ACP-2020-082
CAA Assessment Meeting

Develop & deploy a solution for BVLoS Drone Operations in non-segregated airspace

12th November 2020

Agenda

Introductions
The Consortium
Project Partners
The Project
Statement of Need (Review & Discuss)
The Concept of Operations
Issues arising from proposed change
How to address identified issues
Provisional indication of the appropriate scaling level and process
Stakeholder Engagement
Provisional Project Timescales
Questions
Next Steps & AOB

Introductions

- CAA
- Consortium
- Project Partners

- Confirm all participants are happy to be recorded. Recording will be destroyed once the meeting minutes have been finalised.

The Consortium

- Trax consultants are experts in airspace change, policy, regulatory approvals, classifications and restrictions, flight planning, IFP design, mapping, terrain and charting, live airspace trials, concept development, airspace operational procedures, safety risk assessments and stakeholder engagement and consultation. Trax holds a CAA Permission for Commercial UAS Operations which will be used for the VLOS testing. Trax may seek an OSC for BVLOS operations subject to time constraints.

- uAvionix are experts in developing state-of-the-art airborne avionics transmitters and air/ground-based receivers, navigation aids and UAS integration. uAvionix President Christian Ramsey is appointed to the FAA's Drone Advisory Committee. They have proven and established track record in dealing with the UK CAA and with the process of seeking test license applications for emissions via Ofcom. Working alongside their team of engineers, uAvionix Director of UK/EU Regulatory affairs, Jonathan Smith, will lead the deployment of surveillance capabilities. Jonathan is a licensed Pilot and Flight Information Services Officer.

The Consortium

- ANRA's software platform supports a myriad of UAS through a cloud-based architecture to enable real time flight planning, traffic management, strategic de-confliction, compliance, and fleet management while supporting stakeholder interfaces and integrations. The software will utilise the uAvionix data inputs, configuration and CAA permission for trial, in order to demonstrate acceptability for the UK market.

- Plane Finder's global surveillance network enables end to end control ensuring data integrity that is trusted by industries around the world. In the consumer market Plane Finder's innovations are subscribed to by millions of global Plane Finder app and website users. Together this gives immense domestic and international exposure.

Project Partners

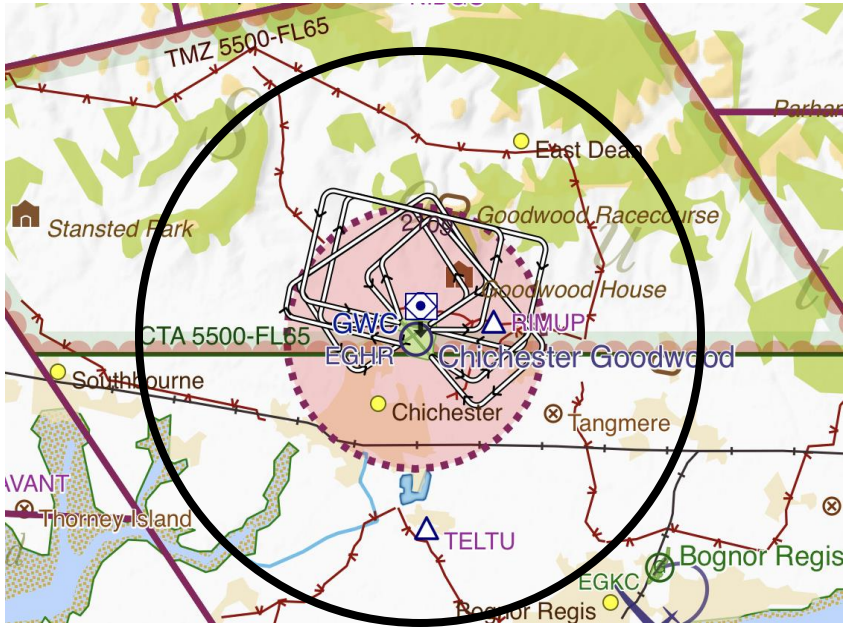
- The Goodwood Innovation Centre is a joint venture between Goodwood Aerodrome and Across Safety Development. At its heart is a team of dedicated professionals experienced in both the manned and unmanned aviation sectors, who are passionate about bringing new UAS technology to market. Goodwood Aerodrome and the Innovation Centre at Goodwood are trial hosts and sponsors of the airspace trial.

