DTL
Drone Technologies

Pioneering the next steps in Drone Deployment

Angus Council

DRONE PORT MONTROSE PROJECT

CONCEPT OF OPERATIONS
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1.0	Initial Issue to CAA (ACP-2019-084)	Richard Stark	17 Aug 20

REGULATION REFERENCES

Regulation	Link
CAP 722 Unmanned Aircraft System Operations in UK Airspace - Guidance & Policy	https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=415
CAP 795 Safety Management Systems - Guidance to Organisations	https://publicapps.caa.co.uk/docs/33/CAP%201059%20SMS%20for%20small%20organisations%20(p).pdf
AP 1059 Safety Management Systems: Guidance for small, non-complex organisations	https://publicapps.caa.co.uk/docs/33/CAP%201059%20SMS%20for%20small%20organisations%20(p).pdf
CAP 1616 Airspace change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information	https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8127

Note taken from "An introduction to unmanned aircraft systems" (CAA Website[1]):

Unmanned Aircraft Systems (UAS) are a new and evolutionary component of the aviation system, offering several new and exciting opportunities, as well as a number of challenges.

Unmanned aircraft come in a variety of shapes and sizes, ranging from small handheld types up to large aircraft, potentially a similar size to airliners and, just like manned aircraft, they may be of a fixed wing design, rotary winged, or a combination of both.

Unmanned Aircraft may also be referred to as:

- Drones
- Remotely Piloted Aircraft Systems (RPAS)
- Unmanned Aerial Vehicles (UAV)
- Model Aircraft
- Radio Controlled Aircraft

Regardless of the name used, they all share the common characteristic that the person responsible for piloting the aircraft is not onboard it. Just like any other aircraft however, an unmanned aircraft must always be flown in a safe manner, both with respect to other aircraft in the air and also to people and properties on the ground.

The CAA's primary aim is to enable the full and safe integration of all UAS operations into the UK's total aviation system.

While the regulations are the same for all types of flight, there are some specific additional requirements placed on commercial operations involving small unmanned aircraft.

Within the UK, UAS are currently split into separate categories according to their weight (or mass) as follows:

- 20kg or less - Small Unmanned Aircraft - this class covers all types including traditional remotely controlled model aeroplanes, helicopters or gliders, as well as the increasingly popular multirotor 'drones' and remotely controlled 'toy' aircraft. They normally have a reduced level of regulation imposed on them which is aimed at being proportionate to the risk and complexity or their types of operation.
- >20kg to 150kg - Light Unmanned Aircraft - this class covers the larger and potentially more complex types of unmanned aircraft and large model aircraft. They are subject to all aspects of UK aviation law, although it is accepted that they will require to be exempted from many of the requirements. Approval to operate is normally given following the submission of a Safety Case to the CAA, which is essentially a package of information which demonstrates to us that the unmanned aircraft can be flown safely.
- Over 150kg - UAS - unmanned aircraft within this class will normally be subjected to the same level of regulatory approval requirement as would be used for traditional manned aircraft. They will normally be certificated by the European Aviation Safety

[1] Website accessed 29 Apr 20: https://www.caa.co.uk/Consumers/Unmanned-aircraft/Our-role/An-introduction-to-unmanned-aircraft-systems/

Agency (EASA), although there is also scope to make approvals for UK only operations via the same process that is used for Light UAS.

Further Guidance on UAS operations within UK airspace can be found in our UK guidance document CAP 722.

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1. EXECUTIVE SUMMARY

The Drone Port Montrose Project aims to create a Centre of Excellence for the development of drone technology in Angus, Scotland. The project aims to establish Scotland's first drone port in Montrose to facilitate the trials of UAS technology that will ultimately support the widespread adoption of routine Beyond Visual Line of Sight (BVLOS), autonomous UAV flights in unsegregated airspace.

The project is comprised of a number of phases. The first will establish an area of temporarily segregated airspace above the North Sea adjacent to the Angus Coastline, supported by ground based support facilities. Future phases will seek to establish more permanent airspace trials areas and onshore facilities, potentially incorporating onshore trial areas, using the lessons learned from the initial temporary phase to access funding from Angus Council's economic development fund, The Mercury Programme.

