in the national framework

The Players

- ENAC, Ente Nazionale per l'Aviazione Civile, is the only Civil Aviation Authority in Italy. It was established by Law Decree n.250/97 on July 1997. Pursuant to Italian Air Navigation Code, ENAC is the single authority for technical regulatory, certification, oversight and control in civil aviation in Italy including certification and licensing of air navigation services
- Pursuant to ICAO Annex 11 and, consequently, to Italian Air Navigation Code, ENAV is the unique Air Navigation Service Provider in Italy appointed to provide air navigation services for airspace and airports under their competence (excluding the military ones)

The agreement signed by ENAC and ENAV is, therefore, coherent with the national and international aeronautical system





Regulatory process in the frame of U-Space

After 3 years of experimentation and considering the ongoing technology development and the new regulatory framework, Italy is now ready to launch a first set of regulated essential U-Space services:

- E-registration
- E-identification
- Geo-awareness
- Maps and No Fly Zones
- Standard VLOS and BVLOS scenarios
- Mission declaration/authorization (when required)

EU Reg. 2019/947

U-Space: The Italian solution

The role of the U-space Service Manager shall be played by the national ANSP or by an entity which is fully controlled by the ANSP:

- ANSPs have in place systems, expertise and procedures which ensure the safety and security of operations within UTM and where UTM and ATM will inevitably overlap.
- ANSPs are already adopting measures that help to protect the safety of existing airspace users especially at or close to the airports.
- ANSPs already play a main role in providing relevant “ATM/ANS information” to U-Space.
- ANSPs are already well structured to act as the “single source” for essential U-Space services, such as:
 - registration (incl. sensitive access for police and law enforcement)
 - identification, surveillance and multi-sensor data fusion tracking, (incl. sensitive missions of security authorities)
 - standardized and quality assured geographical data, flight planning, validation and electronic workflows for permission
 - “single point of access” to ATM



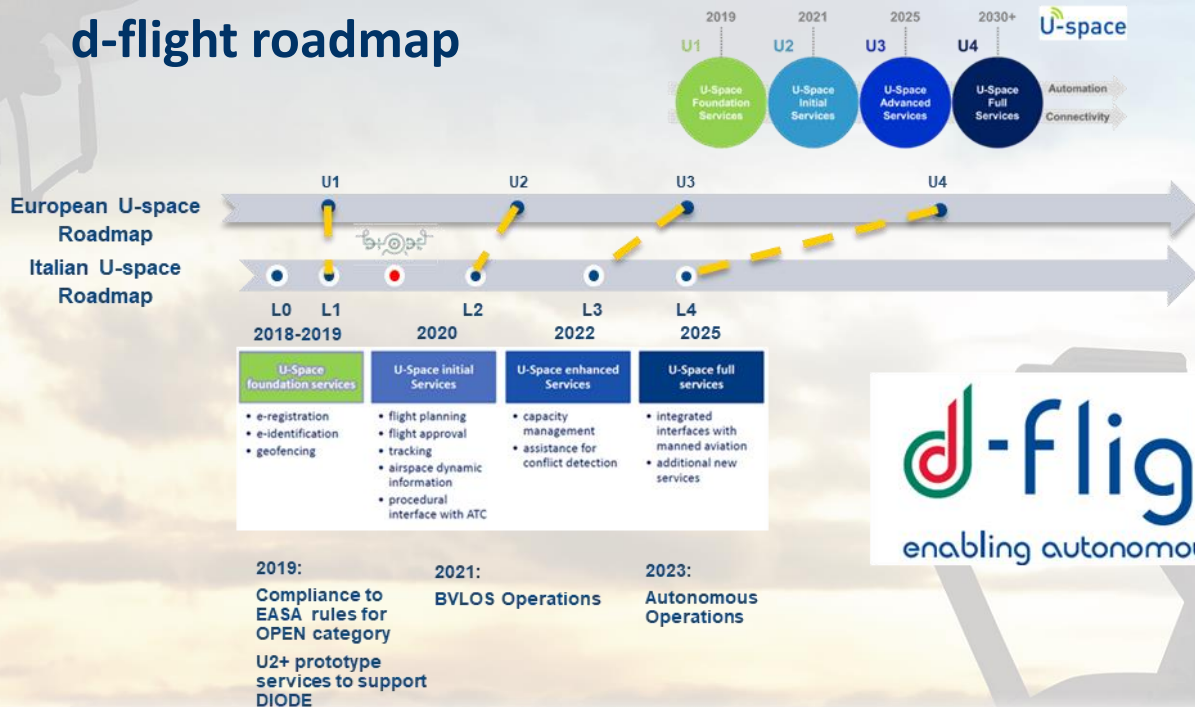
What's about d-flight

The role of the U-space Service Manager shall be played by the national ANSP or by an entity which is fully controlled by the ANSP:

- **d-flight** is an ENAV initiative, started in 2016 upon agreement between ENAV and ENAC (the Italian CAA) and a positive Business Plan
- **d-flight S.p.A.** was constituted in 2018 as an ENAV spin-off. In February 2019, an industrial partner (Leonardo and Telespazio) selected through an open tender procedure, which lasted almost 2 years, entered the company with 40% of shares
- **d-flight** mission is to enable BVLOS and autonomous operations in the Italian airspace, through providing the U-space foundations
- **d-flight** services are already available nation wide. Basic geo-awareness, based on ENAC rules, is provided at no cost for public. It includes Zones management for Authorities (www.d-flight.it)
- Registration, e-identification, traffic information, including mission declaration/authorization, tracking and conformance monitoring (as for DIODE) will be fully operational by summer 2020

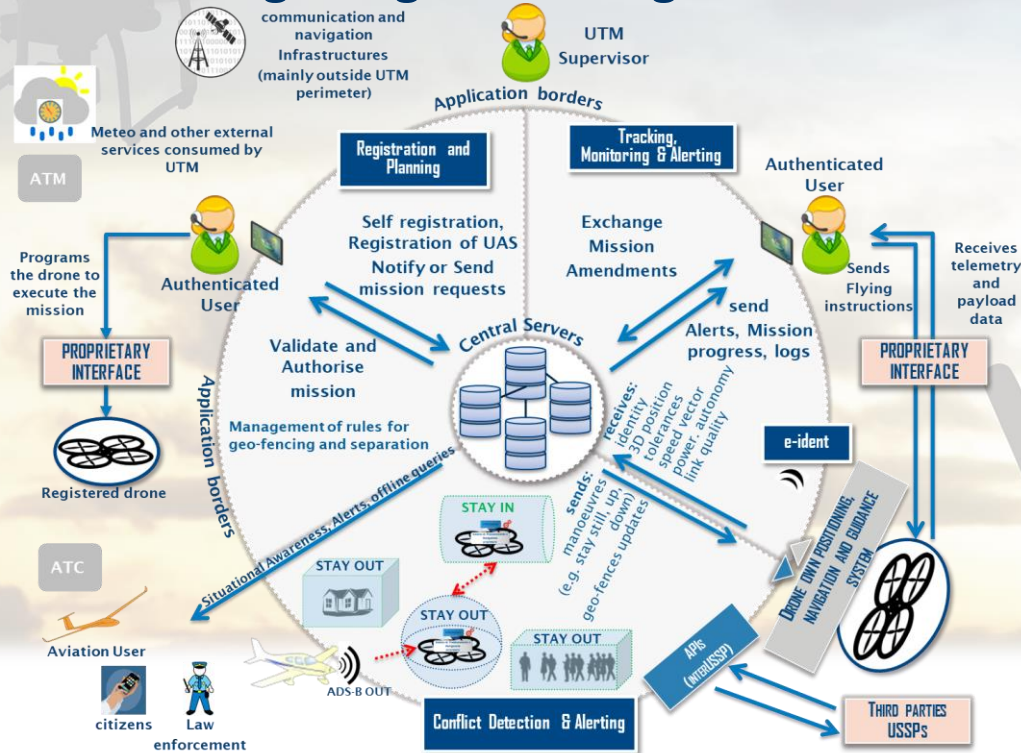


d-flight roadmap





d-flight high level target architecture



Several stakeholders involved, in managing complexity:

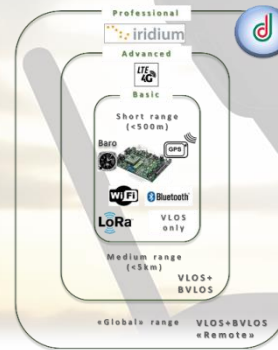
- Users
- Supervisor/coordinator
- Operations
- Proprietary interfaces
- APIs and ICDs for downstream USSPs development



