SKY TRACKER

WITH THOUSANDS OF UAVS SET TO TAKE TO THE AIR, HOW CAN WE AUTOMATICALLY KEEP TRACK OF THEM AND PREVENT ACCIDENTS? **ELLEN MALFLIET** LOOKS AT THE OPTIONS FOR E-IDENTIFICATION SYSTEMS

The potential use cases of UAVs are virtually limitless. They can transform our daily lives. However, UAVs pose a serious security and privacy threat unless they can be identified and monitored by aviation authorities.

In 2017, four billion parcels were ordered online for home delivery. Imagine if only 1% of these deliveries were to be done by UAV in the future – this would mean more than 14,000 UAV flights every hour across Europe alone, according to Airbus' UTM Blueprint.

The increasing popularity and accessibility of UAVs calls for ways to identify who is flying them and where the pilots are – especially in flights that would require them to fly long distances out of the pilot's line of sight or even autonomously.

E-identification will become mandatory from June 2021 onwards, as per the new European legal framework for UAV flights and operations. This applies to UAVs weighing more than 250g.

Remote identification systems will bring radical changes to the UAV industry. They will ensure transparency in the airspace and allow for effective protection of critical areas such as airports, oil and gas industries and stadiums. The development of remote ID solutions means the UAV market is anticipated to grow at an accelerated pace.

Traditionally, aircraft have always been identified, tracked and separated from each other using radar technology. UAVs fly in lower level airspace, where most radars cannot pick them up. Combined with their small size, it makes it difficult to track them.

The specific radar technology to track UAVs in lower level airspace does exist. It requires the installation of radar towers around a specific area, providing excellent coverage, capturing all aerial movement in a given area. Its accurate tracking capabilities make it well-suited for vulnerable locations such as airports. However, this infrastructural requirement coupled with its limited range diminishes its suitability for widespread rollouts.

Many countries around the world have implemented Automatic Dependent Surveillance – Broadcast (ADS-B) tracking to identify and track aircraft. With ADS-B, the aircraft's position is broadcast by an ADS-B capable transponder. This information can be received by air traffic control ground stations and also by other aircraft. This enables situational awareness and self-separation between aircraft. However, ADS-B has not been designed to cater for the large number of UAVs that will fill the skies.

The ideal solution

The ideal solution combines tracking capabilities with e-identification. Just like the licence plate on a car, e-identification links a UAV to the registered pilot. It's important for the device to report the UAV's position in real-time as well as a series of direct remote identification parameters.

The device should be agnostic, completely separate and mounted on top of the UAV. It should not consume energy from the UAV's battery, as this would compromise safety. To withstand the airspace's harsh conditions, the device has to be robust with a weather-proof enclosure that can operate in a wide temperature range; from freezing to blistering hot.

From the moment the device senses movement, it should automatically start broadcasting collected data including identification, current position

and take-off location over LTE mobile phone network connectivity.

The necessary equipment is already in place wherever there is mobile phone coverage, as towers are already plentiful in many areas. Moreover, the device should be a GNSS-based tracking solution, supporting GPS, Galileo, Glonass and BeiDou, and be able to support multiple LTE bands, giving it a worldwide reach in terms of tracking capabilities.

The collected data can also be made available via Bluetooth Low Energy broadcast. This makes it possible for authorities to identify the operator, determine the current position of the UAV and pinpoint the location it took off. Via an intuitive, user-friendly app, authorities can read out all details of UAVs flying within a distance of up to 200m.

If a UAV crashes, the data can be read out similarly to the black box found in manned aircraft.

Compared to traditional aviation technology, we need a way to track UAVs in a more efficient manner. Furthermore, the ideal solution should make it possible to link a UAV to the registered pilot through e-Identification, whilst allowing for real-time tracking. All that is required is for the device to be mounted on the UAV. This way, UAV tracking becomes scalable, cost-efficient and interoperable.

Developments like this allow us to edge closer to science fiction-inspired dreams such as transport by UAVs. There still is a long way to go, but developments are looking promising. We have reached a point where we can realistically work towards achieving these dreams, making many more applications in high-risk areas a safe and secure reality.

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