



Innovation Hub  
**Future Air Mobility**  
Call for Insight



We are inviting stakeholders to provide insights on risk management to increase our understanding of future air mobility business concepts and to inform the regulatory requirements for future commercial operations.

In answering this call, you have opportunity to directly influence the future regulatory framework for air mobility, by helping us to draw a comprehensive picture of the challenges and potential mitigations against the future air mobility landscape. The CAA is responsible for establishing a regulatory path for all UK future air operations and works with counterparts internationally to determine safety standards and encourage regulatory harmonisation across the global aviation sector.

Your input will validate ongoing work in relation to safety matters under EASA and ICAO. This industry insight is essential to establish how safety, environmental and passenger risks may be managed. In turn this will enable regulation and standards to guide future air mobility use cases and business operations in environments such as those available in the UK.

This call is open to all experts who have experience in the design or production of future air mobility solutions or are involved in research and risk management activities relating to these. This could include experience with: aircraft; landing/take-off infrastructure; passenger services; air navigation software and hardware; and airspace design.

## The Context

Future air mobility propositions involving novel ways of transporting passengers, goods or services from A to B – for example Urban Air Mobility (UAM) concepts – have continued to develop. This has been driven by large-scale investments in new aircraft designs, research into future urban mobility and integrated transport networks, and commercial partnerships between equipment and technology firms in aviation. The range of use cases proposed is also expanding; from airport shuttles and on-demand inter-city services to regional, intra-city and rural services.

Whilst existing aviation regulations can enable the exploration and trialling of innovative future air mobility solutions, they do not yet enable commercial operations or fully provide a scalable, proven certification approach. Progress is being made to create certification frameworks for specific aircraft types, for example with EASA's Special Condition for Vertical Take-off/Landing (SC VTOL) aircraft and the FAA's draft policy for Special Rotorcraft class aircraft. This process is however ongoing. We have also seen real commitment from industry to help develop standards, such as through the EUROCAE Working Group on SC VTOL, and the growing numbers of proposals discussing broader integration of future air mobility solutions into the aviation sector.

We recognise there is a role for the CAA to play in addition to this work. Specifically, in identifying and supporting answers to regulatory challenges and working alongside Government, industry and public stakeholders. Our approach to facing these challenges includes this call for insight, which we are launching alongside our first regulatory sandbox challenge on future air mobility. The findings from this call will help inform our decision making and on current and future [CAA regulatory sandbox trials](#). We will share the combined learnings from this work with the public, industry and other regulators. This will accelerate the establishment of regulatory frameworks for future commercial air mobility operations and facilitate discussions across the aviation sector on best practice.

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## Answer our call for insight

We have created risk assessment models encapsulating our initial considerations under a sample UAM scenario. These cover safety aspects of aircraft design and airworthiness, flight operations, infrastructure, Air Traffic Management (ATM), and electrical systems. They also cover environmental and societal impacts, which will play a significant role in enabling UAM operations, such as noise, air quality and passenger experience.

We are asking for input from the industry to validate, challenge and complete these risk models. We encourage you in particular to provide completed models. You can use our sample UAM scenario for this or a different one, which may reflect a specific business case or even proposed route that you or your organisation has developed. This input will be analysed to inform our further regulatory work on future air mobility, including sandbox trials and engagement with the private sector and other policymakers.

We are looking for submissions from a diverse set of global stakeholders, including but not limited to:

- Original Equipment Manufacturers and aerospace designers
- New Entrants and non-aviation sector representatives
- Current Air Mobility (e.g. 'air metro', 'air taxi') service providers
- Electrical/hybrid system experts
- Air Navigation Service Providers
- Aerodromes (including national and international hub airports and private airfields or heliports)
- Infrastructure providers or future infrastructure developers (e.g. vertiports)
- Consumer and aviation passenger service providers
- Transportation and integrated or smart network providers
- Academia
- Regulators and standards bodies
- Policymakers (including local, regional and municipal authorities)

*Specific details on how to respond to this call are included further down this document.*

## About our risk models

We have used the 'BowTie' approach to develop our risk assessment models. This is one of several widely accepted risk modelling tools used in aviation and across other industries. Details on this tool can be found on the CAA's website [here](#)

BowTie risk models are based around a single scenario – referred to as the 'hazard' – which has the potential to cause damage or harm. Basing the model on a single scenario enables a detailed risk picture to be drawn. For that reason, we have chosen the below UAM use case scenario. However, we recognise that future air mobility as a whole covers multiple use cases, including but not limited to: intercity, urban or rural locations; conventional or future aircraft designs; hybrid or electrical propulsion and thrust systems; on demand or other new business operational models; fixed locations or flexible (i.e. non-

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scheduled services). We will gladly accept submissions covering any of these types of use case or your alternative ones.