- Goodwood Aerodrome is located 1.5 nm north northeast of Chichester, West Sussex and is an all-grass operating environment with two runways. It is a thriving GA airfield with a flying school and multiple businesses operating from the aerodrome.

- Skyports is a mobility company developing and operating landing infrastructure for the electric air taxi revolution, as well as operating cargo drone deliveries. Skyports are a UAV operator trial participant with a BVLOS OSC and suitable aircraft. Their OSC will require additional approvals for this concept.

The Project

- The consortium has been awarded UK Research and Innovation (UKRI) Funding because the technical solution proposed by the project was considered an essential enabler for a multitude of UAS projects that would allow more effective recovery from existing and/or future CV19 impacts.
- Temporary Danger Areas (TDAs) have been approved by the CAA at various locations including Goodwood Aerodrome to facilitate BVLOS operations in segregated airspace. Such solutions are only short-term. An alternative solution that allows BVLOS operations through a technology as effective as “see and avoid” should be found.
- Consortium partners: Trax, uAvionix, Plane Finder and ANRA Technologies are working together with trial hosts Goodwood Innovation Centre and trial participants Skyports on a project that aims to prove a concept of safe BVLOS UAS operations alongside conventional traffic in non-segregated airspace.
- This airspace will take the form of a Transponder Mandatory Zone (TMZ) requiring all airspace users to be conspicuous. Such a trial requires initial VLOS & BVLOS testing in a TDA to develop the safety assurances to enable transition to BVLOS operations in a TMZ.



Statement of Need (Sept 2020) - Discussion & Review

- The Proposed Solution

The project aims to gradually demonstrate BVLoS operations in non-segregated (Class G) airspace are safe, can meet with regulatory approval and integrate seamlessly with manned aviation whilst still providing safe and efficient access to the airspace by all airspace users.

The solution will provide RPAS operators (and other equipped aircraft) with real-time, shared situational awareness of the airspace, enabling the remote operator to strategically and/or tactically detect and avoid other aircraft during BVLoS operations.

The eventual solution has three components, based on available and mature technologies and procedures, that are applied together in a new configuration:

- A Transponder Mandatory Zone (TMZ) that enables aircraft to enter the airspace, providing they transmit a basic international standard of Electronic Conspicuity (EC) information.
- A surveillance and broadcast environment created by a network of ground stations that receive the EC information from aircraft and rebroadcast it to all as an integrated air picture via international standards.
- An Unmanned Traffic Management (UTM) system that provides the software and interface for remote RPAS pilots to strategically and/or tactically detect and avoid other aircraft.

Statement of Need – Discussion & Review

- The Existing Situation

CAP722, CAP1861 and CAP1915 indicate that, Beyond Visual Line of Sight (BVLOS) operations in the UK are possible in unsegregated airspace, subject to the 'Detect and Avoid' capability of the Unmanned Air System (UAS) being as good as the 'See and Avoid' capability of conventional aircraft under Visual Flight Rules (VFR).

If a UAS will be operating BVLoS with no detect and avoid capability, then segregated airspace (a Temporary Danger Area (TDA)) should be established. TDAs are required, because they reduce risks to conventional traffic imposed by Remotely Piloted Aircraft System (RPAS) to as low as practically possible.

It is understood that there are currently multiple live applications with the CAA for the establishment of TDAs to enable BVLoS RPAS operations. There is a risk that accepting these requests will create a patchwork of temporary airspace segregations across the UK which will quickly become unsustainable due to the impact on safety and efficiency, specifically:

- SAFETY – more temporary segregated airspace increases the risk of infringements by other aircraft into the protected zone, which may result in mid-air collisions.
- EFFICIENCY – more temporary segregated airspace limits access to aircraft into the protected zone, constraining the operations of other aviation activities (some which will also be essential to CV19 responses).

Statement of Need – Discussion & Review

- What this proposal will involve

This project has received funding from Innovate UK as part of the Drone solutions for COVID-19: Innovate UK Article 25 competition and the aim is to conduct a live trial of BVLoS operations in non-segregated airspace.

It is proposed that the location of the trial and trial preparation will be at Goodwood Airfield, who currently have a TDA in place for drone operations. This project has the full support of the Goodwood TDA applicant, the Goodwood Aviation Innovation Centre and Goodwood Aerodrome. This project aims to integrate with Goodwood's current operation to ensure minimal impact on the current airspace users.

