

27<sup>th</sup> February 2025

# Amazon Prime Air

Darlington and Surrounding Areas  
TMZ for BVLOS Drone Delivery Services



ACP-2024-056: Assessment Meeting

# Agenda

1. Introduction
2. Statement of Need
3. Background
4. Issues or opportunities arising from the proposed change
5. Process requirements – TRA, engagement, safety assessment
6. Provisional timeline
7. Next steps
8. AOB

CAA

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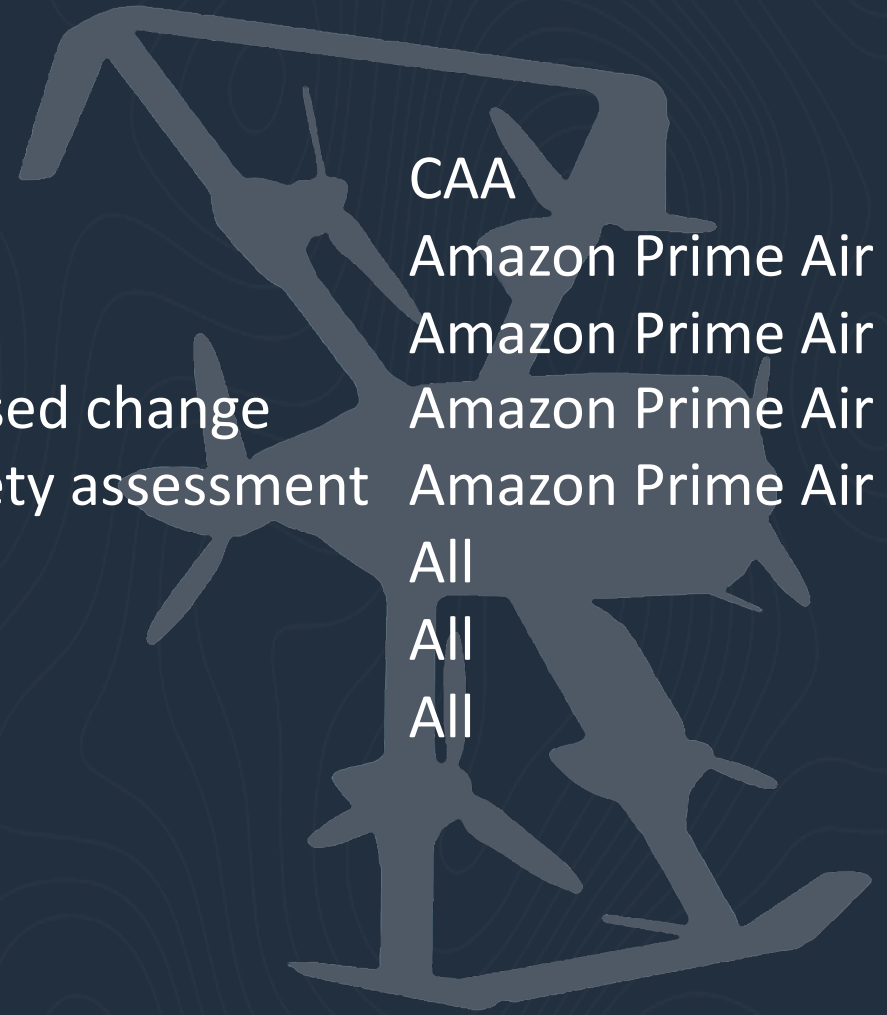
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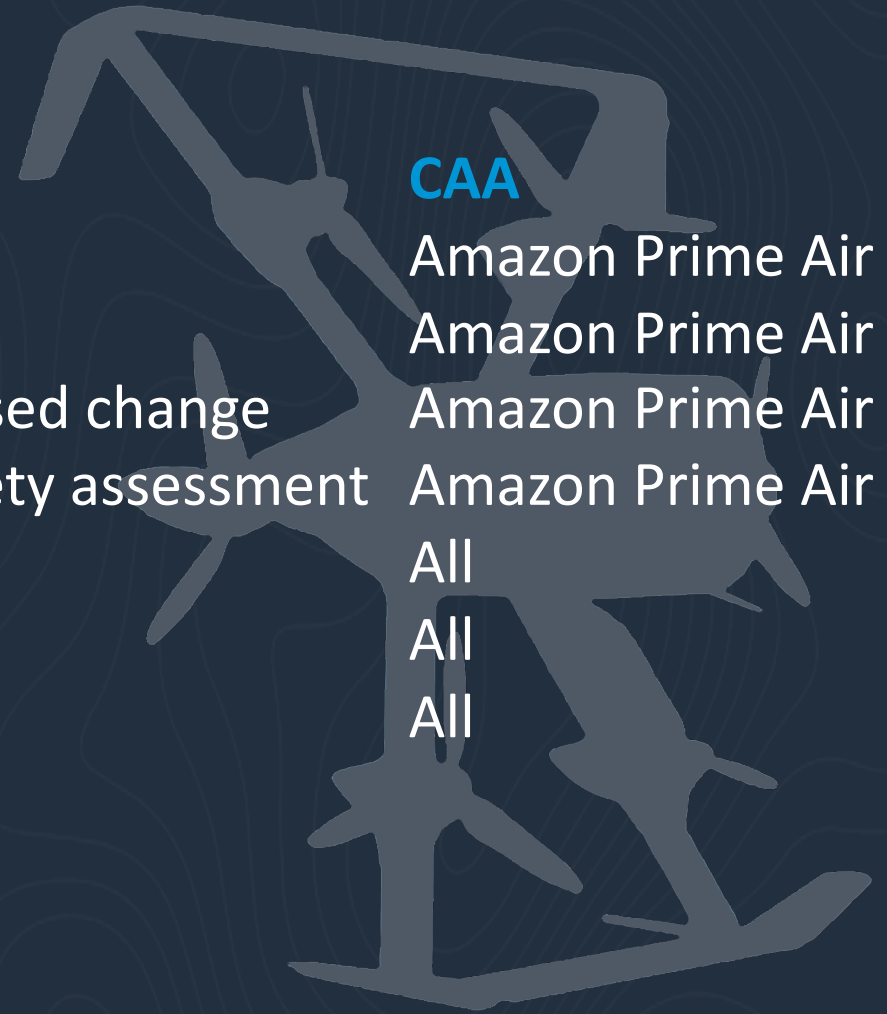
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# Statement of Need

- Amazon Prime Air is participating in the Regulatory Sandbox to demonstrate the capabilities, processes and procedures for integration of Unmanned Aerial Systems (UAS) into non-segregated airspace.
- The operation will demonstrate an end-to-end scalable solution and innovative technology including an on-board Detect and Avoid (DAA) capability that allows Beyond Visual Line of Sight (BVLOS).
- Amazon Prime Air is seeking to establish a combined Temporary Reserved Area (TRA) with a Transponder Mandatory Zone (TMZ).
- The TRA+TMZ will provide a controlled environment to demonstrate the safety, operational and technical protocols required to transition UAS from segregated airspace to non-segregated airspace.
- Our aim is to demonstrate a safe and scalable solution for commercial package delivery operations, enabling BVLOS operations and managed airspace integration.

