What is the role of the regulator in responding to innovation and emerging technologies such as Advanced Air Mobility, and how are we delivering this in the UK?

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An unprecedented era in aviation innovation

- Alongside big challenges like Covid and geo-political instability, an unprecedent era of innovation in aviation focussed on delivering a range of benefits:

    - Net Zero transport – displacing more carbon intensive alternatives
    - Streamlining logistics and rapid delivery to remote locations – for public and private services
    - Expanding reach of traditional aviation

- New market entrants - globally, hundreds of companies developing EVTOL aircraft and services, potentially millions of new commercial drone service providers – many new to the aviation system

- Global capital and significant levels of investment – $8bn disclosed investment in EVTOL at March 2021 (Source: McKinsey), potential global market of $510bn by 2040 (Source: ADS Market Outlook 2021). Reference: global airline revenues in 2019 - $872bn (Source: Statistia)

- Government ambitions to encourage innovation - post-Brexit, UK appetite to work within the global system and also identify areas where regulatory agility offers benefits (especially AAM, BVLOS, UTM)

Never a more important time for the sector, regulators, and Governments to engage and work together.

Never a more interesting time to be a regulator!

Successful introduction of AAM – realising the ambition

Aviation regulation issues

- Vehicle certification and continued air worthiness – particularly on novel elements

- Operations

- Personnel competence (pilots, engineers)

- Cyber and passenger security

- Infrastructure – ports/vertiports

- Airspace integration with other users – and who pays for what services

- Consumer protection – passenger rights, conditions of carriage, service disruption

But it's not just about aviation regulation:

- Public benefits case – accessibility, speed, price, net zero, congestion relieving

- Externalities – eg privacy, visual disturbance, frequency and level of noise

- All informing the "social licence" to operate

- Net zero on an end to end, through life, basis to meet local requirements

- Planning and support to local/national government and transport authorities

- Service proposition

- Energy – connection to power networks

UK innovation and aviation – a system wide UK approach

An aviation regulator has a key role to play – there are many other key actors in the eco-system too:

- Government interest led by both DfT and BEIS:
  - Setting key policy choices and primary legislation
  - Bringing parties together
  - Future of Flight consultation (2021)
  - Brexit Freedoms Bill (2022)

- Future Flight – £300m industrial strategy challenge programme

- Aerospace Technology Institute – aviation technology strategy including FlyZero

- Connected Places Catapult – integrating thinking about different transport modes

Aviation regulation – working with international colleagues

- AAM remains an intrinsically international market – with operators wanting to scale operations in multiple jurisdictions

- Regulators are learning from each other – and not imposing unnecessary duplication whilst respecting right to regulate in own states

- Joint bilateral and multilateral working with FAA on a range of eVTOL certification/validation and operational issues benefiting applicants and regulators alike

- CAA also sharing approaches and information with likeminded states such as Australia, New Zealand and Canada on eVTOL certification

- Contributing to ICAO work on the overarching global aviation framework, including on new technologies

Dual role for CAA as UK aviation regulator

In innovation context, two roles for regulators:

1. Core role of providing regulatory **approvals** where appropriate levels of public safety, security, environmental and consumer protection are met

2. Engaging early to anticipate key system developments and **creating regulatory frameworks** to enable innovations to safely come to market – without taking away accountability for safety from operators

And:

- Not comprising our ability to do 1 by doing 2 objectively

- Not second guessing the market and picking winners – level playing field

- Securing and retaining the capabilities needed to regulate effectively

- Securing funding for activities in sectors that aren't yet mature (grateful for UK Government and Future Flight support)

How to engage with the CAA

- CAA's Innovation Hub – created to 2019 to provide some specific engagement mechanisms:

  - Information for all innovators

  - Sandbox for safe testing of new concepts

  - Paid for Innovation Advisory Services available to innovators before they submit regulatory applications

  - New challenge teams ("Vinci" – known for being ambidextrous) being established to design regulatory frameworks for successful introduction of new technologies – including AAM and routine BVLOS drone operations

- eVTOL Safety Leadership Group – a cross industry group working on safety specific issues for this new technology

Innovation Front Door: https://www.caa.co.uk/our-work/innovation/

Sandbox Case Study: Eve Sandbox

A consortium led by Eve Urban Air Mobility Solutions to develop a Concept of Operations for urban air mobility ("air taxi") services in London.