## CAA scenario

A commercial, passenger-carrying service to transport customers on a scheduled and regular basis from location A to location B using a Small VTOL aircraft (as defined by EASA's Special Condition). *We have made no assumptions on specific propulsion or levels of automation.*

Our initial models cover risks to:

- Safety - multiple factors
- Noise and environment
- Consumer Protection and Social licence

Each model depicts:

- A hazard: a scenario or activity, which has the potential to cause damage or harm
- A top event: an undesirable event or occurrence
- Threats that could cause the undesirable (i.e. top) event
- Consequences that could result from the undesirable (i.e. top) event

The models have been left unfinished for completion of:

- Recovery Controls: the mitigations or actions, which either prevent the consequence from happening, or reduce the severity
- Escalation factors: conditions that could reduce the effectiveness of one or more controls, thereby creating a higher level of risk

## CAA BowTie models for completion

- [1. Loss of separation, control and aircraft operations](#)
- [2. Sub-topic focus: Fire](#)
- [3. Sub-topic focus: Electrical system \(including batteries\)](#)
- [4. Environmental impacts](#)
- [5. Social and consumer impacts](#)
- [6. Annex: Drawing BowTies – step by step guide](#)

## How to respond

In the first instance we are seeking inputs in the form of a single written submission, from an individual expert, organisation or consortium. Submissions should take the form of a single document pack consisting of one or more risk models. These can be based on our scenario described above or an alternative scenario for the transportation of people from A to B by air. Similarly, you can complete the existing risk models or construct your own ones with alternative threats, top events and consequences.

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You can submit your insight in any appropriate format. Examples may include:

- Complete the controls and escalation factors for one or more of the CAA's existing risk models (see document links above), including removing any irrelevant threats and consequences or adding any further ones to those listed on the CAA risk models. (If you already have the XP Software used for BowTies please ask us for the existing files. If you do not have the software you can simply download a copy of our document to edit using Adobe, PowerPoint or one of your other existing software packages.)
- Create a BowTie risk model under your own scenario using a business case, specific route or environment you feel is relevant to your own experiences and expectations.
- Edit the existing risk models to apply to your own scenario, before completing the remaining mitigations.
- Provide your own risk register(s) or maps that identify safety and/or non-safety risks in your own format covering one or more of the risk areas outlined above.

## Timeline

Responses should be submitted by **14 August 2020** to [innovation@caa.co.uk](mailto:innovation@caa.co.uk) with the subject line 'Future Air Mobility call for insight'.

## How we will use your insight

Our intention is to publish consolidated risk models and accompanying analysis, using the insight we receive to share as much detailed information with industry and the public. The CAA and its employees must not disclose information provided to the CAA in pursuance of any provision of the Air Navigation Order (ANO). This includes information to support a potential future authorisation. Further information on how we use data we receive can be found [here](#).

Due to the volume of information it will not be possible for us to check specific text used ahead of publication. We will remove company, aircraft name and personal identifiers and adhere to the above legal requirements. In addition, we would ask you to include any specific details not covered under these areas that you would like us to also treat as confidential.

We will not be able to provide individual responses to all submissions. However, in some cases we may contact you to follow up on a submission directly or to involve respondents with specific insight in broader discussion in relation to this topic.

As a result of this work, we may hold future stakeholder events. If you would like to be informed of relevant events and news from the Innovation Hub, please confirm with your submission that you would like to be added to our contact list, or email us this confirmation separately to [innovation@caa.co.uk](mailto:innovation@caa.co.uk).

If you have any questions about this call for insight, please contact us at [innovation@caa.co.uk](mailto:innovation@caa.co.uk).