The project will develop an airspace trial plan in accordance with CAP1616. The trial plan will contain the evidence necessary for the CAA to approve a live demonstration of BVLoS operations within an established Temporary TMZ within Class G airspace. The evidence for the trial will first be gained from testing within the protection of the Goodwood TDA. For this reason, it is likely that we will seek an extension to the timescales and/or operating hours of the existing TDA.

The Concept of Operations


Goodwood TDA – Current Status

Owing to the delay in UKRI formal project approval to commence, the plan to extend the (then) existing TDA at Goodwood for use by this project was no longer viable.

The Goodwood TDA is no longer promulgated in the AIP.

This project intends to apply for a new TDA to be established at Goodwood in Q1 2021.

It is likely this application will be for a TDA for a period of more than 90 days as part of this airspace trial as explained over the following slides.

Key Trial Objectives

- To create a long-term solution for safe UAV operations alongside conventional manned aircraft in non-segregated airspace.

- Enhance the safety of day-to-day operations in Class G airspace via the broadcast of real-time Flight Information and Traffic Information to enhance situational awareness of all airspace users and stakeholders.

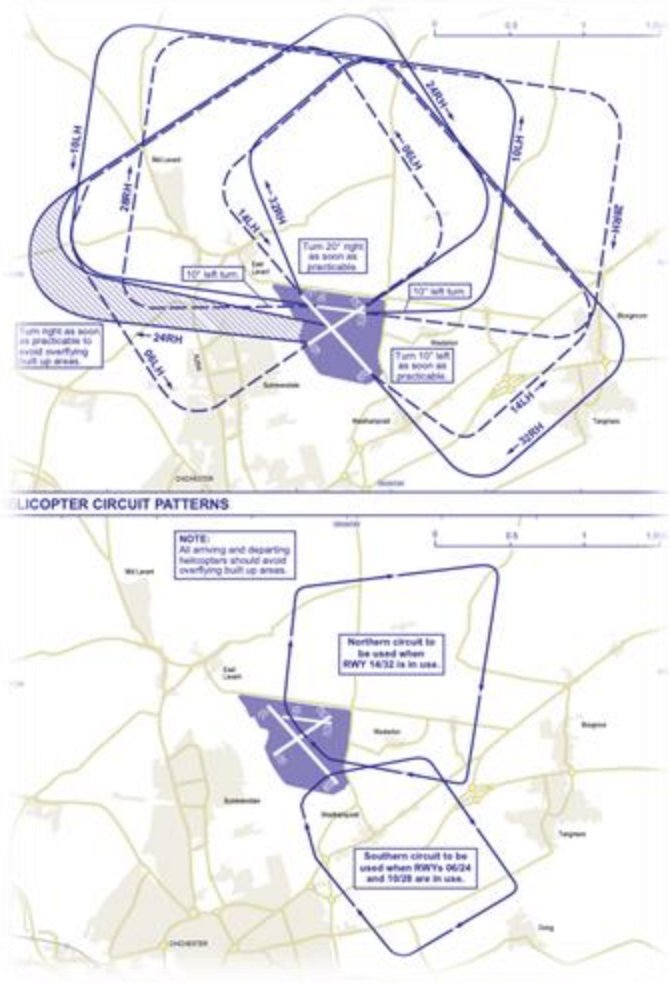
  - This is to be achieved through a gradual build-up of safety assurances and the development of operating protocols in a controlled, segregated environment (TDA).

  - Leading to a demonstration in non-segregated airspace (TMZ) with General Aviation access, subject to meeting a minimum level of EC equipage.

Operating environment

Goodwood is a busy aerodrome in Class G airspace serving a variety of fixed-wing and rotary aircraft.

A FISO provides a Flight Information Service to aircraft on frequency within the ATZ and oversees operations to/from their 3 grass runways.



The surrounding airspace is very busy with General Aviation including the Gliding Community. The recent Farnborough ACP has reduced the amount of Class G airspace in the vicinity.

Goodwood aerodrome welcome and support the trial but the project must not negatively impact the Goodwood operation or their customers.

The Goodwood Innovation Centre recently promulgated a TDA although that has now expired.

