



How Can UAS Be Useful For Police Forces

By Captain Gilles Robine

The French police forces have been interested in the use of the unmanned aircraft systems (UAS) since 2005, when the first studies were carried out on this subject. This can sound surprising for a police force which, compared to its counterparts, seems to ignore the 3rd dimension: the French police forces does not operate any helicopters and fly less than 2000 hour per year for surveillance missions. This singularity comes primarily from the task sharing between a security service - the *Gendarmerie Nationale* - in charge of the rural areas and another - the *Police Nationale* - in charge of crowded agglomerations. This repartition naturally led the Gendarmerie to constitute a fleet of helicopters (~40) mandatory to supervise a very vast area, whereas the police was more focused on «ground» investigation.



Paradoxically, the lack of an existing police air unit probably constitutes an asset; on the basis of a white sheet it becomes possible to consider, with impartiality and only the constraints of effectiveness, the air support organization for the next decades. From this point of view, the option offered by UAS must of course be studied with the greatest attention. For this reason, the national police forces posed themselves early on the fundamental question - which missions could be better accomplished by UAS? - and drew up a first UAS roadmap on the basis of these thoughts.

The question of using UAS should obviously not be considered as a fashion phenomenon, or worse as an inevitable future, the only question remaining being that of the availability deadlines. Such an attitude would indeed prove in the long term to be unproductive, considering that piloted machines currently achieve perfectly well a great number of missions, very often under fully satisfactory security conditions for the pilot and his passengers. We will thus try to describe the missions which, at this stage, are likely to be achieved more effectively, or in a complementary way, by UAS.

Mini UAS for Simple Short-Range Imagery Missions

In the short term, two main missions have been identified which could be accomplished with short range UAS. First, a basic mission, which often constitutes the base of ground investigation: getting an exploitable photograph of a target under condition of absolute discretion. It can be a matter of counting individuals, identifying them, recognizing a license plate number or simply better understanding a site configuration before an intervention. In all these cases, the required discretion does not plead for helicopters or any recognizable aircraft. On the other hand, an electrically powered mini UAS, like the one tested within the ELSA program described below, which is invisible and inaudible at a distance of a hundred meters, would be capable to provide this service. Besides, this type of UAS could fulfil

a task of first utility for the protection of civil servants that are to undertake an intervention: perform a check after an emergency call. Indeed, it happens in period of tension that emergency calls are nothing but lures intended to ambush the rescue teams (policemen or firemen). An aircraft, able to transmit images of the intervention area a few minutes before the arrival of police forces would allow to check in time the reality of facts ... and to avoid incidents with sometimes tragic consequences. In this particular case, the advantages of UAS are double: first, a capacity to be put into operation at once (in opposition to helicopters which cannot be operated specifically for these tasks unless they are already in the air), second, the simplicity to automate such an action (a valid GPS point and the preliminary knowledge of a precise ground model is the only information required). The aircraft must in that case meet specific requirements related to the speed of its deployment and its capability to rapidly arrive at a location a few kilometres away.

Another often-mentioned scenario concerns public order aerial support and more specifically the recording of video footage for evidence purposes during demonstrations or other long lasting public events (rave parties, international events...), which are likely to monopolize a substantial public order service. In this case, helicopters - if they are well equipped - can fulfil the mission, with three limits however: the capacity to remain in flight during hours, the noise disturbance (which can sometimes be required for its dissuasive effect) and... the associated cost. UAS adapted for these scenarii, airships for example, could then prove to be an interesting complementary means to existing ones.

Towards Mutualisation For Complex Missions

Lastly, in a very different register, it appears that some civil safety needs today do not find satisfactory technical solutions. These missions have in common that they require the monitoring of large areas, with a strong need



for aerial permanence. This includes coastal surveillance missions, particularly overseas, but also the monitoring of railway tracks, gas pipelines and large building sites, which are often targeted for theft purposes by well organized criminals, who are responsible for huge financial losses. The UAS likely to fulfil these missions probably belong to the MALE category (Medium Altitude Long Endurance), and therefore today cannot be considered for civil operational use in France, principally for legal and economical reasons. Nevertheless, this scenario deserves special attention considering that the field of application is particularly vast, far beyond the strict police forces missions: energy control (house thermo isolation), air quality control, NRBC detection, ground or sea pollution detection, early fire detection, ...etc.

In short, in principal three types of programmes have been identified: in the short term for discreet short range imagery missions, in the medium term for public order air support missions and in long run for wide area air control missions. For these three cases the cost factor seems crucial. The use of the UAS must allow significant cost reduction to be eligible as a useful complement of existing aerial units. As benchmark, one considers that EUR 2000 is a minimum, all inclusive, cost for a helicopter flight hour, which gives a rough idea of the economical objectives to be attained by civil UAS.

ELSA, An Innovative Mini UAS Experimentation Programme

Taking the aforementioned elements into account, the French national police forces wanted to be pragmatic and especially avoid the *tunnel effect*, which would consist of launching into the theoretical work of defining the suitable solution for 2018. The idea on the contrary was to advance step by step, in order to progress regularly, while preserving the motivation of all persons involved by aiming for and achieving practical intermediate goals. Thus, in parallel of the fundamental studies launched on the regulatory aspects, specific frequencies attribution and the acceptability of UAS by the general public, the STSI (Service des Technologies de la Sécurité Intérieure) started a first mini UAS operational validation program. The aim of this program, while waiting for the regulatory adjustments, which will enable operational use, is to allow policemen to familiarize themselves with the use of UAS in a context as close as possible to real-life operations.

The ELSA (Engin Leger de Surveillance Aérienne) programme began in 2007 and makes it possible for various police services (counter-terrorism, special action, investigation, law enforcement) to pilot a mini UAS under

different circumstances (more than 10 scenarii have been written with the specialized services) during a six months period. For this purpose, several officers of the concerned services were trained to pilot the unmanned aircraft and are taking part in the experimentation. The main objective is to validate the capacity of the selected UAS to achieve, partially or completely, the different missions, and also to build up a first mini UAS operational reference framework for the police forces. It appears at this stage that beyond the technical performances of the UAS, the capacities of the police officers to integrate this new tool in their operational scheme constitutes a real challenge, which should not be underestimated.

The basic technical and operationa specifications of ELSA are as follows:

- weight: approximately 1kg
- motorization: electric motorization
- airframe type: fixed wing
- payload: day and night cameras
- air speed: between 15 km/h and 70 km/h
- autonomy: 30 minutes
- range: 2 km
- full automatic capabilities (take off & landing).

Finally, in the light of the work and experiments carried out by the French police forces, it appears that the UAS could gradually find a place in the air as complement of the existing air units. In the short run, light UAS (not inserted in air traffic) will probably be used for very simple imagery missions, later on the medium altitude long endurance UAS will be used for public order support missions and for long range monitoring and control missions. These last missions will undoubtedly have to be considered within the logic of interdepartmental mutualisation, not only for security purposes but also (mainly?) to improve environmental protection and natural stock management.



Capt. Gilles Robine