



Light UAS: Potential Police Applications

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Unmanned aircraft systems (UAS) have become a mature technology within the military. They have been extensively deployed in battlefield scenarios to provide an airborne platform for an array of different camera technologies, and can be used as a surveillance tool and as a source of CCTV imagery in dynamic situations.

As with much that originates within the military, there is a gradual migration of the technology into the civil arena. A good example is the helicopter, which was originally developed solely for military use in 1936 and which now is used by virtually every major public service. Over the next few years it is anticipated that there will be a significant increase in the use of UAS technology outside of the military.

One obvious potential customer is the police, who already deploy helicopters to provide a view from the air of incidents on the ground. It follows that as manufacturers continue to develop these systems, they will find niche markets into which they will be able to sell. And sell they will, for this market could be substantial.

So what would the Police be looking for?

The answer to that question will be outlined in an SoR (Statement of Requirements) currently being worked on by the Association of Chief Police Officers (ACPO) UAS steering group in the United Kingdom.

What that document is likely to contain is a series of operational requirements that will require some creativity and innovation on the part of developers – particularly on the system control side of the equation. For example, it is likely that there will be a requirement for systems to automatically track an identified target (such as a running man) with the camera remaining on target AND the system flying autonomously, whilst streaming the live video to a mobile base-station (e.g.: a ruggedised laptop).

This may be a daunting challenge for manufacturers of small UAS to achieve, given the limitations on payload that such systems can carry, but it is at this end of the market that the British Police are looking. Whilst heavier airframes could carry the technology that would deliver this requirement, those airframes will never be deployed in British skies until a resoundingly safe 'sense-and-avoid' technology is developed that meets the requirements of the CAA. Whilst projects are in place to develop sense-and-avoid, the earliest realistic date for a working technology is 2012 – and that may be optimistic.

This presents the manufacturers of smaller systems – those that can be flown today, below 400 feet and within line-of-site of the operator – with a window of opportunity to exploit the desire within the police to have access to cheaper airborne platforms than helicopters. Four British forces have already been early adopters, purchasing a range of systems from different suppliers, but all would agree that the systems still have a long way to go in terms of being truly user-friendly and easy to deploy.

The Future

If, sense-and-avoid existed, what then?

The day that happens will see a transformation in our skies. Unmanned Aircraft Systems would be adopted by power companies, to monitor transmission lines; by water authorities to monitor water courses, by the railways and BTP to monitor the tracks; by the highways agency to monitor traffic flows and of course by the police in general – not as a replacement for helicopters, but as an enhancement of the mixed air assets available in the fight against crime and terrorism.

Amongst the most appealing aspects is the revenue costs of running such systems, which would be a fraction of those incurred by running helicopters, and the inherent endurance that these airframes would have between refuelling stops. It is conceivable that police forces might keep these systems in use virtually continually, detecting anomalous activity on the ground that is indicative of criminal activity. Take, for example, theft of metals – and in particular, theft of lead from church roofs, which is a particular crime problem in the UK at the moment.

I can envisage a UAS being deployed over the skies of Northamptonshire, where I live, at night, on a pre-programmed route that has each of the churches with a lead roof, as a waypoint. The system would be instructed to look at each roof, with an IR camera, and automatically detect and report any heat sources likely to be a human being, streaming live video back to Force Headquarters for analysis, where an anomaly occurred.

I have a friend called Ken Pease, who is professor of criminology at Loughborough University, who will tell you that criminals engage in activity that enable self-selection – in other words they do things that you and I wouldn't do, and if you can detect that activity, you will catch the criminals. Theft of lead from a church roof is a good example. You or I would not be on a church roof at 2-o'clock in the morning, stripping metal from the building. The ability to automatically detect activity such as this is – and thereby make life hard for the criminal – is what attracts the police the most to this technology.

Consider another crime type. High-value thefts from curtain-sided haulage vehicles parked up at night. The same model described above works. The A14 that runs through Northamptonshire is a hotspot for thefts of this kind. The road is unlit and has lay-by's every mile where trucks park at night, only to find their loads missing in the morning. A UAS could patrol this route all night and again identify any anomalous human activity on the ground. This technology offers the potential to catch criminals when they are at their most vulnerable – being in places they shouldn't be, doing things they shouldn't be doing.

Of course, there will be howls of protest from the campaign for criminal – sorry, civil – liberties, who will argue that surveillance of this type is an infringement of our Human Rights, but let's face it – when did your human rights ever

extend to relieving St John's church of its roof, or Eddie Stobart of a lorry-load of Plasma TV's?

Conclusion

Sense-and-avoid technology is the key to opening up all the possibilities that Unmanned Aircraft Systems offer policing, but that technology is a few years away at best. In the meantime the smaller systems will enjoy a free run at the market, and any manufacturer who can develop a system that is – above all – easy to fly, and can maintain «camera-on-target» for a moving person, such as a suspect running from the scene of a crime, should do very nicely over the next few years.

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