



GSMA Internet of Things Case Study Telco GSM networks for Low Altitude Airspace Management

EXECUTIVE SUMMARY

Telstra has been researching the features and characteristics that the aviation industry requires of its wireless networks to provide communication, navigation and surveillance to aircraft, including drones, recreational and general aviation operating in the currently unmanaged lower altitudes. This work has been carried out by Telstra Labs in conjunction with Thales.

Background

In Australia, the Civil Aviation and Safety Authority (CASA) regulates the national airspace and Air Services Australia is the Air Navigation Service Provider (ANSP). Both organisations are under direction from the government to develop strategies, policies and procedures around better managing drone usage.

Telstra and Thales both actively respond to requests from CASA, ASA, The Ministry for Transport, Regional Development and Cities as well as Senate inquiries for information and keep all of the above parties informed of our collaborative work.

There are many challenges to the safe and secure management of drones that are being solved through the application of Telstra and Thales technologies. Thales provides general aviation traffic management technology to Air Services Australia and has a wealth of international experience in managing airspace. Telstra brings a wealth of networking capability in their advanced LTE wireless networks and a solid understanding of aviation networks as they supply underpinning terrestrial network connections for civil and military airspace today. Their LTE networks also have some unique features that can serve the application well.

Objectives and challenges

The most pressing and short-term problem for the industry is the time taken to seek and gain approval for BVLOS flights. Telstra's combined approach automates that process as much as possible reducing operator and regulator workloads.





Registration of drones is about to be introduced in Australia, and remote electronic identification is likely to follow. Telstra proposes that existing identity checks and device registration processes used by operators for mobile phones have been proven effective, safe and secure and can be repurposed for this application.

Built into the system is a flexible framework for the imposition of whatever business rules might exist in the future. These includes tools for:

- Airspace management
- Air traffic flow management
- Airspace density management
- Dynamic no fly zones
- Emergency override
- Traffic prioritisation by mission type
- Traffic prioritisation by operator

Later in the development, Telstra hopes to see advanced features supporting:

- De-confliction
- Dynamic routing
- Collision avoidance (supporting future on board and ground based sensors)

How mobile networks can support drones

Telstra sees the mobile network as middleware, sitting at the hub of communication between the aircraft, operator and ANSP. There are a number of aviation specific features they are investigating for inclusion into a specialised service for Low Altitude Airspace Management.

Some of the features we are considering are:

- Identity – the SIM based mechanism provides a robust and proven ID method
- Location verification – using the network as a secondary source of location to verify data coming off the in-flight aircraft
- RF coverage publication – for automation of route planning and risk assessments.
- Private and secure networks
- Network prioritisation
- Situational awareness tools for authorities.
- How traditional legally required interception tools might be applied



Conclusions and lessons learned

Telstra sees the mobile network as middleware, sitting at the hub of communication between the aircraft, operator and ANSP. There are a number of aviation specific features they are investigating for inclusion into a specialised service for Low Altitude Airspace Management.

Telstra needs to do more work to understand how their networks propagate at altitude and develop planning tools to design coverage at altitude.

OEM integration will be required for the system to be most effective. This itself will require regulation to mandate the adoption of the technology. Telstra are engaging with drone and flight controller OEMs in anticipation.

Traditional control links for UAVS are generally point-to-point and non-redundant. Mobile networks allow for longer control range at affordable prices with the diversity and network management of a well-engineered mobile network.

Telstra see potential for two types of mobile services:

1. A secure aviation network for traffic management
2. Industry specific payload services

There is opportunity, once an LTE modem is onboard, to offer a range of value-added payload services in addition to the service, to meet regulatory compliance requirements. These might include things like:

- News gathering video uplinks with QoS and throughput minimums
- High volume plans for large data sets
- IoT services
- Private networks
- Future capability not imagined yet

Telstra and Thales will proceed to larger and longer scoped trials in and about a regional city in Australia and incorporate general aviation into the trial as well as complex operations in an urban environment.



About the GSMA

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com or the GSMA Internet of Things programme at www.gsma.com/IoT.

Follow the GSMA on Twitter: [@GSMA](https://twitter.com/GSMA).

Further reference materials:

www.gsma.com/drones

About Telstra

Telstra is Australia's leading telecommunications and technology company, offering a full range of communications services and competing in all telecommunications markets.

In Australia we provide 18.0 million retail mobile services, 3.7 million retail fixed bundles and standalone data services and 1.7 million retail fixed standalone voice services.

We believe the more connected people are, the more opportunities they have. That's why we help create a brilliant connected future for everyone, everyday.

That's why we build technology and content solutions that are simple and easy to use, including Australia's largest and fastest national mobile network. That's why we strive to serve and know our customers better than anyone else – offering a choice of not just digital connection, but digital content as well.

And that's why we have an international presence spanning over 20 countries.

In the 21st Century, opportunity belongs to connected businesses, governments, communities and individuals.

As Australia's leading telecommunications and information services company, Telstra is proud to be helping our customers improve the ways in which they live and work through connection.

www.telstra.com.au



About Thales

The people we all rely on to make the world go round – they rely on Thales. Our customers come to us with big ambitions: to make life better, to keep us safer. Combining a unique diversity of expertise, talents and cultures, our architects design and deliver extraordinary high technology solutions. Solutions that make tomorrow possible, today. From the bottom of the oceans to the depth of space and cyberspace, we help our customers think smarter and act faster - mastering ever greater complexity and every decisive moment along the way. With 65,000 employees in 56 countries, Thales reported sales of €15.8 billion in 2017.

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