Where can drones can fly and where not? Which rules of the air, which air traffic control procedures?

7TH FLORENCE AIR FORUM

Florence School of Regulation (FSR-Transport)

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ENAV ROLE and Mission

ENAV is the designated responsible for the provision of Air Navigation Services within the Italian Airspace, from GND to ULM

- ENAV's primary task is to contribute to the efficiency of the national transport system guaranteeing the safety and regularity of circulation within the Italian air space to **all categories of users**, respecting the international obligations of the country
- Users must comply with all the applicable rules, e.g VFR or IFR, aircraft category and navigation performances, onboard equipment, interested airspace categories, weather conditions, restrictions, exemptions, etc. and apply all the relevant procedures

ENAV is strongly motivated to support the advent of drones, regardless their categories, business mission and modes of use. Drones must be able to fly within our airspace, provided that there will be no compromise for the safety and regularity of circulation of any other user.

ENAV view

We see two main distinguished (although not black and white…) areas for development/emerging themes

- The so called "**integration of RPAS in ATM**", i.e. in "controlled and non-segregated airspace":

  This theme is addressed by the European ATM Master Plan. R&D related activities are performed under SJU coordination (SESAR 1 DEMO Campaign 2013, S2020 Program – Pj03a-09, 10.05, 13.01.01). Ruling process is on-going at international level

- The exponential growth of "**small drones**" used for recreational or business purposes. Use is mainly under 500ft, i.e. within "UNCONTROLLED AIRSPACE":

This theme is yet not addressed nor recognised in the European ATM R&D Agenda

ENAV View

RPAS integration in ATM (1/2)

In March 2015 ICAO published the first edition of a RPAS Manual, with the purpose to provide guidance on technical and operational issues applicable to the integration of RPA in non-segregated airspace and at aerodromes.

The tendency is to “mandate” RPA to comply with minimum CNS equipment requirements and relevant airworthiness certification applicable for operations in the specific airspace, rules of the air and compliance with the local ATS authority.

Additionally, the RPAS operator needs to be able to provide to the appropriate authority a Flight Plan for its approval, prior to the execution of the flight, and be able to conduct the flight in conformance with the approved Flight Plan, on the basis of the clearances received by ATS along its execution.

ENAV View

RPAS integration in ATM (2/2)

From the ATCO point of view, ideally it should be completely transparent whether ATC interactions are conducted with a piloted aircraft, a remotely piloted aircraft or an autonomous aircraft. Seamlessly, this is probably true for aircraft to aircraft interactions! In the real world, special procedures will have to be accommodated, including e.g. the application of larger separation minima, new Flight Plan fields which specify recovery modes and flight behavior in case of loss of C2 Link, etc.

ENAV is involved with a primary role in EC funded demonstration activities (e.g. SU MEDALE Demonstration project, ESA DESIRE, DESIRE2); we're proposing us with a leading role in all related S2020 R&D projects/solutions.

Our R&D goals are:

- Accommodate RPAS with minimum impact on our technologies/on-going investments;
- Minimum impact on ATCOs workload;
- No impact on overall safety records and minimum application of special procedures, which would negatively affect the regularity of traffic flow;
- Minimum impact in term of ATM related airborne equipment to comply with.

ENAV View

Small Drones

Each State is currently developing rules at national level (some time using different approaches). Such small drones, unless malicious or misconducted behavior, are not impacting legacy ATM service provision; furthermore current rules exclude them from accessing controlled airspaces.

Although regulation for small drones in Europe is currently delegated to State level, EASA recently published a Concept of Operations for drones, introducing **a risk based approach to regulation of unmanned aircraft**.

A huge **limitation** of current regulation(s) is represented by the constraint to maintain the drone under direct observation/control by the operator, i.e. in Line of Sight; *the current limit is set e.g. 500m of distance between the pilot (or observers maintaining communication with the pilot) and the drone, with no obstacles to direct observation.*

In order to enable the rendering and the exploitation of all innovative services built upon drones, full autonomous BLOS drones operations should be allowed: **current limitation have to be addressed and overcome!**

ENAV view is that an "**Unmanned Aerial Vehicle Traffic Management (UTM)**" service availability, together with the means of compliance (equipment, procedures, etc.) to be mandated to any intended operator, would be the required enabler to overcome such limitation.

While in USA, NASA has been mandated to coordinate UTM development (with a significant budget assigned), ***Europe has no a R&D Agenda item addressing it****.*

ENAV View

Small Drones marked advent supported by UTM

UTM is a system based on a high level of automation, which integrates localisation and geo-reference systems allowing, in a given volume of space, **the simultaneous flow of several small drones**, even over populated areas, each drone free to pursue the objectives of the mission for which it has been designed and it is being operated. Main functionalities provided by UTM should be

- **planning**
- **monitoring**
- **assure separation from obstacle, other vehicles and geo-fenced area**

UTM is the key enabler to remove the current regulatory limitations, thus allowing the full exploitation of the new markets and services built upon an intensive use of (small) drones**.**

Institutions and relevant European agencies should foster and support the fast development and deployment of an **UTM service**, enabling **safe** autonomous flight for “small drones” traffic under 500ft (i.e. outside traditionally controlled airspace).