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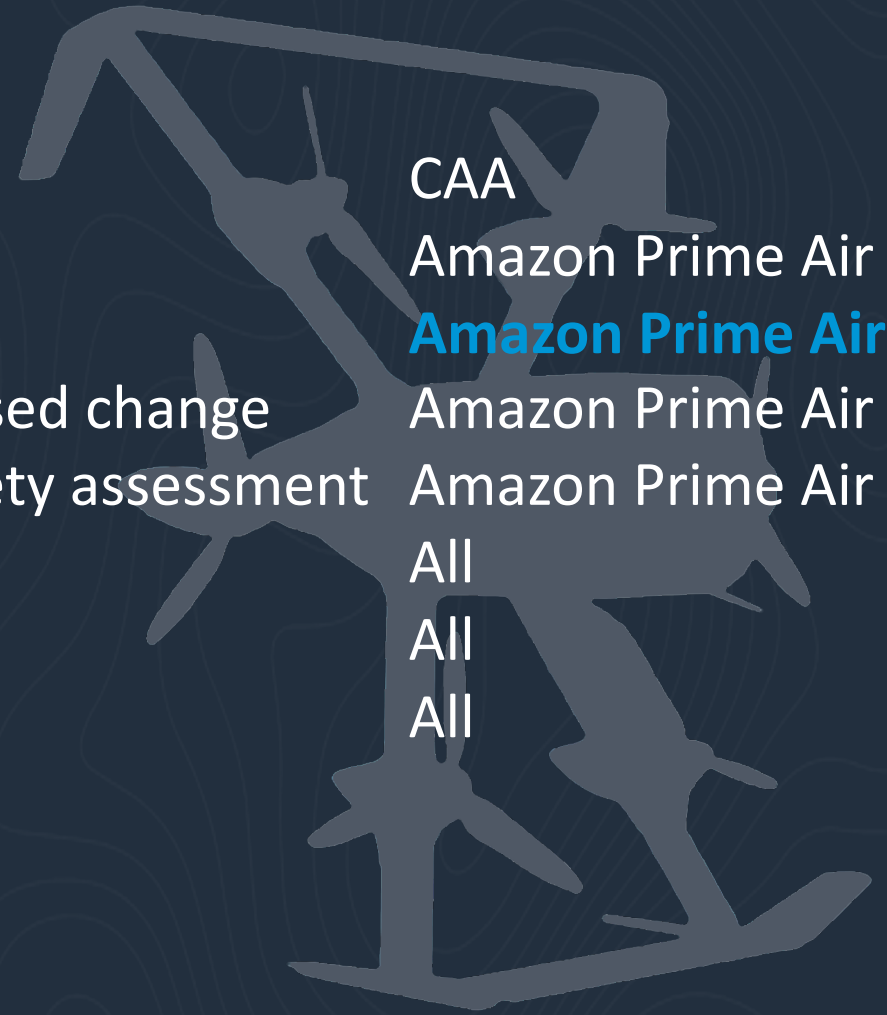
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# Overview of Prime Air

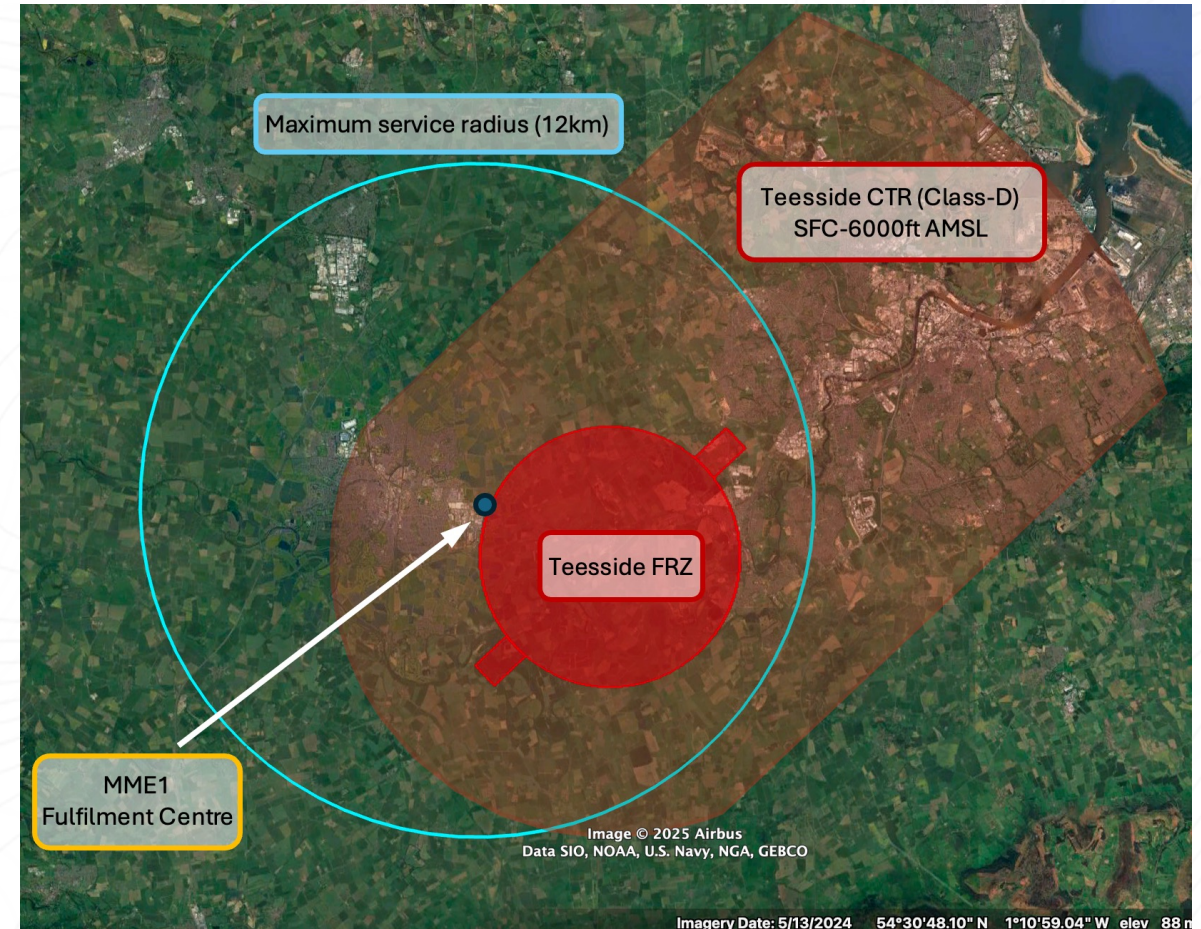
- Established in 2013, Prime Air is tasked with developing Amazon's next generation delivery capability using drones
- Headquartered in Seattle, USA, with live commercial and test & development operations
- Prime Air is seeking to expand its commercial drone delivery service using the MK30 drone to qualifying Amazon UK customers
- Initial operations are proposed to take place from the Amazon Fulfilment Centre (MME1) located on the outskirts of Darlington





# Background

- The maximum service radius of the MK30 drone is 12km from base, and up to 377ft above ground level during transit phases of flight
- The proposed operation would consist of two phases, (accommodation and integration), with criteria to progress between them defined as part of the Sandbox.
- The potential operating area spans the Class D Teesside CTR (shown in orange) and surrounding Class G airspace.
- There would be no Prime Air operations within the Teesside Flight Restricted Zone (FRZ – shown in red).