Milestones

a) Installation of a network of EC receivers and transmitters with robust and effective coverage.

b) A consultation with aviation stakeholders on the specific aspects of the BVLOS trial including the size, location and equipage requirements of the TDA and subsequent TMZ.

c) Validation of the accuracy and latency of the surveillance system and understanding of limitations.

d) Provide RPAS operators (and other equipped aircraft) with real-time, shared situational awareness of the airspace.

e) Integration of UTM Situational Awareness (web client) for Goodwood FISO to monitor live UAS telemetry and conspicuous aircraft

f) Implementation of a TDA for a period of c.3-5mths for safety assurance development.

g) VLOS and BVLOS flight testing within the segregated TDA that demonstrate both the coverage and technical specifications of the air/ground receive/transmit functions and UTM system. During this testing, the operating procedures that UAS operators shall adopt to enable remote, see and avoid BVLOS operations, will be developed.

h) Test the HMI system in a controlled BVLOS environment (within TDA) with flights by involved GA aircraft.

i) Submission of a trial plan to the CAA including safety assessment in accordance with CAP1616 for an airspace trial to demonstrate BVLOS operations within non-segregated airspace (TMZ).

j) The establishment of a Temporary TMZ for 1-2mths for a live demonstration of BVLOS operations alongside all suitably equipped airspace users.

k) The demonstration and refinement of procedures, permissions, rules and capabilities that UAS operators must be able to demonstrate in order to operate BVLOS in a remote detect and avoid environment, including system failures and contingency scenarios.

l) A final trial report outlining the requirements (systems and procedures) that enable BVLOS operations within non-segregated airspace.


Surveillance & Re-broadcast Overview

- Plane Finder's existing surveillance coverage of Goodwood will be enhanced with additional Plane Finder and uAvionix systems.
- Locations identified for siting of supplementary receivers and new transmitters.
- Requests for 978Mhz broadcast license submitted to OFCOM.
- Systems will detect ADS-B, Mode S (MLAT) and FLARM for UTM/FISO display only.
- TIS-B will re-broadcast Mode S (MLAT) and FLARM position information. FIS-B will include TMZ location/dimension/status.
- Access to TMZ will require Mode S or ADS-B Out as a minimum.
- FLARM will not enable TMZ access.

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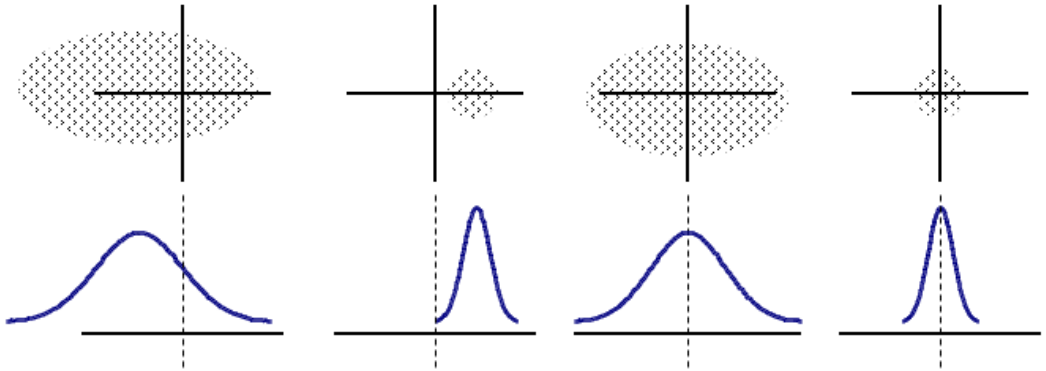
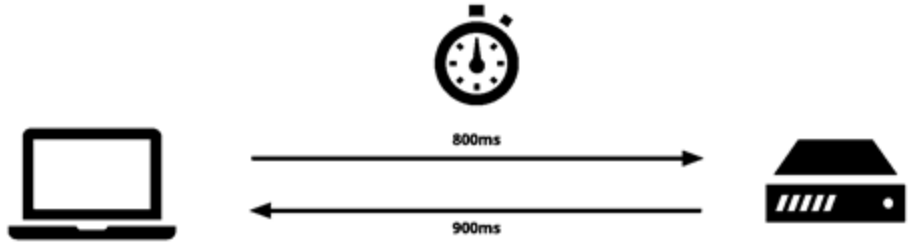
Gradual build-up of safety assurances

