STIRLINGX
A GALLOS COMPANY

Vanguard Temporary Reserved Area with TMZ overlay

ACP-2025-025: Assessment Meeting

Agenda

1.	**Introduction**	**CAA**
2.	Statement of Need	SX
3.	Background	SX
4.	Issues or opportunities arising from the proposed change	SX
5.	Options to exploit / address opportunities & issues identified	SX
6.	Process requirements – TRA, engagement, safety assessment	SX
7.	Provisional timeline	All
8.	Next steps & AOB	All

**HexCam or Stirling X may be used interchangeably throughout this document*

STIRLINGX
A GALLOS COMPANY

Introduction - StirlingX / HexCam

Who are we?

- StirlingX (previously HexCam) is a professional drone services provider with over 14 years' experience.
- We provide drone-based aerial survey, mapping, asset inspection, construction monitoring, thermal and creative imaging services across a range of industries including major infrastructure construction projects associated with the connection of large offshore wind farms into the National Grid

What are we wanting to do?

- Our goal is to safely carry out energy-efficient, fixed wing BVLOS drone surveys and mapping flights along the Norfolk Offshore Wind Zone (NOWZ) construction corridor (previously known as Norfolk Boreas and Norfolk Vanguard East and West) in fully integrated airspace from our airfield base in Felthorpe

What have we achieved so far?

- Application submitted and accepted as part of BVLOS Sandbox (CAP2540)
- Setup a BVLOS-Trial website to keep community informed, multiple end-user engagements
- 15km BVLOS (VM) approved in 2024 with increasing separation between observers which forms part of a 6-phase plan to integrate BVLOS and other aircraft in a volume of airspace.

STIRLINGX
A GALLOS COMPANY

Statement of Need

- In May 2023, HexCam successfully applied to be part of the CAA's Beyond Visual Line of Sight (BVLOS) airspace sandbox trial. HexCam is therefore seeking a Temporary Reserved Area (TRA) with an associated Transponder Mandatory Zone (TMZ) located in Norfolk, for a six-month trial period.

- The aim of the trial is to demonstrate that by combining a ground-based sensor network with detect and avoid (DAA), an equivalent level of safety can be achieved when compared to see-and-avoid. This is to enable low-level BVLOS UAS operations in unsegregated airspace.

- The TRA will provide a controlled environment to demonstrate the 'accommodation' to 'integration' path described in CAP2533 that supports the airspace integration vision, particularly the integration strategic objective described in the CAP1711 Airspace Modernisation Strategy (AMS). The ACP for the trial will follow the guidance detailed within CAP1616g.

- There are 3 cascading objectives which are described in the following slides.

Statement of Need 2

Objective 1
Demonstrate low-level BVLOS flight and limited managed access to additional airspace users within a TRA (+TMZ). DAA is achieved by the provision of an ATS – with a Flight Information Service (FIS) supplemented with surveillance - by Norwich Airport ATC against EC traffic inside the TRA (+TMZ). This will provide the data to be able to achieve objective 2.

Objective 2
Demonstrate low-level BVLOS flight and limited managed access to additional airspace users in a TRA with TMZ. DAA is achieved by a combined ground-based system (ATOM), Traffic Information Service and onboard Transponder and ADS-B out. Data collected whilst achieving this objective will allow us to prove the case for objective 3.

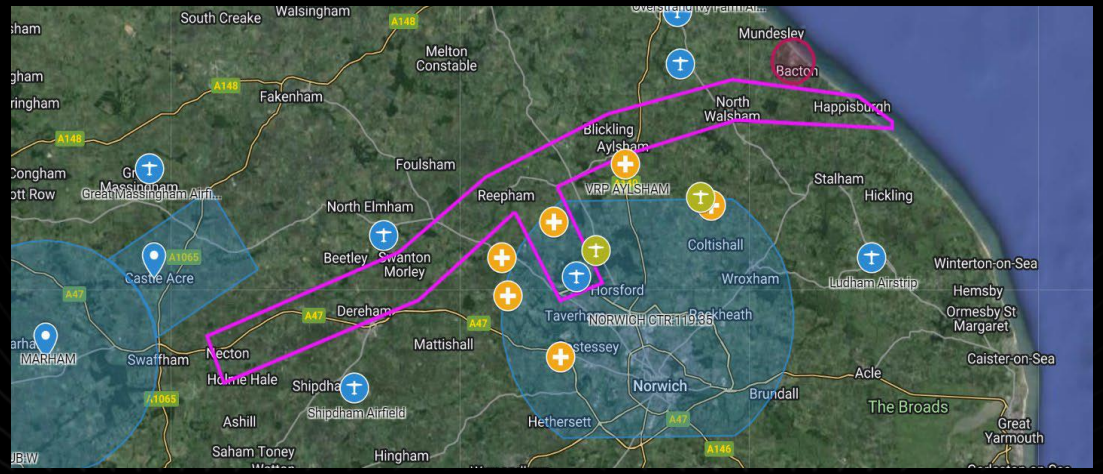
Objective 3 (future)
Demonstrate low-level BVLOS flight in unsegregated Class G airspace.