*Overview of area*

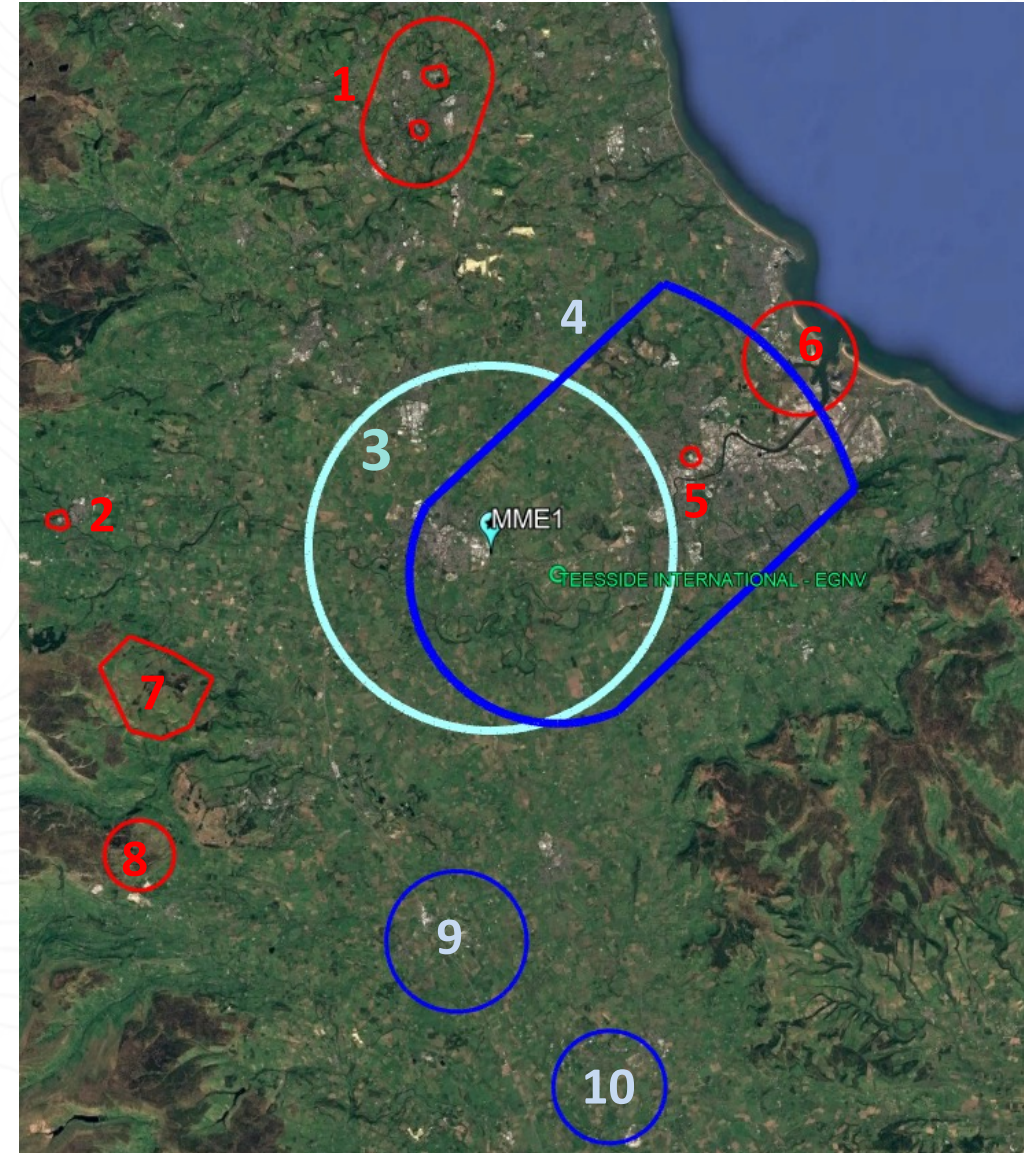


# Background

- Multiple local aviation stakeholders have been identified within the wider area, including glider, heliport and model aircraft sites.
- The proposed operation aims to safely integrate the drone delivery service into UK airspace under the principles of flexible-use, shared access.
- Prime Air will establish an operations centre at the Amazon Fulfilment Centre (MME1), located East of Darlington, within the Teesside CTR (shown in blue) but outside the FRZ.
- Package loading, launch and recovery, and all supporting ground operations will take place from the MME1.

