

UK GOVERNMENT'S DRONES PATHFINDER PROGRAMME FRAMEWORK

Version 1
November 2018

This document sets out the purpose and aspirations of the Pathfinder Programme (Part A), the governance, including the roles and responsibilities of the Steering Committee members (Part B), and the criteria and requirements for being a member of the Pathfinder programme (Part C).

The Pathfinder Steering Committee

Department for Transport
Department for Business, Environment and Industrial Strategy
Civil Aviation Authority
Transport Systems Catapult

PART A: PURPOSE OF THE PATHFINDER PROGRAMME

INTRODUCTION

The drone 'Pathfinder' 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, estimated to be worth up to £42 billion for UK GDP by 2030.

The Pathfinder 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 Transport Systems Catapult (TSC).

GOVERNMENT DRIVERS

DELIVERING THE GOVERNMENT'S INDUSTRIAL STRATEGY

The UK 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 removing people from harm, while also increasing productivity and delivering other economic benefits as noted by PwC¹. 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 Pathfinder Programme aims to rapidly drive progress in drone technology and regulation over the next ten years, enabling industry and the public sector to fully exploit the market in areas such as logistics, geo-mapping, national infrastructure inspections and surveying, as well as 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.

¹ PwC (May 2018) The impact of drones on the UK economy

MISSION

The Programme will focus on identifying and overcoming the technical, operational, and commercial barriers, providing a platform for industry 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, this 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 enable this, a number of challenges of particular interest and example UK standard scenarios will be identified, prioritised and reviewed (Appendices A and B). These will be used to inform potential targeted and sustained development programmes for BVLOS flight operations. This list will be managed by the Steering Committee and will evolve as progress is made and as new or existing challenges are reprioritised based on operational intelligence.

METHODOLOGY

The Pathfinder Programme will take a structured approach to enabling routine use of drones within the UK by identifying, prioritising and reviewing the challenges to safe, routine BVLOS operations.

To ensure that the focus of the programme remains up to date, the list of challenges will be updated regularly based on industry engagement, the current national public requirements, horizon scanning and requests received that are beyond current regulatory approval mechanisms. These will be assessed and prioritised by the Steering Committee on a regular basis. It is envisaged that by tackling the identified challenges as a collaborative community, we will start to build a catalogue of standard scenarios which will support future business models and objectives.

The latest list of challenges will be made available once updated as an appendix to accompany document.

LOOKING BEYOND THE PATHFINDER PROGRAMME

The Steering Committee will work with the Pathfinder Community to coordinate research efforts and provide appropriate steering with parallel initiatives beyond the Pathfinder Programme, including the NESTA Flying High Challenge, Unmanned Traffic Management

initiatives, the development of national and international standards, electrification and digitisation initiatives within the Aviation sector, and ongoing external work streams around the world.

BENEFITS OF THE PATHFINDER PROGRAMME TO UK PLC.

The benefits from the Pathfinder Programme trials 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 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 supporting the framework of regulations, accessible to all.

ENABLERS

To enable adoption and exploitation of drone technology through joint working between public and private sector organisations, the programme will 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 in the appendices accompanying document.

A key requirement for joining the Pathfinder Community, as detailed in Part C, is the demonstration of activities in exploration of one of the identified challenges, or proposing activities in support of a new challenge that is accepted by the Pathfinder Steering Committee. Additionally there are communication and education requirements to ensure shared industry learning in support of the programme aims and for UK plc.

In addition to the more easily quantifiable benefits of the programme, such as efficiency savings and improvements to capability and 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.

BENEFITS TO PATHFINDER PROGRAMME PARTICIPANTS

Key benefits to 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

Funding advice and assistance

- Signposting to possible funding sources
- Assistance with consortium building
- Access to TSC expertise and services

Enabling testing

- Assistance with developing a test programme
- Advice and guidance from CAA on demonstrating the necessary safety case
- Access to a sandbox environment to assist innovators in the preparations to seek regulatory approval, and where appropriate for the CAA to provide approval for testing new innovations subject to risk mitigations

Collaboration and information sharing

- The opportunity to learn from the network of Pathfinder partners 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

- Enabling the development of operational, procedural and technical mitigations, with sufficient evidence, to alleviate the regulatory burden.
- Potential 'first mover' advantages through being involved in the creation of UK standard scenarios from the outset