Statement of Need 3

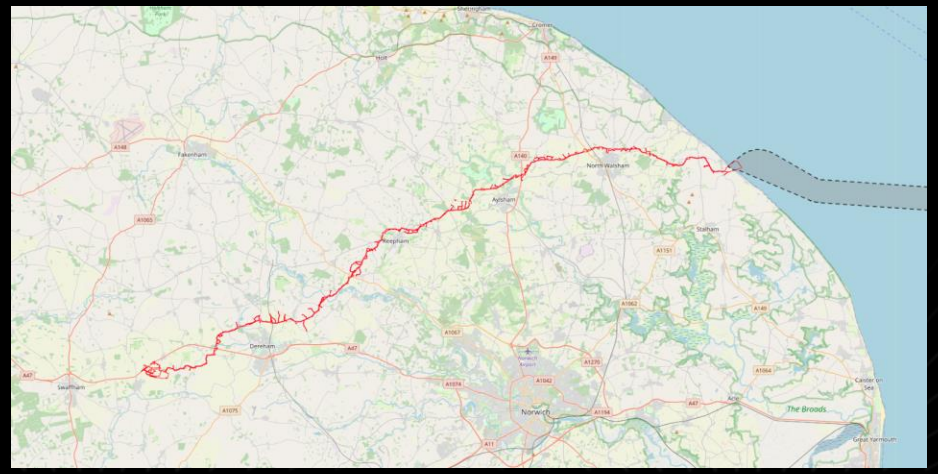
Area of Operation
Note that StirlingX / HexCam already operate on this route monthly using existing BVLOS (VM) permissions.

The proposed TRA broadly follows the route of the NOWZ cable corridor from its landfall between Happisburgh and Cart Gap to the substation at Necton. In addition to the NOWZ corridor, the TRA extends south from Cawston towards HexCam's base at Felthorpe Airfield.

Airspace Details
- The vertical extent of the TRA is up to 750ft on the Norwich QNH equating to approximately 540ft AGL along the full route.
- All drone survey and mapping flights within the TRA will be LOW LEVEL – between 200ft and 400ft Above Ground Level (AGL).



Area of proposed TRA



Onshore cable corridor construction route

STIRLINGX
A GALLOS COMPANY

Background

The Operator

- The Operator has been flying UAS commercially since 2011 and collectively the Remote Pilots have conducted over 10,000 flights gaining 1450 hours of flight time.

- StirlingX currently holds an Operational Safety Case allowing operations with the following exemptions:

    - Extended Visual Distances - out to 1500 m
    - Increased Height Operations - up to 1000 ft AGL
    - Reduced Minimum Separation Distances - reduced to 10 m from Uninvolved People
    - BVLOS (with Visual Observers) - out to 15km from a TOLS
    - Remote RP to TOLS (Control Room)
    - Overflight of Uninvolved Persons

Background 2

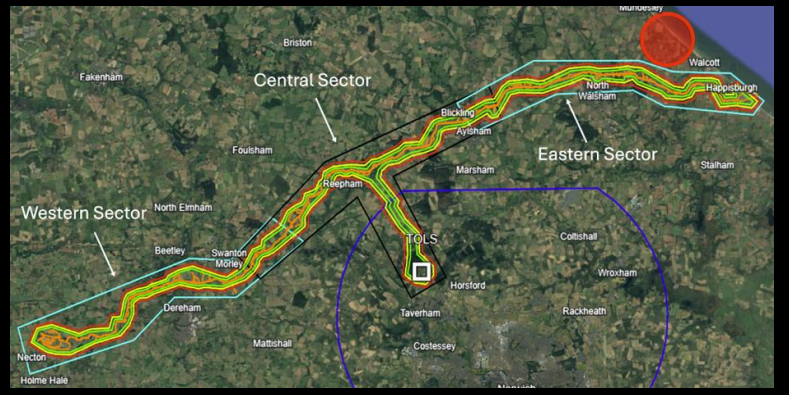
Concept of Operation

- The Sparrow Hawk fixed wing VTOL drone (XSH1) will be used for routine BVLOS operations. XSH1 has a 2hr endurance and is equipped with ADS-b out and a Mode S transponder. Ground based ‘ATOM’ stations will be used to provide real-time traffic rebroadcasting

- The operating area includes a stub within the Norwich CTR Class D alongside Class G airspace. Traffic Service will be provided by Norwich ATC.