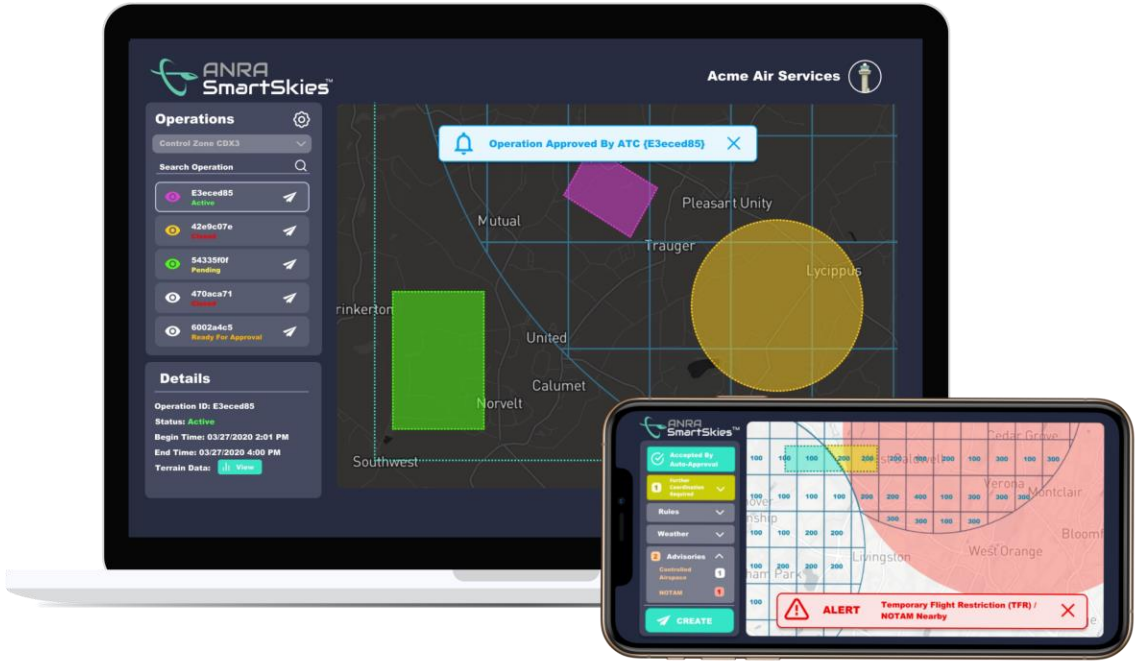
- Surveillance system tested for accuracy and latency.
- Limitations of system (inc coverage) understood and mitigated.
- UAV behaviour and limitations tested.
- Initial VLOS testing to take place either with or without TDA (subject to aerodrome approval).
- Operating protocols developed and refined.
- Additional requirements may be generated for UTM Platform and HMI.





Gradual build-up of safety assurances

- UAV and FISO operator to study and test Smartskies platform.
- Additional requirements may be generated for UTM Platform and HMI such as further alerts & alarms for FISO and/or UAV operator.
- UTM platform & surveillance Site Acceptance Testing.