The offshore airspace will comprise of an area of segregated airspace divided into sectors to allow multiple trials to be conducted at once and commercial operations to vessels at anchor. 2 drone corridors (again in segregated airspace) will connect Drone Port Montrose (DPM) to the site of the soon to be installed Seagreen Windfarm and the Bell Rock Lighthouse.

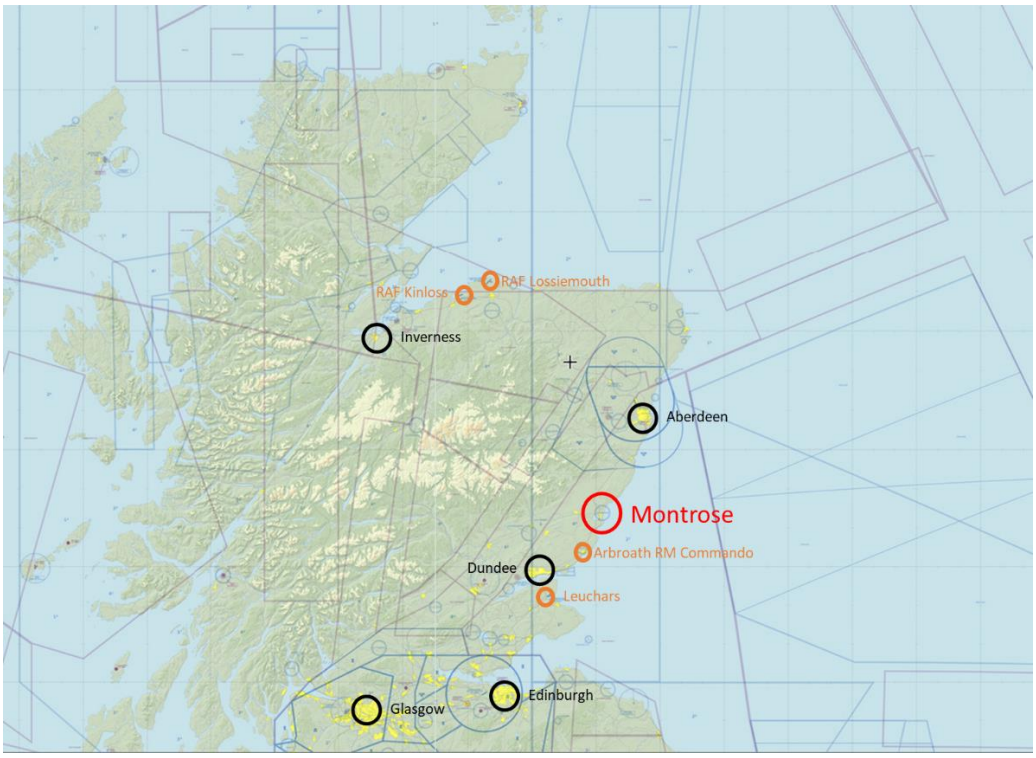
Management of UAS operations will be conducted by DPM in line with the constraints of its Operations Manual. Responsibility for flight operations will rest with the client and their Remote Pilot. Alignment of DPM's Operations Manual with the Client's Operational Safety Case (OSC), avoiding any gaps emerging, will be managed through a Flight Planning Bridging Document which details the Trial Programme and the Remote Pilot capabilities and refers to the an approved UAS OSC Vol 2 for the UAS system to be used and a Risk Assessment based on that of DPM and the UAS. This document will also provide the basis for insurance responsibilities.

This Concept of Operations (1) provides an overview of the project how trial and commercial operations at DPM will be conducted The Safety Management System (SMS) (2), DPM Risk Assessment (3), BLOVIS Trials Area Manual (4) and Onshore Facilities Operations Manual (5) provide the detail, specific requirements and templates governing all activities taking place. Together these five documents are known as the DPM Operations Manual.