- Data has and will continue to be gathered from Pilot Aware ground stations in BVLOS (VM) operations which will be used to supplement positional accuracy and begin initial Air Encounter Characterisation.

- The BVLOS ConOps has been widely distributed to local Air User Groups such as the East Anglia Airspace Users Working Group and MOD and has been presented in brief to the Shared Airspace Council.



STIRLINGX
A GALLOS COMPANY

Opportunities & Issues

Integration – Demonstrate a safe, scalable, phased path to BVLOS operations in unsegregated airspace. The core purpose of the Sandbox trial is to provide data and learnings to the regulator to substantiate safe airspace integration.

- StirlingX will demonstrate safe and scalable BVLOS operations by participating in the CAA's BVLOS Sandbox (CAP 2616), which enables real-world testing of integrated Concepts of Operation (ConOps) for drone flights in unsegregated airspace using Temporary Reserved Areas (TRAs)

- By aligning with the airspace policy framework outlined in CAP 2533, StirlingX can validate it's detect-and-avoid capabilities and airspace integration strategies, supporting the UK's transition toward fully integrated drone operations alongside conventional air traffic

*A Temporary Danger Area (TDA) would not allow the demonstration of integration concepts and hamper integration data capture

STIRLINGX
A GALLOS COMPANY

Opportunities & Issues

Environmental – Providing linear asset surveys expeditiously, and without unnecessarily disturbing landowners and flora, fauna, by land access with people and vehicles

- XSH1 (SparrowHawk UA) flights produce zero emissions
- Aligns with the DfT's Future of Flight Action Plan through using green technology to meet the UK's net zero ambitions
- Supports the Airspace Modernisation Strategy, which prioritises environmental sustainability as a core guiding principle

Opportunities & Issues

Policy - Inform policies on the accommodation and integration of crewed with un-crewed aircraft, as well as demonstrating a safe pathway (risk assessment & assessment criteria) for routine linear and construction corridor BVLOS operations in the UK

- StirlingX's participation will help shape the regulatory framework for BVLOS operations, which is essential for the safe and widespread integration of drones into UK airspace
- StirlingX will demonstrate in a managed environment, detect-and-avoid (DAA) technologies and operational procedures critical for BVLOS integration
- The proposed Temporary Reserved Area (TRA) combined with a Transponder Mandatory Zone (TMZ) will enable shared access with other airspace users, capturing valuable data on interoperability and real-time response
- Insights gained from these trials will inform future Airspace Change Proposals (ACPs) and contribute to the development of a permanent, integrated airspace model.

Opportunities & Issues

- **Technology** – Inform policies on Electronic Conspicuity – Develop risk exposure around low-fidelity aviation sensors and demonstrate new technology with existing ATM procedures to progress integration of drone operations
- **Stakeholders** – Demonstrate best practice on how to engage with an all-air user community
- **SORA** – Showcase robustness of employed strategic and tactical mitigations
- **Regional** – New aviation system benefits to the Norwich region

Opportunities & Issues

Environmental, Noise – StirlingX acknowledges that BVLOS flight operations within the Vanguard BVLOS Sandbox may generate noise that could be perceptible to ground-based stakeholders; however, the overall impact is considered negligible due to the predominantly rural and low-density nature of the operational corridor.

Mitigating Factors:

Low Population Density: The 60 km cable corridor route primarily traverses arable and forested farmland, classified as areas where few people are present—typically fewer than 5 people per square kilometre

Controlled Construction Zone: The corridor is an active construction site with gated access and fencing, further reducing the likelihood of uninvolved persons being exposed to operational noise

Minimal Urban Encroachment: Urban areas intersecting the Ground Risk Buffer (GRB) represent only 1.55% of the total ground risk area, with even lower percentages within the contingency and flight volume boundaries (0.81% and 0.14%, respectively)

Edge-of-Buffer Exposure: The few higher-density areas (e.g., North Walsham, Felthorpe, Reepham) lie at the outermost edges of the GRB, meaning any potential noise exposure would occur only in rare edge-case scenarios involving multiple system failures

Flight Altitude, Routing & Frequency: Operations are conducted at altitudes between 200–400 ft AGL, with routing designed to avoid densely populated zones and minimize disruption. Flights take place no more than twice per month.