Consortium: Eve, NATS, Skyports, Volocopter, Vertical Aerospace, Atech, Heathrow Airport, London City Airport
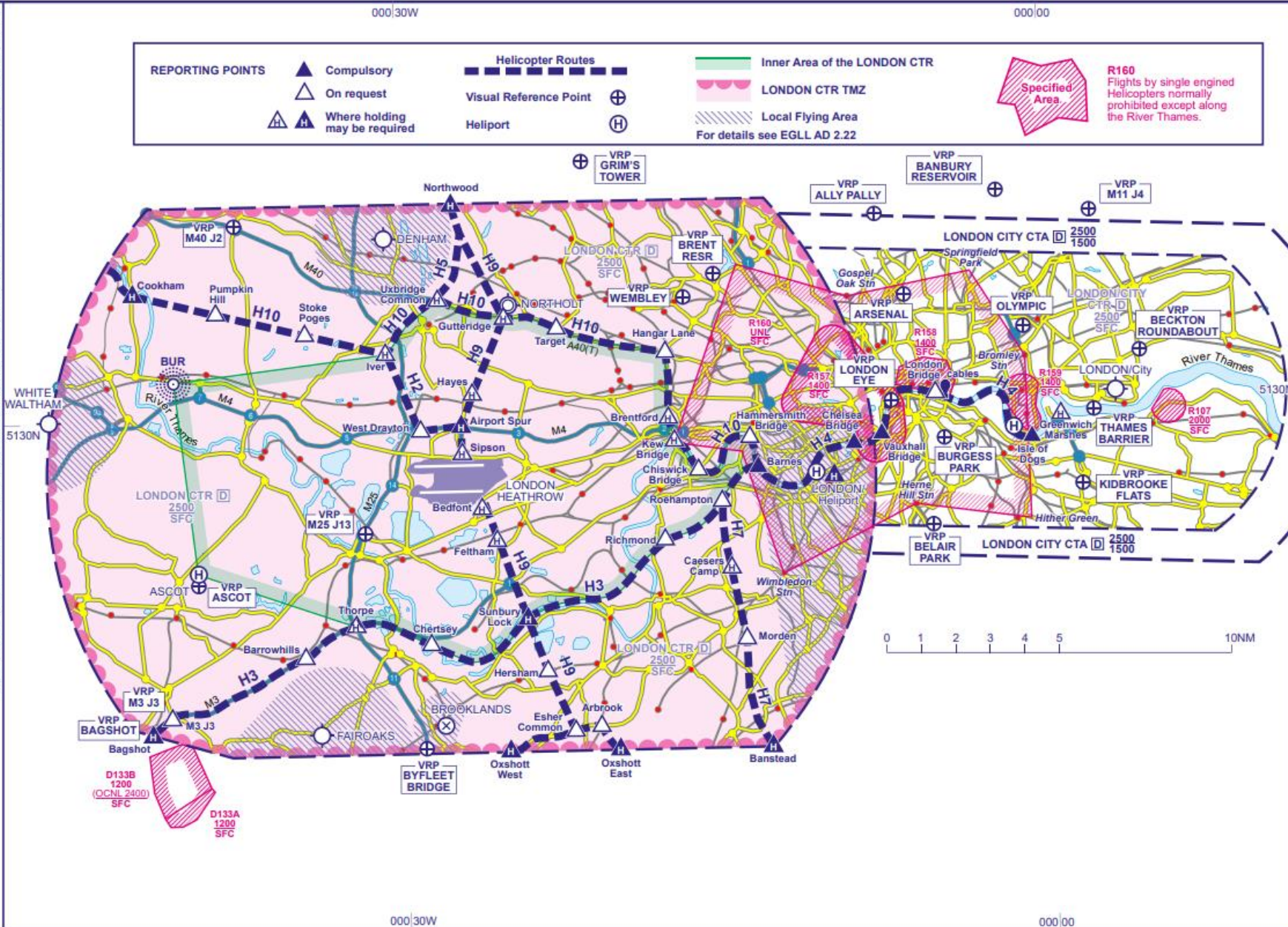
Project Deliverables

- Develop a concept of operations for safely integrating passenger carrying piloted electric air taxis into low-level airspace, with specific focus on the transportation of passengers from London City to Heathrow airport with stops in between.

