UK GOVERNMENT'S DRONES PATHFINDER PROGRAMME FRAMEWORK

The Pathfinder Programme is described through the following documents:

- The Pathfinder Framework
    - Part A - Purpose of the Pathfinder Programme
    - Part B - Governance
- Part C - Pathfinder Programme Application Guidance;
- Part D - Application Form to become a Pathfinder;
- Part E -Terms of Engagement of Pathfinder Projects.

PART A: PURPOSE OF THE PATHFINDER PROGRAMME

INTRODUCTION

The drone Pathfinder Programme (**"Programme"**) was announced in 2015 as part of the strong drive across government to promote emerging technologies as a driver for growth. The exploitation of drone technology could present important opportunities for UK industry to become a world leader in drone technology.

The Programme is part of a wider programme of work, both government led and across the UK's public and private sectors, aimed at enabling integration of drones into UK airspace. In 2018 the Programme's focus was reviewed and refreshed, under the governance of the Department for Transport (DfT), the Department for Business, Energy and Industrial Strategy (BEIS), the Civil Aviation Authority (CAA) and the Connected Places Catapult (CPC).

A current list of pathfinder Projects can be found at the drone pathfinder Programme webpage[1].

GOVERNMENT DRIVERS

DELIVERING THE GOVERNMENT'S INDUSTRIAL STRATEGY

The Industrial Strategy is about boosting productivity and earning power across the UK, building on our world-class strengths and making the most of untapped potential.

As a tool that can be deployed across many sectors, drones provide a clear opportunity for the Government to deliver on its industrial strategy, as well as the Future of Mobility Grand Challenge - one of four Grand Challenges - which aims to make the UK a world leader in the way people, goods, and services move now and in the future. Drones are saving lives and

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[1] https://cp.catapult.org.uk/case-studies/pathfinder/

removing people from harm, while also increasing productivity and delivering other economic benefits as noted by PwC[2]. To take advantage of this new market, the Government recognises the need to tackle the challenges, to unlock barriers to operations within current and emerging regulatory frameworks, and to encourage innovation as drone technology develops.

UK drone companies are also exporting their services across the world, further cementing the UK's place as a global leader in innovative services and generating productivity and growth across a range of international sectors.

VISION

The Programme aims to rapidly drive progress in drone technology and regulation enabling industry and the public sector to fully exploit the market in areas such as logistics, geo-mapping, national infrastructure inspections and surveying, and the provision of other commercial and public-sector services. It aims to facilitate the opportunities for organisations to contribute to realising this vision by identifying the commonalities between use cases and facilitating live testing of operational concepts. Such vision will be achieved working closely with related UK programmes in order to encourage collaboration and strive for consensus.

MISSION

The Programme will focus on identifying and overcoming the technical, operational, and commercial barriers, providing a platform for innovators to engage with government and the regulator at early stages, to jointly explore solutions and share information throughout the community. This increased engagement will serve to both maximise understanding of the current and future regulatory environment, as well as creating an opening for suggested adaptations to regulations where appropriate. It is envisaged that this will assist in optimising the use of drones in the private and public sectors, enabling efficiency savings, improving their capabilities including the ability to carry out high risk activities in a safer way. In particular, the Programme will continue to explore solutions for safe, routine beyond visual line of sight (BVLOS) drone operations across a range of applications, as set out in the methodology section of this document.

In respect of the particular challenges presented in unlocking sustainable BVLOS operations, the Programme will encourage industry to consider a variety of solutions in areas such as airspace access and improved situational awareness, examining a range of aspects from operational to technical. In order to assist this, a number of Pathfinder Challenges have been identified as set out at Part C - Application Guidance that will be relevant when considering submitting an Application for this Programme.

METHODOLOGY

The Programme will take a structured approach to achieving routine use of drones within the UK by exploring specifically how routine BVLOS operations could be enabled by overcoming

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[2] PwC (May 2018) The impact of drones on the UK economy

the identified challenges. To ensure that the focus of the Programme remains up to date, the list of Pathfinder Challenges detailed at Part C - Application Guidance will not be a definitive list and may be updated from time-to-time. This will be instigated and managed by the Steering Committee who in their decision making will consider actual industry engagement, the current national needs, horizon scanning and requests received that are beyond current regulatory approval mechanisms.