Operational Experience and Safety Culture: StirlingX has a strong safety and operational track record, with over 10,000 flights logged and a robust safety management system that includes continuous monitoring and mitigation of operational impacts

Opportunities & Issues

Environmental; habitat, flora, fauna – Nature and Restoration:

The corridor is a temporary construct for the duration of the construction phase. Once the project is complete, the land will be restored to its original use as arable farmland by Vattenfall, further reducing long-term environmental impact.

Vattenfall's environmental planning (Environmental Impact Assessment) ensured that the route was specifically designed to avoid sensitive environmental features, including:

- Areas of Outstanding Natural Beauty (AONB)
- Environmentally Sensitive Areas
- National Parks
- Special Areas of Conservation (SACs)

This was achieved through:

- Early geophysical surveys to detect buried archaeology and sensitive habitats.
- Horizontal directional drilling (HDD) at landfall near Happisburgh to avoid beach and coastal habitats.
- A narrowed cable corridor (45m wide) to reduce environmental footprint

Based on CAP 1616i a Habitats Regulations Assessment will not be required

Opportunities & Issues

Access – Potential impact on other airspace users / perceived removal of airspace

- To foster goodwill and ensure safe integration with the local flying community, HexCam / StirlingX have begun to engage in proactive stakeholder outreach, including establishing mutual notification agreements with local aviators at Felthorpe Airfield and Norwich Airport. This engagement will continue for the duration of the Sandbox trial

- A Commercial Agreement has been signed and is in place. Provision of a Traffic Service to StirlingX UAS Remote Pilots during drone sorties has been agreed;
  - Norwich ANSP will gain experience
  - Risk register / Haz IDs / TOI development has begun at NWI

- Drone sorties will only be conducted twice per month, limiting impact on recreational and emergency service airspace users

- Letters of Agreement will be signed as required, with key stakeholders

STIRLINGX
A GALLOS COMPANY

Options to exploit / address Opportunities & Issues identified

Open Discussion

ATM Arrangement

1. Managed access to the TRA (+TMZ)
2. Level of ATS and provision of appropriate traffic information
3. Access to CTR (incl. blue light) and TRA(+TMZ) impact on Norwich CTR / CTA, IFPs, ATC procedures
4. Communications procedures
5. Contingency and emergency procedures
    - Loss of comms
    - Non-availability of ATC (e.g. staffing, equipment or capacity)
    - Loss of C2 link
    - Aircraft accident, AIRPROX etc.

Process Requirements

Engagement

- Engagement will involve aviation and local stakeholders, including airspace users, emergency services, relevant NATMAC consortiums, and the Ministry of Defence (MoD).
- A formal engagement period of six weeks will be provided for stakeholders to review and respond to the proposed operations.
- Proactive engagement with key airspace users such as Norwich International Airport, the MoD, NPAS, and GNAAS, is planned, ahead of the formal consultation window.
- StirlingX will operate in accordance with agreed procedures outlined in Letters of Agreement (LOAs) with the relevant parties.

Process Requirements

TRA + TMZ

- A Temporary Reserved Area (TRA) with an overlaid Transponder Mandatory Zone (TMZ) will be established to support the operation.
- The TRA will be defined in line with the principles of flexible use of airspace and shared access.
- Norwich International Airport will be responsible for managing the TRA.
- Activation of the TRA will be communicated via NOTAM.
- Compliance with the TMZ will require aircraft to be equipped with a transponder.
- TRA height AGL > 540’ (vertical dimension of the calculated Contingency Volume)
  - The Flight Volume extends from the surface to **400 ft AGL (122m)**

Provisional Timeline

Activity	Estimated date
CAA Review of proposed engagement approach (as part of FSI/RIO letter)	September 2025
Stakeholder engagement:	Mid-September > End October 2025 *minimum of 6 weeks
Formal ACP Submission	10-Jan-26
Decision	10-Feb-26
Target AIC	20-Feb-26

STIRLINGX
A GALLOS COMPANY

Next Steps

1. Meeting minutes distributed
2. CAA to review Stakeholder engagement plan
3. Development work to agree the proposed TRA + TMZ
4. Progress Trial Plan, ConOps and SORA documentation
5. Carry out stakeholder engagement and determine if noise impact assessment required
6. Finalise design and impact assessments in response to stakeholder feedback
7. Submit ACP documentation in line with CAP1616G

STIRLINGX
A GALLOS COMPANY

STIRLINGX

A GALLOS COMPANY

< UNLOCKING THE VALUE OF DATA FROM SENSORS

AND AUTONOMOUS SYSTEMS >