2. INTRODUCTION

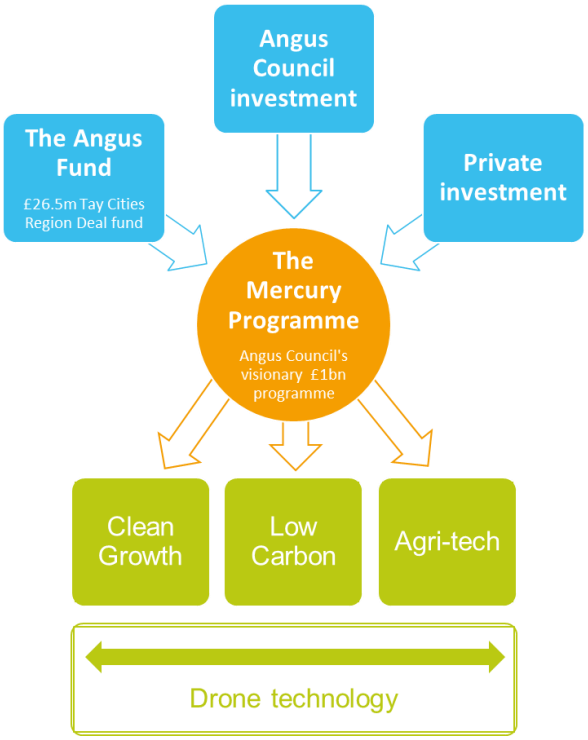
2.1. WHAT IS THE DRONE PORT MONTROSE PROJECT?

Drone Technologies Limited (DTL) is working with Angus Council to establish a hub for the development of drone technology in Montrose, Angus. The hub will be centred around Scotland's first Drone Port facility, called *Drone Port Montrose,* and aims to attract companies investment and employment to the region by providing facilities focused primarily on supporting companies and organisations developing BVLOS and autonomous Unmanned Aerial Vehicle (UAV) flight.



Montrose is located on the east coast of Scotland, equidistant from Aberdeen and Dundee. The airspace is relatively quiet and therefore any trials airspace area less likely to interfere with existing and routine air users.

The Drone Port Montrose Project is a four-phase project. Phase 1 of the project has been funded using Angus Council funds whilst it is envisioned that phases 2 – 4 will form part of the Mercury Programme, the Council's economic development plan, and generate commercial revenues.



A schematic of the Mercury Programme, Angus Council's £1Bn multi-year economic development plan for the county. The Drone Port Montrose Project is part of the Programme

The purpose of Phase 1 is to establish the Drone Port to allow DPM to demonstrate their ability to operate safely and prove the Drone Port Montrose business case prior to the commitment of larger sums of funding from the Mercury Programme budget.

Once established Drone Port Montrose is intended to operate as a commercial Joint Venture between DTL and Angus Council. The exact commercial nature of the entity will be decided during phase 1 of the project.

2.2. WHAT IS A DRONE PORT?

The Drone Port facility will comprise of two elements:

- An area of segregated trial airspace.
- Ground-based support facilities such as take-off and landing areas, warehousing, workshops and office space.

Whilst not necessarily a unique concept, there are very few drone ports (also known as Verti-ports) globally. Their scope of operations and procedures are therefore immature and untested in a commercial setting. By building Drone Port Montrose Angus aims to play an integral role in defining not just the physical characteristics of the facilities, but also the commercial business model for both the UK and globally.

2.3. WHY DRONES, WHY ANGUS AND WHY MONTROSE?

Over the past 5 – 10 years the use of UAS in military, commercial and consumer applications has witnessed exponential growth[2]. This growth is now being constrained by the regulations which generally limit operations to within Visual Line of Sight (VLOS – defined as no more the 500m from the remote pilot) and resulted in some of the returns on the significant investments being made not being wholly realised. The widespread adoption of Beyond Visual Line of Sight (BVLOS) and autonomous flight will unleash the next revolution in UAS technology making drone deliveries to the doorstep, airborne autonomous taxis and extended duration infrastructure inspection and surveillance possible.

Countries such as China, Rwanda, France, Netherlands, Ireland, UAE and the US have already embarked on this journey, making the initial regulatory changes to allow widespread trials and early commercial operations to begin. The UK is lagging behind. The aim of the Drone Port Montrose Project is to support the Regulator and industry catch up by creating a purpose-built hub for the development of UAS technology where trials can be conducted in a controlled environment, to test the technology and develop UK-centric processes and procedures and bolster the confidence of the Regulator, ultimately leading to the adoption of new regulations.