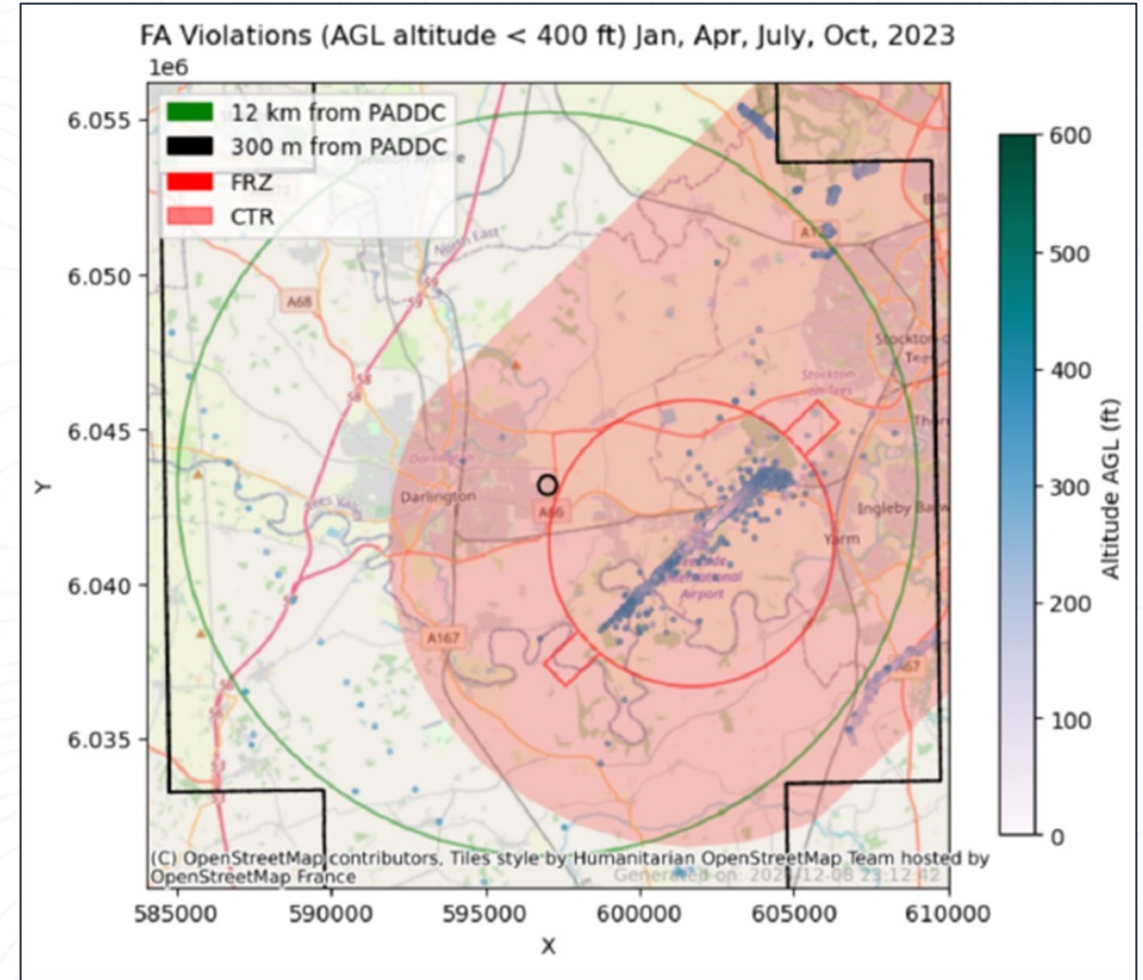
- 1) HMP Frankland/ Durham Restricted Airspace
- 2) HMP Deerbolt Restricted Airspace
- 3) 12km radius from Prime Air base
- 4) Teesside International CTR
- 5) HMP Holme House Restricted Area

- 6) Restricted Area Hartlepool
- 7) Feldon Danger Area
- 8) Bellerby Danger Area
- 9) RAF Leeming
- 10) RAF Topcliffe



# Background

- Using historical flight data, this area has been assessed to be low-risk. Over a 4-month period across different months in 2023, 6 ADS-B tracks were detected below 400ft.
- Further on-site data collection will validate this data
- Most interactions with Prime Air operations are anticipated to be with locally-based air ambulance and Teesside aero clubs.



*ADS-B detections below 400ft*



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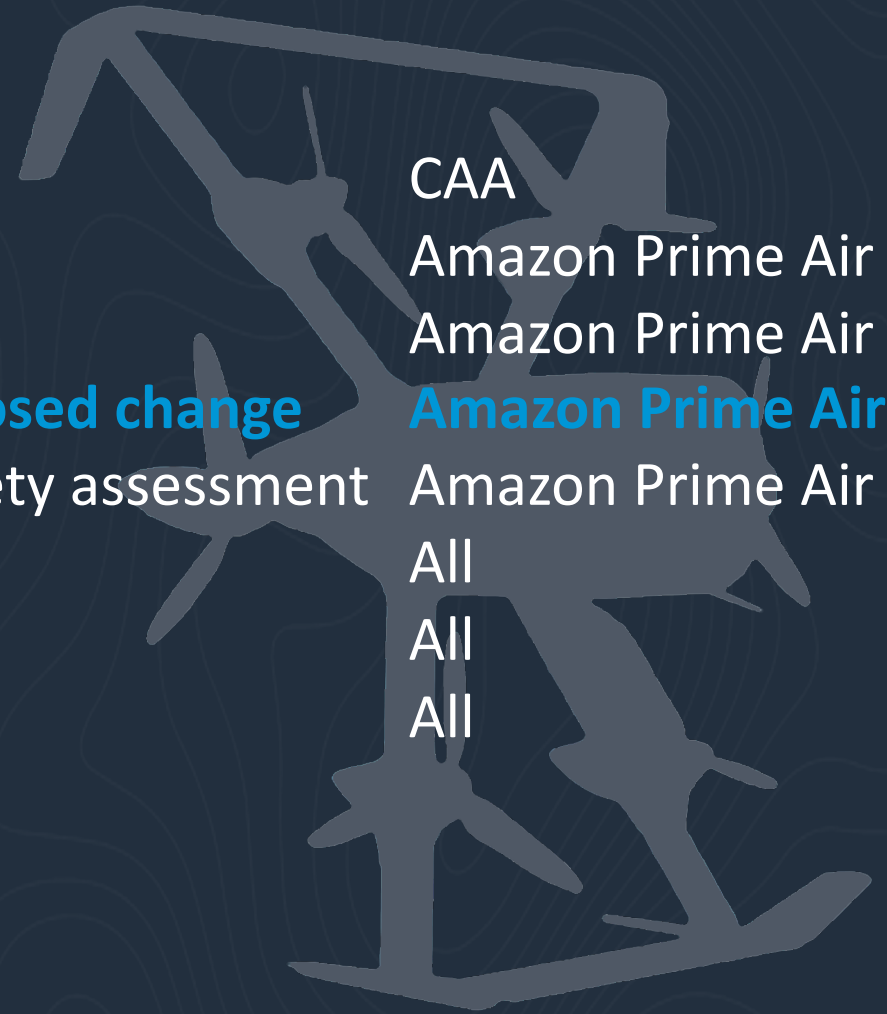
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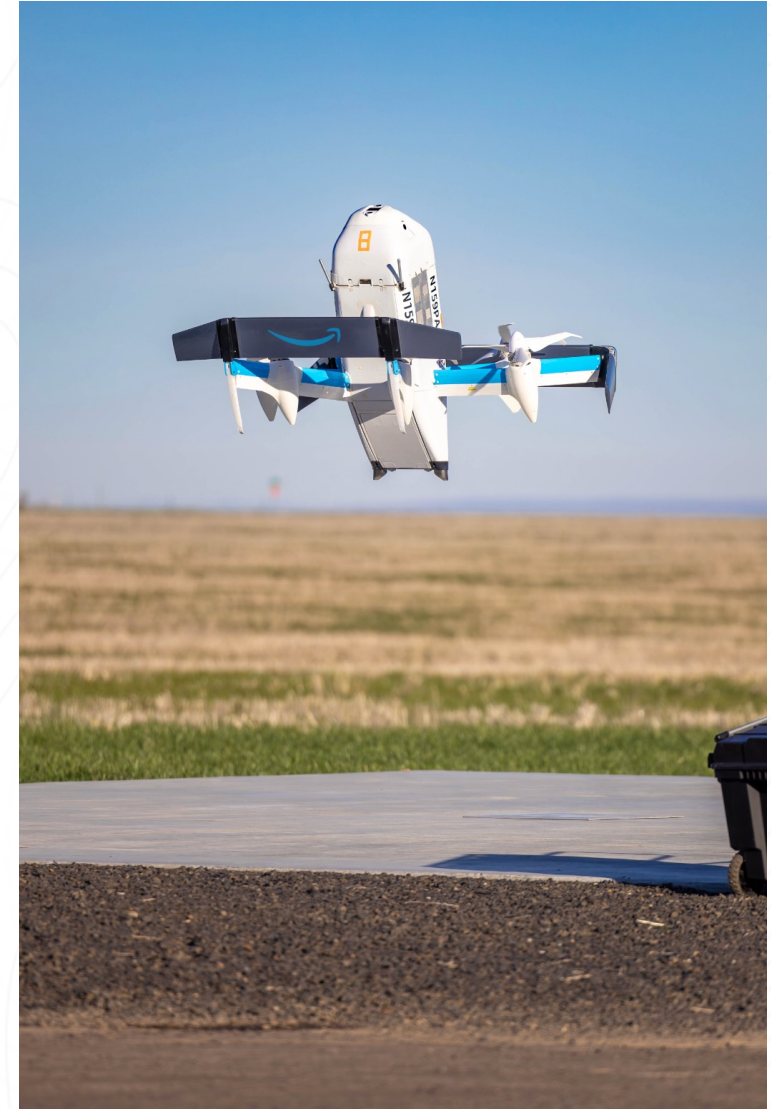
# Issues & Opportunities