As progress is made and the Programme evolves, new or existing challenges may be reprioritised based on operational intelligence at the Steering Committees discretion. The Pathfinder Challenges will also be shared, discussed and revised in line with other similar programmes in order to maximise the rate of progression towards finding solutions.

The Programme currently has no dedicated funding to allocate to Projects, but significant time has been allocated by the Steering Committee member organisations to manage the Programme.

It is envisaged that by tackling the identified challenges collaboratively as a community we will start to build a catalogue of standard scenarios which will support future business models, objectives regulatory frameworks, and Government policies. The Pathfinder Community as referred in this document includes the Programme Steering Committee, Project Participants and any participating individuals and organisations, plus external contributors (other Government and non-Government stakeholders, including the Drones Industry Action Group (IAG), related initiatives and interested parties ("**Pathfinder Community**").

LOOKING BEYOND THE PATHFINDER PROGRAMME

Governance members will work to coordinate research efforts and provide appropriate steering with parallel initiatives beyond the Pathfinder Programme, including the NESTA (National Endowment for Science, Technology and the Arts) Flying High Challenge, CAA Regulatory Sandbox, Unmanned Traffic Management initiatives, the development of national and international standards, electrification and digitisation initiatives within the Aviation sector, analogous initiatives within the maritime and automotive sectors and ongoing external work streams around the world.

BENEFITS OF THE PATHFINDER PROGRAMME TO UK PLC

The benefits from any trials under the Programme will read across to a wide range of sectors who may wish to use drones now and in the future. Benefits may include the nurturing of future technologies, development of world-leading specialisms and/or niche manufacturing, thought leadership and other 'first mover' or 'trusted mover' benefits in BVLOS operations. This will ultimately benefit all businesses, big or small, who want to use drones, as our work will play a role in creating a framework and regulations which are accessible to all.

ENABLERS

To enable adoption and exploitation of drone technology through joint working between public and private sector organisations, the Programme will mutually support industry and

Government through knowledge sharing and collaborative working on topics such as, but not limited to:

- Understanding the sustainable business model
- Identifying viable airspace solutions
- Explore viability of electronic visibility solutions with surrounding airspace users
- Developing notification criteria appropriate to a model of operation
- Understanding options for UTM/ATM integration
- Mitigating commercial risks due to adverse events such as weather

Further detail is provided at Part C- Application Guidance. A key requirement for joining the Programme will be demonstrating activities in exploration of one of the areas of Pathfinder Challenges as identified at Part C- Application Guidance or by proposing activities in support of a new challenge that is accepted by the Steering Committee of the Programme. Additionally, there will be an appropriate information sharing mechanism to ensure shared industry learning in support of the Programme aims.

In addition to the more easily quantifiable benefits of the Programme, such as efficiency savings and improvements to capabilities/productivity, the Programme will also recognise and aim to deliver a number of societal benefits, for example improving the safety of operations that are usually carried out by placing a person in a dangerous environment, such as on live railway tracks.

BENEFITS TO PATHFINDER PROGRAMME PARTICIPANTS

Key benefits to the Unmanned Aerial System (UAS) industry and market sectors participating in the Programme may include:

Technical expertise
- Access to relevant technical and subject matter experts
- Advice on available technology and systems, both current and envisioned
- Assistance with the process for identifying a technology provider or end-user

Funding advice and assistance
- Signposting to possible funding sources
- Assistance with consortium building
- Access to CPC expertise and services

Enabling testing
- Assistance with developing a test programme
- Advice and guidance from CAA on demonstrating the necessary safety case
- Signposting to test environments, assisting innovators in achieving appropriate regulatory readiness

Collaboration and information sharing
- The opportunity to learn from the Pathfinder Community through networking opportunities and the sharing of Project outputs and lessons learned

- Coordinated engagement with Government departments
- Opportunity to inform Government roadmaps and policy as well as future regulatory constructs

Regulatory guidance and support
- Potential 'first mover' advantages through being involved in the creation of UK standard scenarios from the outset
- Help to improve regulatory readiness with support, guidance and access to the CAA Innovation Hub services

## PROJECT FUNDING OPPORTUNITIES

The Programme will aim to support project funding by leveraging private sector investment, directing projects towards established Government funding or grant opportunities, and sign-posting to funding sources from across the UK and internationally. The Programme may also be able to provide support with related funding applications.