- Help the CAA to shape future regulations for UAM operations across the UK.
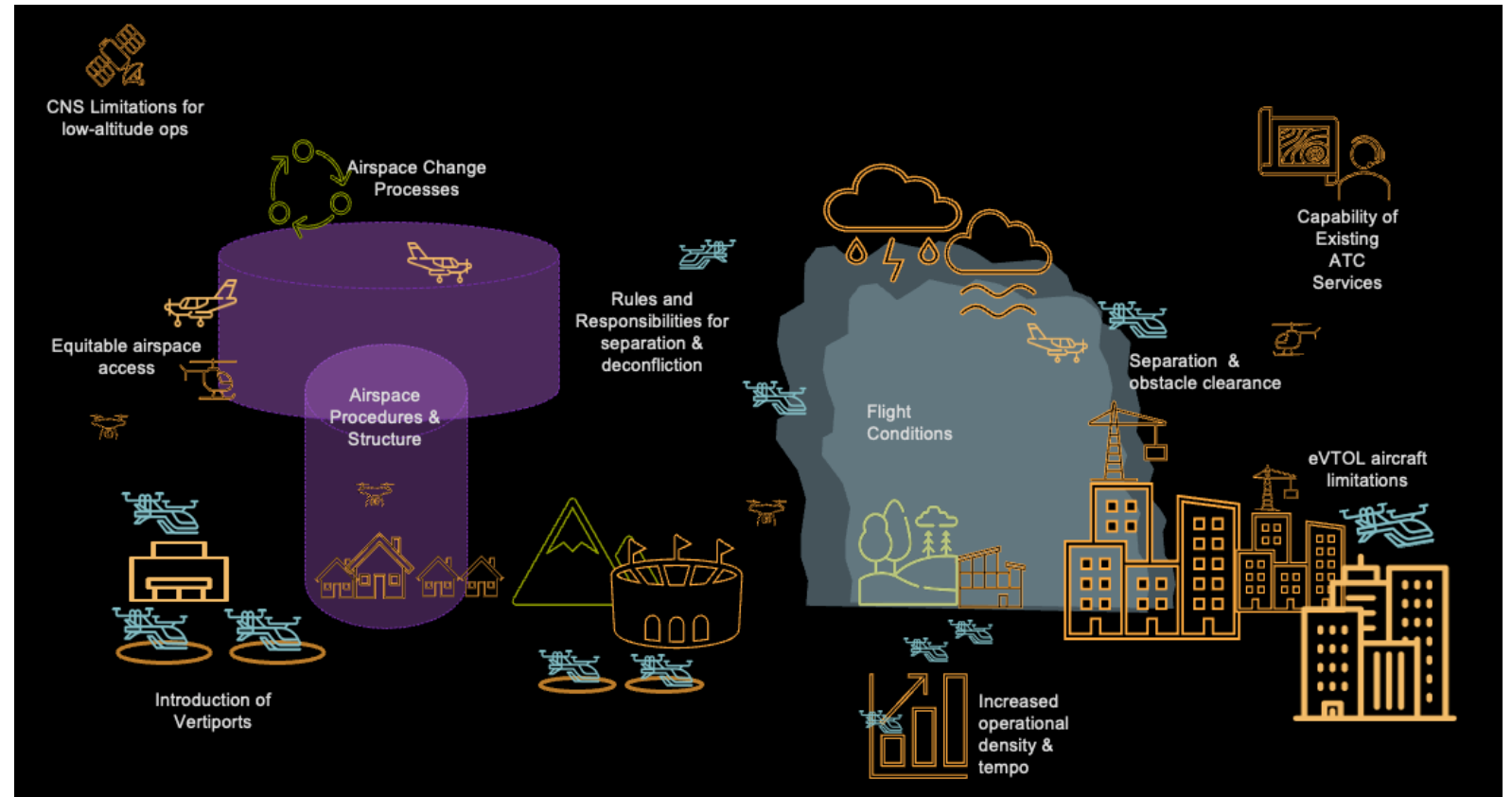
CONOPS Publication Target Release Date: 10 March 2022

Integrating new users in existing airspace system

Common challenge for scaling any significant new services – AAM, BVLOS or space – is airspace integration:

- Many existing users – commercial airlines, military, air taxis, leisure flying, balloons, model aircraft

- A range of communication, navigation and surveillance practices today, no single system

- Greater challenges as piloted and automated services use the same airspace

In October 2021, CAA published a study on considerations for urban air mobility integration with airspace (CAP 2272)

Challenges for UAM operations at scale

Challenges for low-level flying in congested built-up environments

Challenges for understanding the endurance capabilities of eVTOL aircraft for airspace integration

In January 2022, CAA started consulting on a new airspace modernisation strategy (CAP2298 A and B):

- Continues with upgrade of airspace around commercial airports

- New focus on how to integrate new user groups

- Closing date for your views: 4th April 2022

- https://consultations.caa.co.uk/policy-development/draft-airspace-modernisation-strategy-2022-2040/

What can you do to help us to help you?

- Consider all the issues necessary to successfully scale and integrate new services into the existing eco-system - including operations and social licence, end to end/through life issues as well as the technology

- Consider the other public bodies/regulators whose support you will also need

- Engage early with the aviation regulator

- Clarify the initial operating model – including location