## Opportunities

- **Environmental** – Adopting green technologies in logistics
- **Integration** – Demonstrate safe and efficient BVLOS operations in unsegregated airspace
- **Policy** - Inform policies on the accommodation and integration of New Airspace Users (NAU), as well as drone delivery risk assessments
- **Technology** - demonstrate new technology with existing ATM procedures to progress integration of drone operations
- **Risk Assessment** - Drone Delivery operations standard setting

## Issues

- **Access** – Potential impact on other airspace users
- **Environmental** – Noise impact on ground-based stakeholders
- **Environmental** – Potential overflight of European designated sites (HRA)





# Issues & Opportunities

## Environmental

- Amazon's climate pledge is to reduce their carbon emissions to zero by 2040, a decade ahead of the Paris Climate Agreement.
- Prime Air drone delivery flights produce zero emissions
- Supports the DfT UK Future of Flight Action Plan through adoption of green technology in logistics.
- Aligns with the Airspace Modernisation Strategy which includes environmental sustainability as an overarching principle.



# Issues & Opportunities

## Integration

- A phased approach:
  - **Phase 1: Accommodation Phase** (this ACP) – Launch and establish an initial BVLOS operation within a TRA
  - **Phase 2: Integration Phase** – Operations beyond the TRA; requires integration airspace solution
- The Prime Air BVLOS capability is comprised of ground-based ADS-B monitoring, on-board optical based perception technology, and a supporting system of operational procedures.
- Aligns with the Airspace Modernisation Strategy which seeks to establish enhanced airspace sharing and integration of airspace users.
- A non-operational trial or proposed Temporary Danger Area (TDA) would not allow the demonstration of the key Prime Air airspace integration concepts, hampering integration data capture.





# Issues & Opportunities

## Policy Development

- Inform regulatory framework for BVLOS operations; crucial for adoption and safe integration of drones into UK airspace.
- Amazon Prime Air's demonstration will provide a controlled environment to rigorously explore key DAA technologies and operational techniques required for BVLOS integration.
- Proposed TRA+TMZ will allow access to other airspace users, with information captured on how they react and operate together.
- Data and insights from the demonstration will inform future ACPs and support the establishment of a permanent integrated airspace.





# Issues & Opportunities

## Safety Risk Assessment

- Establish a new precedent for the approval of drone delivery operations
- Detailed risk assessment in-line with latest industry standard for assessing both air risk and ground risk
- Clear definition and validation of risk mitigations using latest CAA Operational Risk Assessment framework
- Supports development of assessment criteria for domestic drone package delivery.





# Issues & Opportunities

## **Shared Access – potential impact to other airspace users**

- Minimum amount of airspace will be requested, both in volume & time
- Emergency services (blue light) retain primacy throughout
- Required coordination / information will be shared between Prime Air and Teesside ATC
- Operations will be conducted on a principle of minimising additional workload for Teesside ATC
- LOAs will be agreed as required with key stakeholders

# Issues & Opportunities

## Noise Impact

- Prime Air will undertake a noise impact assessment including the scale of anticipated impacts.
- The MK30 drone operates at reduced noise levels than previous versions, due to its innovative propeller design.
- Self-imposed No-Fly Zones (NFZ) and No-Land Zones (NLZ) will be used to exclude certain areas from the flight volumes, including hospitals, schools and windfarms.
- A population study alongside stakeholder feedback, will be used to refine the final flight volume.