Previous project funding sources have included private sector innovation funding from sector consortia, as well as part funding from government-backed sources such as Innovate UK.

PART B: PATHFINDER PROGRAMME GOVERNANCE

OVERVIEW

The Steering Committee consists of the DfT, BEIS, CAA and CPC (**"Steering Committee"**).   The governance structure of the Programme is designed to support the individual Projects, provide regulatory support and enable Projects to achieve their objectives. Importantly, the Steering Committee will determine whether a Project may be nominated as a 'Pathfinder' under the Programme and the scope of those Projects with regard to progressing towards achieving the Programme vision and goals.
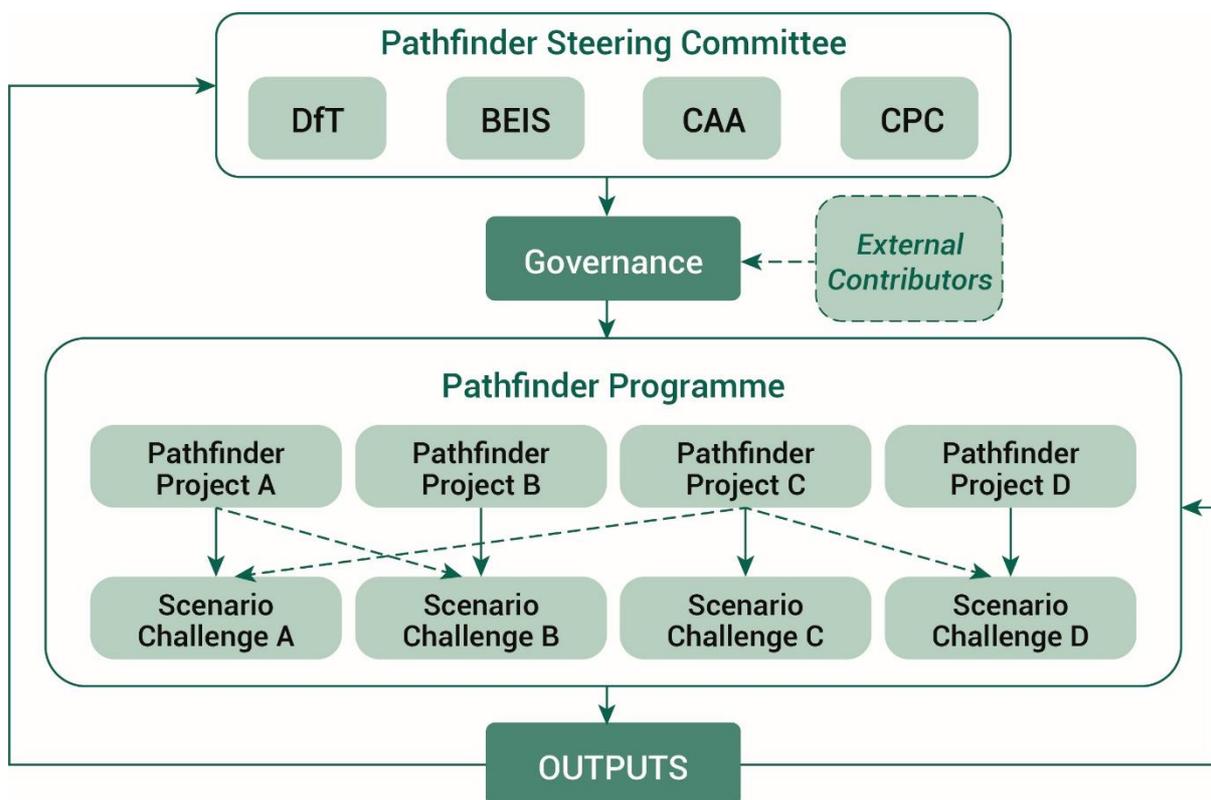
GOVERNANCE STRUCTURE

Steering Committee

Each party shall appoint one individual to the Steering Committee. Each nominated individual (and any changes thereto) shall be notified in writing to the other parties. Each party shall be entitled, but not bound, to appoint an additional individual to the Steering Committee to act as an observer. An observer appointed in such a manner shall be entitled to attend, but not vote, at meetings of the Steering Committee.