PROJECT FUNDING OPPORTUNITIES

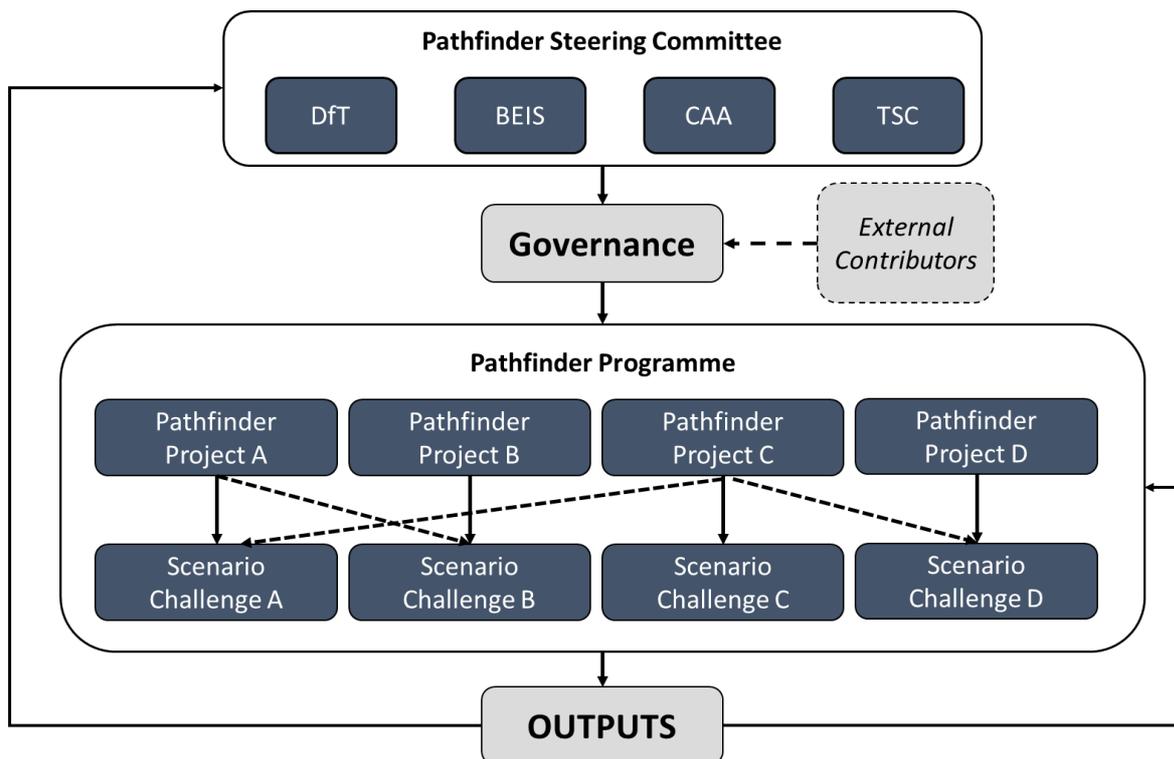
The Programme will aim to support project funding by leveraging private sector investment, directing projects towards established Government funding or grant opportunities, and signposting to funding sources from across the UK and internationally. The programme may also be able to provide support with 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: GOVERNANCE ARRANGEMENTS

GOVERNANCE STRUCTURE

The Steering Committee consists of the DfT, BEIS, CAA and TSC. The governance structure of the Pathfinder Programme is designed to support the individual Pathfinder projects, provide regulatory support and enable projects to achieve their objectives. Importantly, the committee will determine whether a project may be classified as a 'Pathfinder', and the scope and terms of those projects with regard to best progressing towards achieving the programme vision and goals.



Definitions:

- Pathfinder Programme - the Steering Committee and active Pathfinder projects.
- Pathfinder Projects - individual projects which are regularly assessed against the programme criteria by the Steering Committee.
- Pathfinder Community - includes the Pathfinder Programme as defined above, plus external contributors (other Government and non-Government stakeholders, including the Drones Industry Action Group (IAG), related initiatives and interested parties).

PROGRAMME FUNDING

The Pathfinder 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.

ROLES & RESPONSIBILITIES

The role of each Steering Committee organisation with regards to the Pathfinder Programme is 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, and responsible for ensuring that it meets its objectives and delivers the projected benefits.
- 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.

The CAA will:

- Provide a **regulatory steer** and appropriate regulatory guidance pulling in lessons learnt from existing operations.
- Identify and prioritise key challenges to routine BVLOS operations which pathfinders 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 pathfinders in identifying mitigations, whether they be technical, environmental or operational.
- Provide technical subject matter expertise in aviation and regulation and possible access to a regulatory sandbox environment
- Provide an organisational structure 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.
- Provide guiding principles.