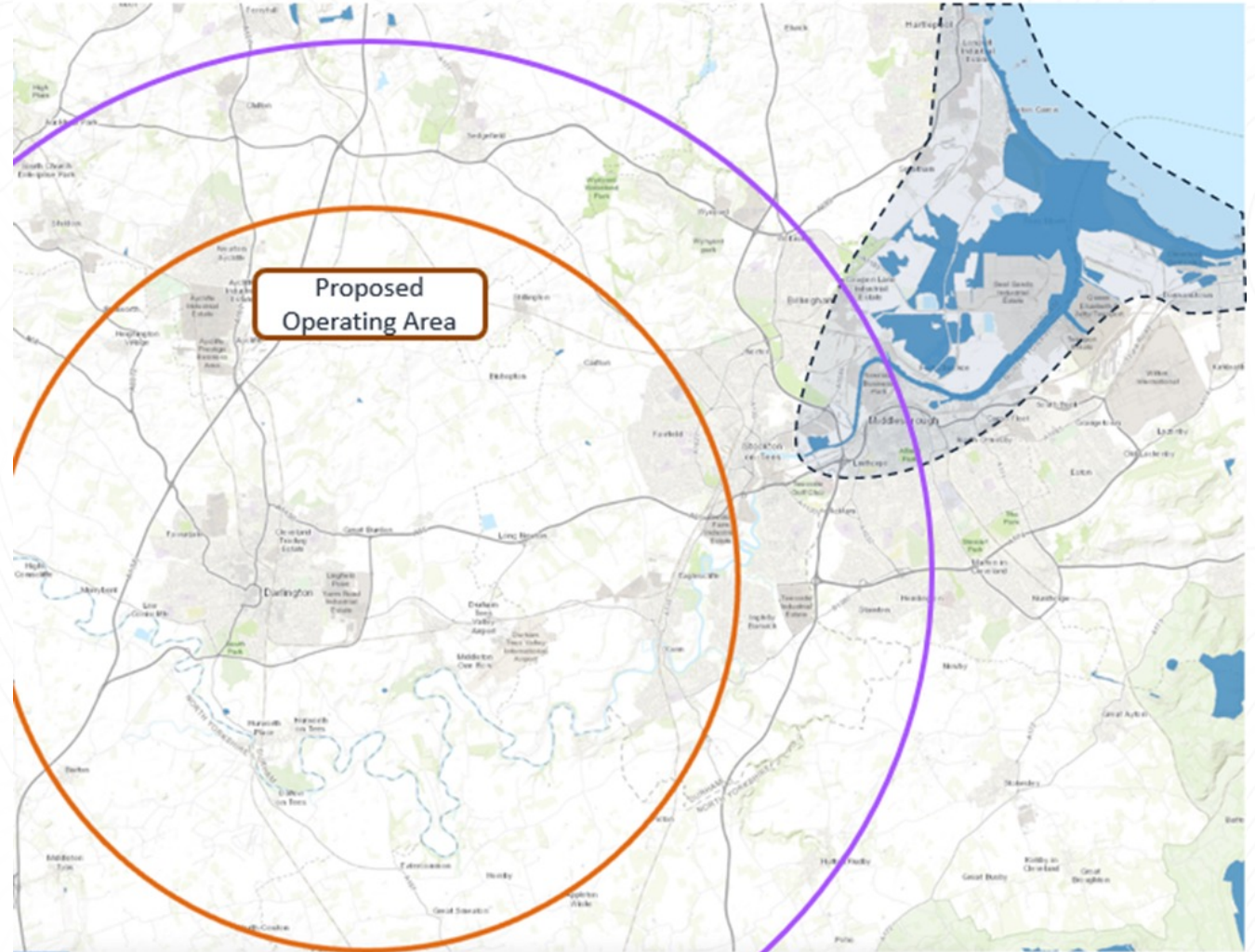




# Issues & Opportunities

## Environmental

- A HRA Screening Form will be sent to the CAA for review.
- The proposed TRA is not directly above any Areas of Outstanding Natural Beauty (AoNB), Environmentally Sensitive Areas, National Parks or Special Areas of Conservation
- The Teesmouth and Cleveland Coast Ramsar Site and Site of Special Scientific Interest (SSSI) is to the northeast of Teesside International Airport, and falls within the 18km screening zone for European sites



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# Process Requirements - Engagement

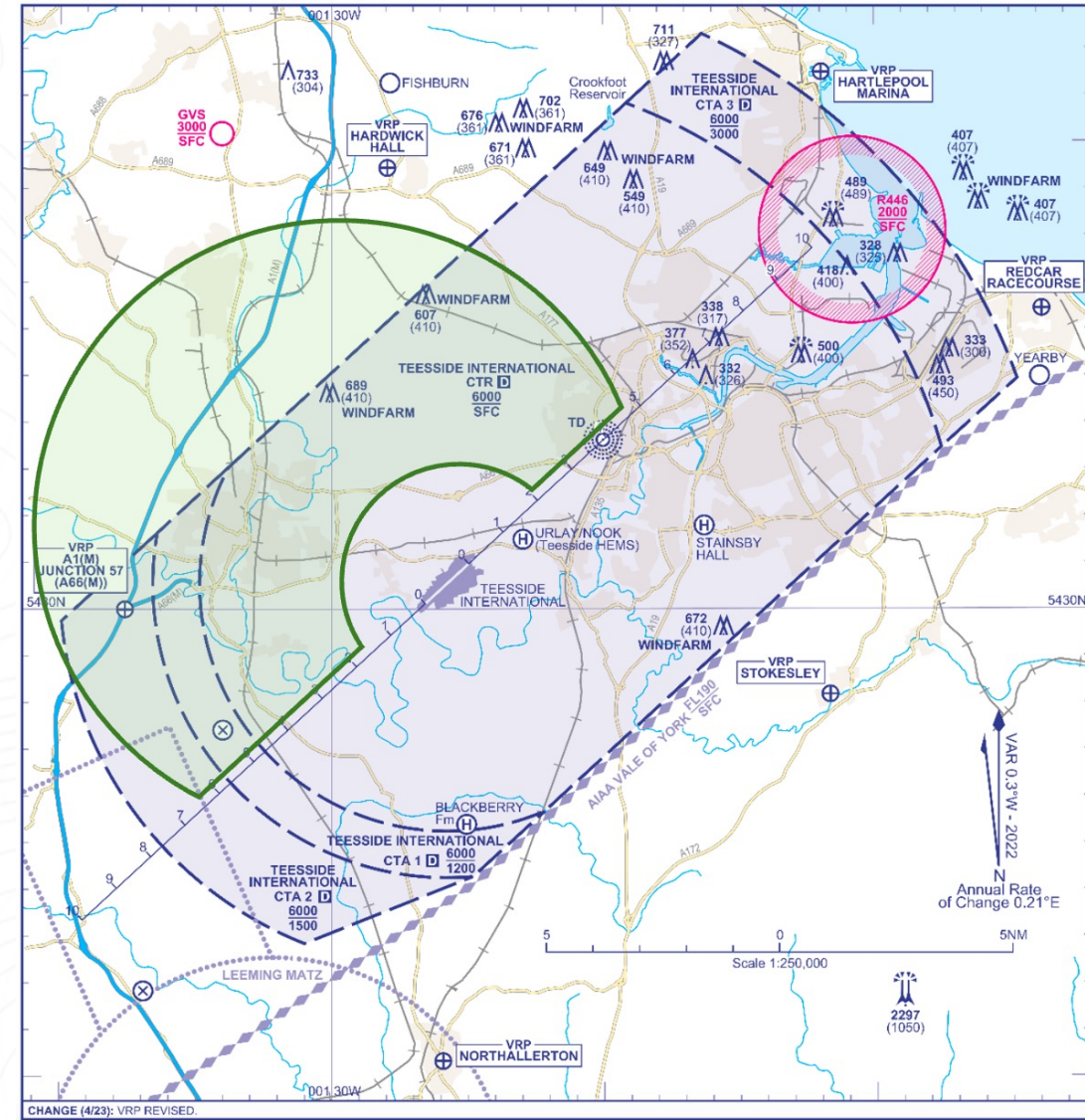
- Engagement will be with aviation and local stakeholders including airspace users, emergency services, relevant NATMAC consortiums and the MoD.
- Engagement period of 6 weeks for stakeholders to consider and respond to the proposed operations.
- Active engagement planned with targeted airspace users prior to formal engagement period e.g., Teesside International Airport, MoD and NPAS, GNAAS.
- Prime Air will operate to agreed procedures detailed in LOAs with relevant parties.
- Parallel community engagement activities taking place from Feb 2025, in relation to the local planning approvals.