The Steering Committee will appoint a Programme Manager from the CPC (**"Programme Manager"**). All significant matters relating to the Programme will be decided upon by the Steering Committee, which may also put in place any structure to manage the Projects that it

agrees. The quorum for a meeting of the Steering Committee shall be not less than 50% of the parties (or their proxies). The DfT will be appointed as Chairman for each meeting unless agreed otherwise by the parties.

The Steering Committee meet quarterly at venues to be agreed or at any time when reasonably considered necessary at the request of any of the Parties. Requests to meet with the Steering Committee can be made on an ad hoc basis through the Programme Manager.

Meetings shall be convened with at least twenty-one (21) days' prior written notice, which notice shall include an agenda. Minutes of the meetings of the Steering Committee shall be drafted by the Programme Manager and transmitted to the parties without delay and in any event within 15 days of the meeting. The minutes shall be considered as accepted by the parties if, within thirty (30) days from receipt, no party has objected in writing to the Programme Manager.

As required by the Steering Committee, the Programme Manager will manage the preparation of progress reports from each Project and a draft of each report will be circulated to each member of the Steering Committee along with the written notice for the relevant meeting.

Each party shall, through one of its representatives, have one vote in the Steering Committee. Decisions will be taken by a majority vote of a meeting of the Steering Committee in the event of a tied vote, the Chairman shall have the casting vote.

Programme Management

The Programme Manager will:

- Be the primary contact for the Project Participants and Steering Committee;
- Attend Steering Committee meetings at the request of the Steering Committee and/or Chairman;
- Be responsible to the Steering Committee for the day-to-day management of the Programme;
- Make contact as required with Projects to receive progress in respect to milestones and deliverables;
- Be responsible for facilitating decisions taken by the Steering Committee.

ROLES & RESPONSIBILITIES

Each party who comprises the Steering Committee will have a different area of focus as described as follows:

The **Department for Transport** will:
- Provide **transport policy steer**, identifying policy and regulatory changes required in order to enable future routine drone operations.
- Act as the programme Senior Responsible Owner, providing leadership for the Programme overall and accepting responsibility for ensuring that the Programme meets its objectives and delivers the projected benefits.

- Act as Chairman for meetings with the Steering Committee and Project Participants.
- Ensure alignment with the wider objectives of DfT's drones programme, in particular:
  - Ensuring UK drones policy and regulation are fit for purpose, addressing the risks and harnessing the opportunities.
  - Ensuring adequate mitigations are put in place to protect the safety of the British public and manned aviation.
  - Ensure drone operations can develop and operate within shared airspace with manned aviation and integrate with existing air traffic management.
- Identify opportunities for the department's agencies to use drones, where efficiency savings can be made, to improve their capabilities or to carry out activities in a safer way e.g. maritime applications, infrastructure inspection, accident investigation.
- Act to ensure other Government Departments are aware of the Programme, and are identifying opportunities.

The **Civil Aviation Authority** shall operate via their Innovation Hub[3]. Any advice and guidance from the CAA Innovation Hub does not constitute regulatory advice. Instead, the Innovation Hub enables the collection and dissemination of regulatory advice from across the CAA for the purpose of supporting safe innovation. The organisational structure and working practices in place ensure that the Innovation Hub is at an arm's length from the traditional functions of the CAA.

The Innovation Hub will:
- Provide a **regulatory steer** and appropriate regulatory guidance pulling in lessons learnt from existing operations and other research / innovation programmes.
- Identify and prioritise key challenges to routine BVLOS operations which the Programme would be aiming to address.
- Utilise corporate knowledge to provide examples of how challenges may be mitigated.
- Generate high level work scopes in support of these challenges.
- Work with Project Participants in identifying mitigations, whether they be technical, environmental or operational.
- Provide technical subject matter expertise in aviation and regulation and possible access to the Regulatory Sandbox.
- Provide advice on how to avoid regulatory capture and ensure that advice does not predispose or impact regulatory decision making.
- Support regulatory education with respect to current and future regulations, including signposting how activities may progress within the current regulatory framework, or could impact and influence future regulations.