BEIS will:

- Provide a **business and industry policy steer**, ensuring that the Pathfinder 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).
- 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 Pathfinder programme and the Drones Industry Action Group (IAG).

TSC will:

- Provide a **technical steer**, as project partners embedded in a number of the existing Pathfinder projects
- Be responsible for programme management and provide secretariat to the Pathfinder Programme
- Engage directly with project consortiums to capture progress, barriers, risks and lessons learned. Meetings between the TSC and Pathfinder Programme project partners will be undertaken on a regular basis and will provide overarching support across the programme
- Engage with prospective Pathfinder project consortiums to develop project scopes that meet Pathfinder criteria. TSC may also, where possible or needed, engage with wider industry, develop the consortium, explore funding opportunities and support discussions with the regulators
- TSC will communicate Pathfinder Programme developments and support wider public engagement e.g. hosting initial 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 Pathfinder projects:
 - Structured programme management and routes of access across the programme board and project partners.
 - 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 project.

CONVENING

The Pathfinder community will meet once per quarter with the Steering Committee at Pathfinder Community events. These 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 programme any suggestion for improvements.

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 Pathfinder 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 Drones IAG in order to ensure that the programme remains relevant and aligned with industry initiatives where possible. The Drones 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 Pathfinder projects to coordinate 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.

The Steering Committee will maintain a list of related initiatives with which the Pathfinder Programme will seek to align or collaborate, to be provided in an accompanying appendix.

COMMUNICATIONS

The Pathfinder projects will be required to communicate progress in support of the aims of each project to the public. The Pathfinder Programme Steering Committee is looking to promote more widely the activities being undertaken by the Pathfinder Programme and the participating organisations, through dedicated webpages, attendance at events and workshops, and increased presence on professional social media channels.

Pathfinder projects should advise and consult with the Steering Committee before releasing any communication pieces that reference their participation on the programme, or the programme itself. This will aim to harmonise the messaging of the programme and ensure that it is consistent with the objectives and agenda of the programme, and the other Pathfinder community members.

PART C: PATHFINDER PROGRAMME PARTICIPATION

The success and credibility of the Pathfinder Programme depends upon cooperation and effective collaboration between programme participants. In order to participate in the programme, organisations will be assessed against the following criteria and must agree to the requirements set out below which cover their responsibilities including for communications and the sharing of outputs.

ASSESSMENT OF PATHFINDER PROJECTS

The Steering Committee is responsible for deciding which projects are members of the Pathfinder Programme to ensure that the programme remains focused on its strategic objectives.

Current and prospective projects will be assessed against the following criteria:

1. **Challenges of interest** - Is the project intending to tackle one of the challenges listed at Annex A, in a way that is unique to other Pathfinder projects? Or is it proposing to tackle a new challenge that should be considered for inclusion in the programme?
2. **Benefits** - Does the project intend to make a significant contribution to the benefits specified in Part A of this document?
3. **Viability of the operating model** - Do the project's stated goals, timeline and milestones seem feasible? Can it deliver the operations safely?
4. **Applicability to market** - The market potential addressed by the project must be significant in value or in its societal benefits. A business case justifying the market segment needs, and an outline of how the technology may be integrated into the operational workflow of the end-user is a key requirement for each Pathfinder.

It is important that the Pathfinder Programme remains focused on aggressively tackling the challenges facing the UK for drone implementation. The Steering Committee therefore reserves the right to steer or reassess the programme and the scope of each project.

Projects which are not in support of the identified challenges, or of a new challenge accepted by the Steering Committee, will not be accepted onto the Pathfinder Programme.

OUTPUTS/REPORTING REQUIREMENTS

A subsequent version of this framework will detail the specific reporting requirements for Pathfinder projects.

PERMANENCE ON THE PROGRAMME

Permanence on the programme will be subject to evidence of progress towards the project and programme objectives. This and will be demonstrated by the achievement of project milestones and regularly assessed for efficacy by the Pathfinders Steering Committee.

FRAMEWORK APPENDICES

In support of the programme framework, the following additional information is available in separate supporting appendices.

APPENDIX A: PRIORITISED PATHFINDER CHALLENGES

APPENDIX B: ASSOCIATED INITIATIVES AND PROGRAMMES

APPENDIX C: PATHFINDER PROGRAMME PARTICIPANTS