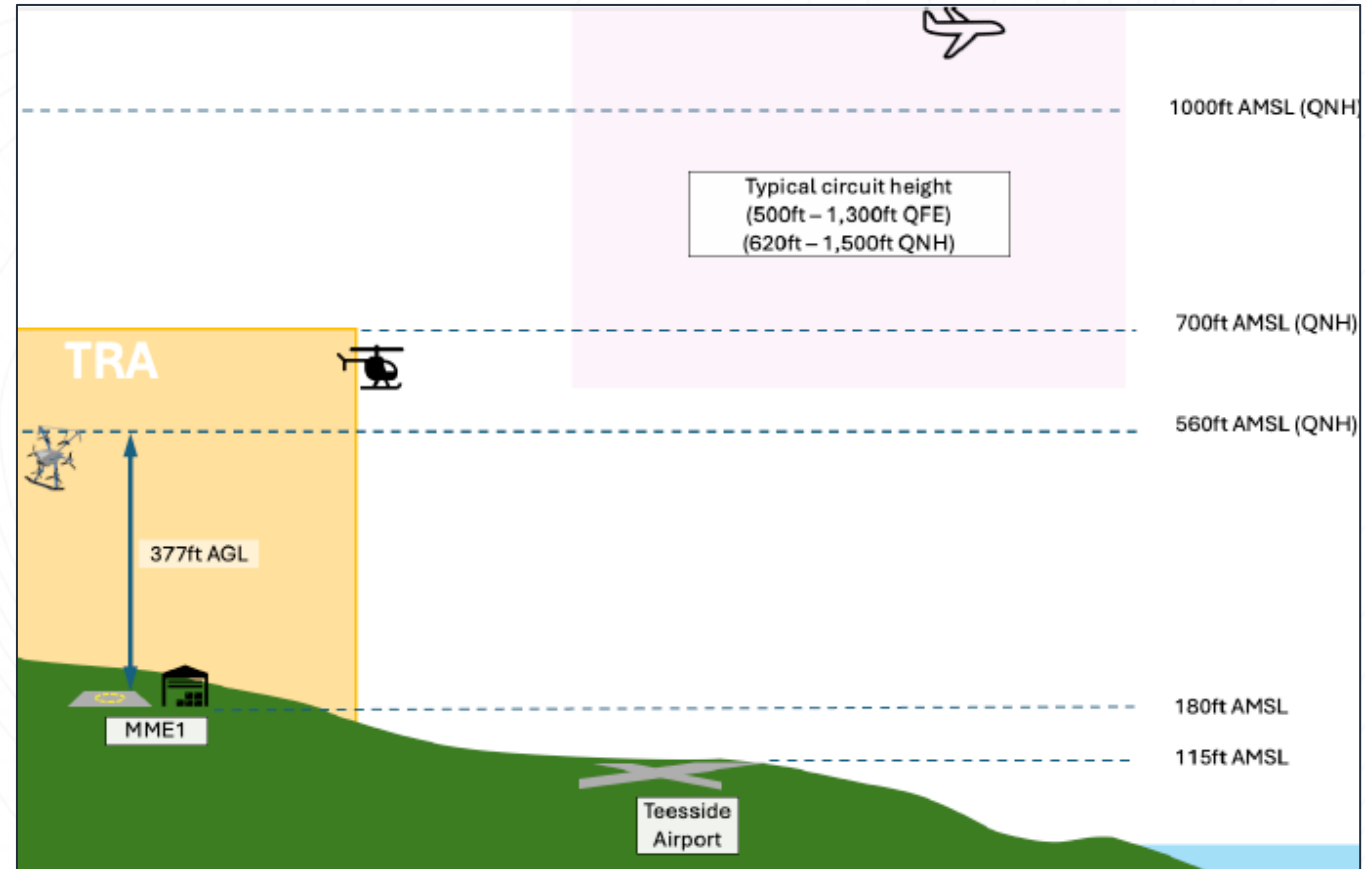
# Process Requirements – TRA+TMZ Establishment

- A TRA with a TMZ overlay will be used to facilitate the operation.
- Defined using the principles of flexible use and shared access.
- TRA management provided by Teesside ATC.
- TRA activated via NOTAM.
- Electronic Conspicuity requirements of the TMZ will be an ADS-B out capability.



# Process Requirements – TRA+TMZ Establishment

- TRA radius of 12km from the base is based on the MK30 drone range and endurance.
- TRA maximum height of 700ft AMSL to avoid non-cooperative aircraft transiting the CTR.
- As shown in the side-profile visual, most traffic is anticipated to remain above Prime Air operating height





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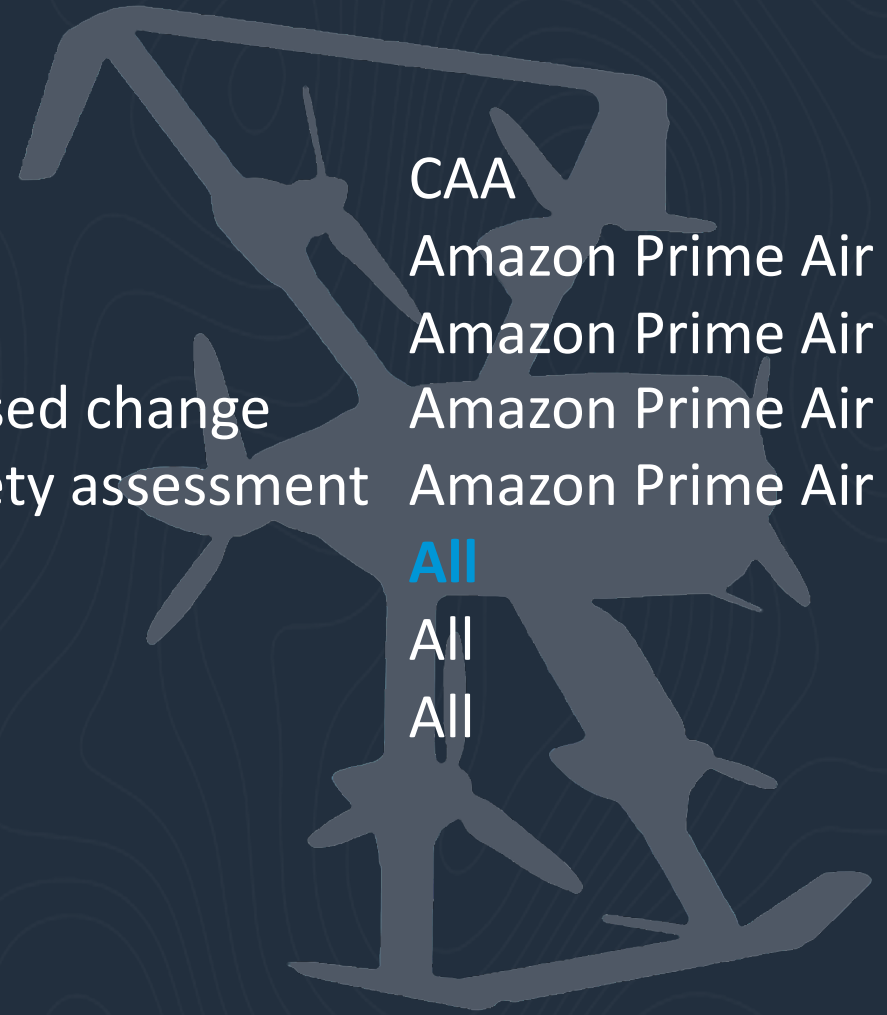
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# Provisional Timeline