d-flight Technical solution – e/Identification, Position reporting and Tracking

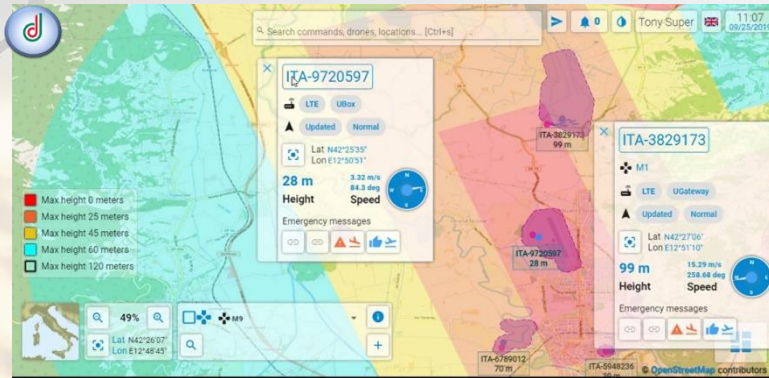


- Hook on device (UTM Box)
- Virtual Box - (GCS plug-in)
- U-space-enabled Drone





d-flight Technical solution – Front-end



Tracking / Traffic information

Mission List

Refresh Status Edit Send Change Status Delete Start Pause Stop

ion Code	Drone ID	Pilot ID	Operator ID	Mission Status	Mission Type	Flight Com
p_1569243980369	ITA-2260075	ahlewgrou	ahlewgrou	RUNNING	RECREATIONAL	VLOS
p_1569244473754	ITA-4236778	ahlewgrou	ahlewgrou	RUNNING	RECREATIONAL	VLOS
9243680565	ITA-5876561	adgm	adgm	RUNNING	CRITICAL	BVLOS
p_1569242633559	ITA-2164914	ahlewgrou	ahlewgrou	DONE	CRITICAL	BVLOS
p_1569243035917	ITA-7774091	ahlewgrou	ahlewgrou	RUNNING	CRITICAL	BVLOS
pe_1569243234103	ITA-2124441	rlaudato_ope	rlaudato_ope	RUNNING	RECREATIONAL	BVLOS

Drone operation planning



Monitoring



ITA-4236778: land immediately!

Warning message for the drone: ITA-4236778. Land immediately!

Emergency mgmt



ANSP, Airforce and other institutions within U-space

Appropriate involvement and engagement of military authorities has to be properly considered for the defense and security requirements

- Need to maintain a well clear, safe and unlimited priority access to State aircraft for e.g.:
 - search and rescue, SAT, civil protection, heli-ambulances, fire-fighters, low level flight training activity, law enforcement etc.
- U-space development and regulation shall consider very special military requirements, such as prioritization, stealth operations, management and protection of military data/information, etc.
- U-space development can benefit from the considerable experience accrued by military community in RPAS operations
- ANSPs, as recognized national institutions, have the proper position and recognition to interact with all those entities which might be interested or impacted by drone operations especially in VLL (very low level), such as military, police and other civil servant entities



U-Space service manager and downstream USSPs

- While the essential services required for the safe integration of drones should remain within the perimeter of the U-space Service Manager, as a public service, other USSs might compete in the market, for the provision of non-core UTM services
- The existence of the U-space Services Manager ensures interoperability and conformity between different U-space Service Suppliers
- The U-space Services Manager ensures equitable access to the airspace to all USSPs and its subscribers, and harmonizes the interaction between them, the manned aviation and the involved authorities
- For every downstream U-space Service Supplier, the U-space Services Manager acts as a proxy/intermediary to the manned Air Traffic Management system
- Whilst the core role of the U-space Services Manager is to provide the core U-space functions outlined above, the provider of these services could, dependent on national preferences, also act as default U-space Service Supplier for basic services



U-Space services

Service Manager
Registration (Drone Registration, Drone Pilot Registration, Drone Owner Registration, Drone Operator Registration)
e-Identification
Tracking
Drone Aeronautical Information Publication
Geo-Awareness
Geo-Fencing provision
Mission declaration/authorisation
Strategic Conflict Management
Tactical Conflict Management
Monitoring
Traffic Information
Interface with ATC
Emergency Management
Legal Recording
Accident/incident reporting

Supplemental Data Services
Weather information
Geospatial information service
<ul style="list-style-type: none"> • Terrain map • Buildings Obstacles
Population density Information
Electromagnetic information

Other supporting services
Dynamic Capacity Management
Registration Assistance
Drone operational plan preparation assistance
Risk analysis assistance
Citizen reporting
Digital Logbook
Insurance services
Asset management
Data management

Infrastructure Services
Navigation Coverage information
Navigation Infrastructure Monitoring
Communication Coverage information
Communication Infrastructure Monitoring
Surveillance Data
Refuelling – Landing/Takeoff points
Delivery/Pick up points
Automatic shelters
Urban corridors

As an example: Inspection mngmt.



Conclusions

- **Our institutions** believes in a centric approach for basic U-space services so to grant equal and fair access to U-space for all users in the whole country, whether the market exists or not or despite any commercial consideration
- **d-flight delivers U-space foundation services:**
 - Natively embeds data flow Vs authorities (CAA, ANSPs, AirForce, Civil Protection, Law Enforcement, Ministries, neighboring countries)
 - Assures universal access for UAS operators to basic U-space services in all portions of airspace
 - Enables open and competitive market for vertical solutions through public APIs and ICDs
- **d-flight is an aggregator** for several different U-space (or close to U-space) Service Providers which will be able to ease and improve complex UAS operations and its integration with other manned operations, with no compromise with safety, security and privacy.
- It is not a barrier for market entrees in U-space business, on the contrary:

d-flight is a catalyst for the market of any service related to UAS operations!



d-flight

enabling autonomous flight



**Thanks! Visit us at our booth for
further details**