The **Department for Business, Energy and Industrial Strategy** will:
- Provide a **business and industry policy steer**, ensuring that the Programme is tackling the key challenges in line with the industrial strategy.
- Facilitate broader policy reach, with access to and influence on BEIS policies (and therefore Ministers).

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[3] www.caa.co.uk/innovation

- Ensure direct connections into the Industrial Strategy, its grand challenges, and the broader UK plc benefits, such as the economic and jobs impacts.
- Enable greater access to / signposting for funding or grant opportunities, including access to UK Research and Innovation (UKRI) and alike.
- Provide significant UK industry stakeholder outreach
- Enable and facilitate a strategic link between the Programme and the Drones Industry Action Group (IAG).

The **Connected Places Catapult** will:
- Provide a **technical and market steer** to assist identify industry challenges for adoption of drone technology.
- Be responsible for Programme Management and provide secretariat to the Programme.
- Engage directly with Project Participants to capture progress, barriers, risks and lessons learned.
- Provide overarching support across the Programme to the Steering Committee and Project Participants.
- Engage with prospective Project Participants to develop project scopes that meet Programme criteria as detailed in the Application Guidance document. The CPC may also, where possible, engage with wider industry, develop the consortium, explore funding opportunities and support discussions with the regulators.
- CPC will communicate the Programme developments and support wider public engagement e.g. hosting web content, collation of web content, posting on social media channels and interacting with relevant press and journals.
- Organise relevant events (i.e. information sharing events, Pathfinder Community days, pathfinder workshop events) and host as required.
- Ensure that the Pathfinder Community is effective and includes a range of relevant stakeholders, and maintain engagement with broader industry.
- Provide the following benefits to Programme:
  - Structured Programme Management and routes of access across the Programme.
  - Guidance and support to ensure Projects meet UK government policy requirements.
  - Access and introduction to wider industry, support to develop consortia, and identification of potential funding opportunities.
  - Support with technical aspects of the Programme.

The **Department for International Trade** will be working closely with the Steering Committee on advising and connecting to international markets and industry, focus on export and investment and provide insight across drones, Urban Air Mobility and Electrification of Aerospace.

CONVENING

The Pathfinder Community will meet once per quarter with the Steering Committee at Pathfinder Community events. These Community events will also include a broad range of interested stakeholders from across the UK, and will provide the Pathfinder Community with the ability to network, socialise potential projects and opportunities, communicate Project updates (challenges, benefits, methodologies, risks, etc.) and share lessons learned. This is also an opportunity to feed back to the Steering Committee any suggestion for improvements of the Programme. Separate engagements will occur on an ad-hoc basis depending on progress of specific Projects.

WIDER CONSULTATION AND ALIGNMENT ACROSS INITIATIVES

There is a need to ensure coordination between the Programme and other UK or international initiatives to avoid repetition of research.

The Steering Committee will ensure that the Programme and other Government strategies remain aligned and will consult regularly with the drone Industry Action Group (IAG) in order to ensure that the programme remains relevant and aligned with industry initiatives where possible. The IAG will also serve as a portal through which wider consultation for the Programme can be facilitated.

The awareness of ongoing development streams will also enable Projects to be coordinated effectively and take advantage of knowledge sharing with external projects. This will aim to avoid fragmentation of discussions and initiatives, and generate a unified effort towards the adoption and advancement of drone technology for national benefit.

Specific initiatives which the Steering Committee will actively collaborate with include the Future Flight Challenge[4], and the CAA Regulatory Sandbox[5].

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[4]https://industrialstrategy.blog.gov.uk/2018/12/19/how-aerospace-sector-deal-will-help-develop-flight-technology-of-the-future/
[5] https://www.caa.co.uk/Our-work/Innovation/The-CAA-regulatory-sandbox/