- The demonstration encompasses the 'Accommodation' phase of BVLOS operations, including data collection.
- Once BVLOS capability is approved, the operations will move to the 'Integration' phase, without a TRA.
- The output of this demonstration will inform the specific integration requirements.

Activity	Estimated Date(s)
HRA early screen assessment for CAA review	March 2025
Engagement materials for CAA 2-week review	Early April 2025
Engagement period	Late April – Early June 2025
Submit ACP	29 <sup>th</sup> August 2025
AIC submission date	26 <sup>th</sup> September 2025
AIC date	3 <sup>rd</sup> October 2025
Implementation	November 2025



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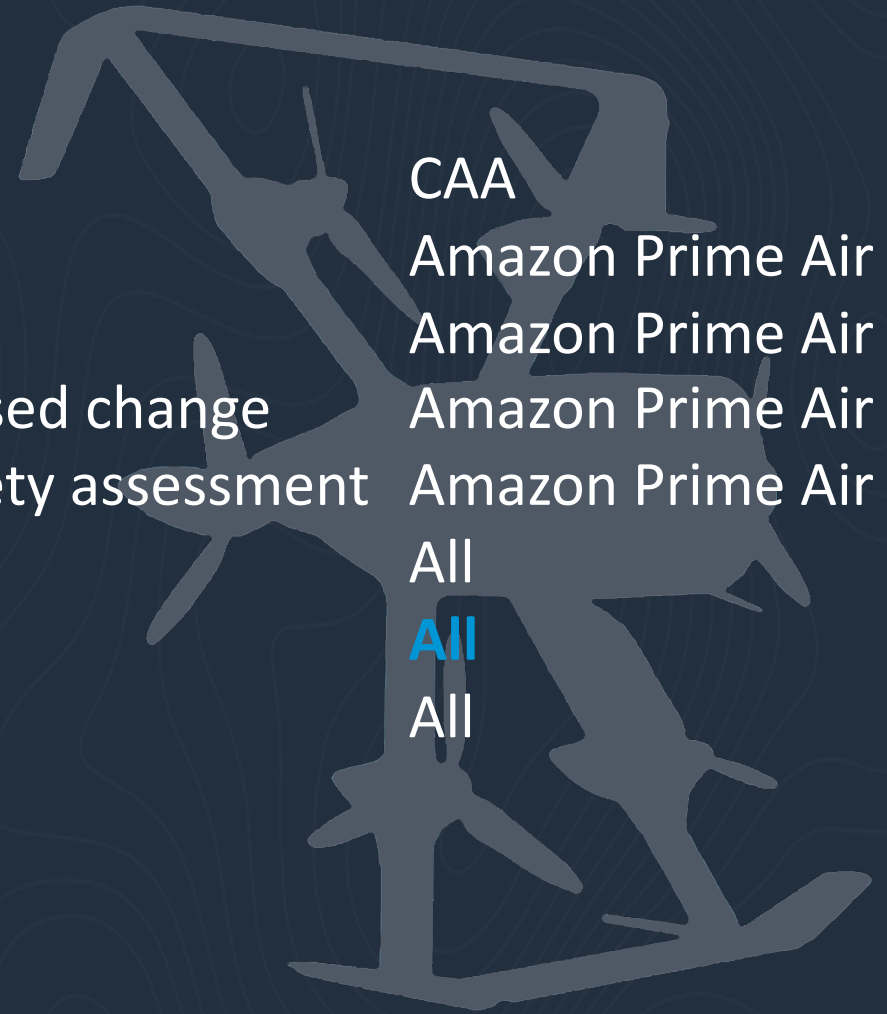
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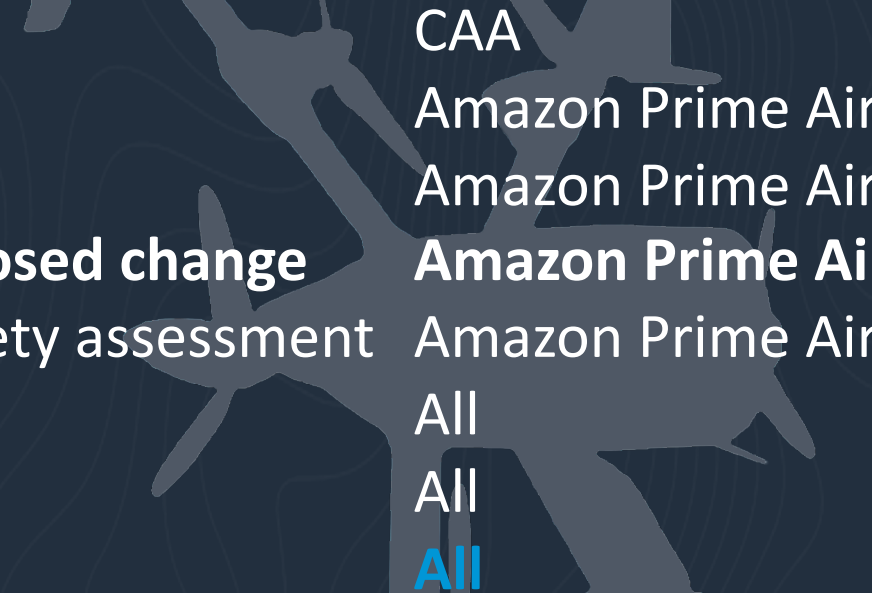
# Next Steps

- Development work to agree the proposed TRA + TMZ
- Complete and submit HRA Screening Criteria Form
- Progress Trial Plan, ConOps and OA documentation
- Carry out stakeholder engagement + noise impact assessment
- Finalise design and impact assessments in response to stakeholder feedback
- Submit ACP documentation in line with CAP1616G





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**prime air**

The Amazon smile arrow, a blue curved line with a small arrowhead pointing to the right, positioned below the text "prime air".