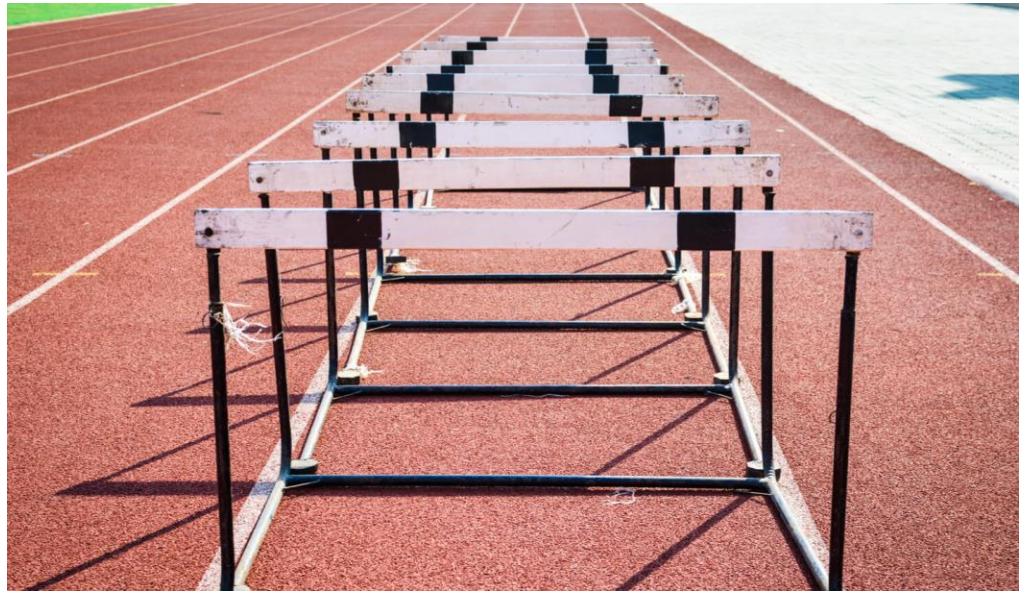


Gradual build-up of safety assurances

- VLOS and BVLOS testing of pre-defined and terrain-safe routes and areas which meet regulatory requirements within TDA.
- Gradual introduction of controlled fixed and rotary traffic to the TDA in simulated scenarios.
- Hazard Identification and Mitigation.

Issues Arising

- UAV operators are not necessarily pilots or ATCOs.
- Cannot be expected to be a licensed position.
- Class G is ‘see and avoid’, so no defined separation standards.
- What can the UAV operator do with the information?
- What **can’t** the UAV operator do with the information?
- Innovation naturally means there’s no policies against which the CAA can regulate.



Trax planefinder uAvionix ANRA TECHNOLOGIES Skyports

We have applied to the CAA Sandbox

ACTIVITY	Details of possible support required
Alignment of innovation, UAS, Airspace and Policy Teams within CAA	The project is multi-faceted requiring and engagement and buy-in across multiple difference CAA departments. Innovation team requested to help co-ordinate comms within CAA and help manage any conflicting regulatory requirements.
OSC approval	Innovation team requested to accelerate information exchange and help UAS team to define all the necessary requirements for such a trial.
De-risk chances of rejection of trial plan by CAA	Innovation team requested to provide a channel for on going engagement, review of draft material (e.g testing schedule and trial plan) and general monitoring of progress.
Escalation of issues within CAA (e.g. regulatory barriers/delays)	Innovative projects often lack policy against which the regulator can assess. Innovation team requested to help the different departments to reach agreement/consensus in a timely but safe manner.
FISO Situational Awareness	CAA permissions to allow Goodwood FISO to view web-based UTM display for improved situational awareness of UAS and conspicuous aircraft


Provisional Indication of Scaling

Stakeholder Engagement

Stakeholders previously consulted for TDA		
Goodwood Aerodrome & Aero Club	Bembridge Airport	NATS
Goodwood Flying School	Shoreham Airport	Farnborough Airport
Goodwood Aircraft Engineering	Sandown Airport	ARC Rescue Co-ordination Centre
Elite Helicopters	Bognor Regis Gliding Centre	DAATM
Ultimate High	Parham Gliding Site, Southdown Gliding Club	National Police Air Service
Boultbee Flight Academy	Glidden Microlight Site	Kent, Surrey & Sussex Air Ambulance Trust
GA Aircraft	Thorney Island Royal Artillery Station	
Solent Airport	Southampton Airport	

Additional Stakeholder's Identified

To be consulted for the trial
Aerodrome Consultative Committee (Boxgrove, Lavant, Singleton, Tangmere and Westhampnett Parish Councils, Chichester District Council, The Chichester Society, Summersdale Residents Association, Sussex Police and West Sussex County Council.)
BGA
LAA
GAA
BMFA
A4A
Chichester & District Model Aero Club
Lasham Gliding Club
South Downs National Park
Local Businesses e.g. Rolls Royce Factory, The Goodwood Hotel

- All of the stakeholders previously consulted for the TDA, plus the additional stakeholders identified will be engaged with & consulted (as appropriate) on the TDA & the TMZ.

Provisional Project Timeline

	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21
Surveillance installation											
TDA/TMZ consultation											
TDA implementation											
Surveillance & HMI Testing											
VLOS/BVLOS Flight Testing		VLOS only without TDA									
Controlled GA integration (TDA)											
Submit trial plan											
TMZ/OSC Approvals											
TMZ Trial inc promulgation											


Questions


Next Steps & AOB

- Minutes of the meeting to be produced and approved by the CAA prior to publishing on the CAA Portal.
- Meeting recording to be deleted.
- CAA to confirm level
- Submit draft consultation document to CAA for review