As a drone company based in and operating around Angus, DTL considers the county to be an ideal location to establish Drone Port Montrose, Scotland's first drone port, as the county can boast the unique combination of:

- **QUIET AIRSPACE**: The air space above Angus and out to sea is relatively quiet and therefore less likely to interfere with manned aviation as in many other locations
- **LOW POPULATION DENSITY**: Angus and the seas off its coast have low population densities reducing the risk to both the population beneath any drone and the privacy concerns drones create in more dense areas
- **COMMERCIAL OPPORTUNITY**: The large windfarm developments due to be installed off the Angus coast offer an opportunity for research and development to be conducted with near term fee-charging opportunities
- **RURAL ENVIRONMENT**: Angus is an agricultural leader in the UK both in terms of the quality of its farming produce and its use of advanced technology, including drones, by some of the county's companies
- **SKILLED WORKFORCE**: Montrose is situated equidistant between two of Scotland's major cities; Aberdeen with existing expertise in offshore operations, automation and robotics and Dundee with an expertise in software development. The two cities boast 4 universities between them, and Montrose is well connected to both, as well as Central Scotland and further south by the main east coast train line which runs through the town

Whilst Drone Port Montrose seeks to support the development of all drone technology, because of the county's environment, particular focus will be directed to offshore, rural and agricultural applications.

[2] Goldman Sachs, 2016. https://www.goldmansachs.com/insights/technology-driving-innovation/drones/

2.4. PROJECT OVERVIEW

2.4.1. PROJECT PURPOSE AND OBJECTIVES

Problems and Purpose

To support the trials of UAS BVLOS and autonomous flights, the development of robust accompanying procedures by companies and organisations are required to conduct flight planning and there is currently a need to apply to the Regulator (CAA) for temporary segregation of air space on a case-by-case basis. This is not only time consuming and expensive, but also diverts a developer's resources away from the development of the technology to airspace planning and is an inconvenience to other air users.

This case-by-case approach not only limits testing because of the draw on resources which could otherwise be spent on core business, but silos the lessons learned within companies. From a safety perspective this is sub-optimal as the greater the pool of experience from which lessons can be drawn, the greater the improvement of the safety management system (SMS) and associated procedures.

With BVLOS, autonomous flight constrained more by Regulation than technology, ensuring lessons learnt can be drawn from as wide a pool as possible, rather than on a case-by-case basis, will be a key factor in developing the Regulator's confidence in the technology and procedures, and ultimately accelerate the inclusion of BVLOS, autonomous flight into the regulations. DPM has been established to support this gathering of evidence by putting in place an operating environment which is not only simple and quick to access without compromising on the imperative for operations to introduce no enhanced risk to other air users than exists today.

Objectives

To establish a UAV test area and support facilities within Angus that will establish the country as a recognised Centre of Excellence for the development of drone technology to:

- Support clients and regulatory authorities to achieve BVLOS, autonomous flight in unsegregated airspace.
- Support the economic development of Angus by attracting companies, investment and jobs to the county as part of the Council's Mercury Programme.

Whilst not exclusively so, DPM will primarily focus on the provision of trial scenarios for the marine and offshore industries, agriculture and rural applications by reason of the surrounding environment and industry. Whilst lacking a large city within its boundaries, Angus' low population density and small towns offer low risk, trial scenarios for companies aiming to exploit the advantages of UAV operations within urban areas by providing early tests of their technology.

2.4.2. FACILITIES

The airspace trials area will be comprised of two elements:

1. Visual Line of Sight (VLOS) trials areas (detailed in the Onshore Facilities Manual):

- Class G airspace in the immediate vicinity of DPM's onshore facilities
- Class G airspace above the Petrofac Training Facility immediately west of the Zero Four Development

- Trials and operations within these areas will be governed under existing standard flight permissions

2. Beyond Visual Line of Sight (BVLOS) trials areas (detailed in the BVLOS Trial Area Manual):

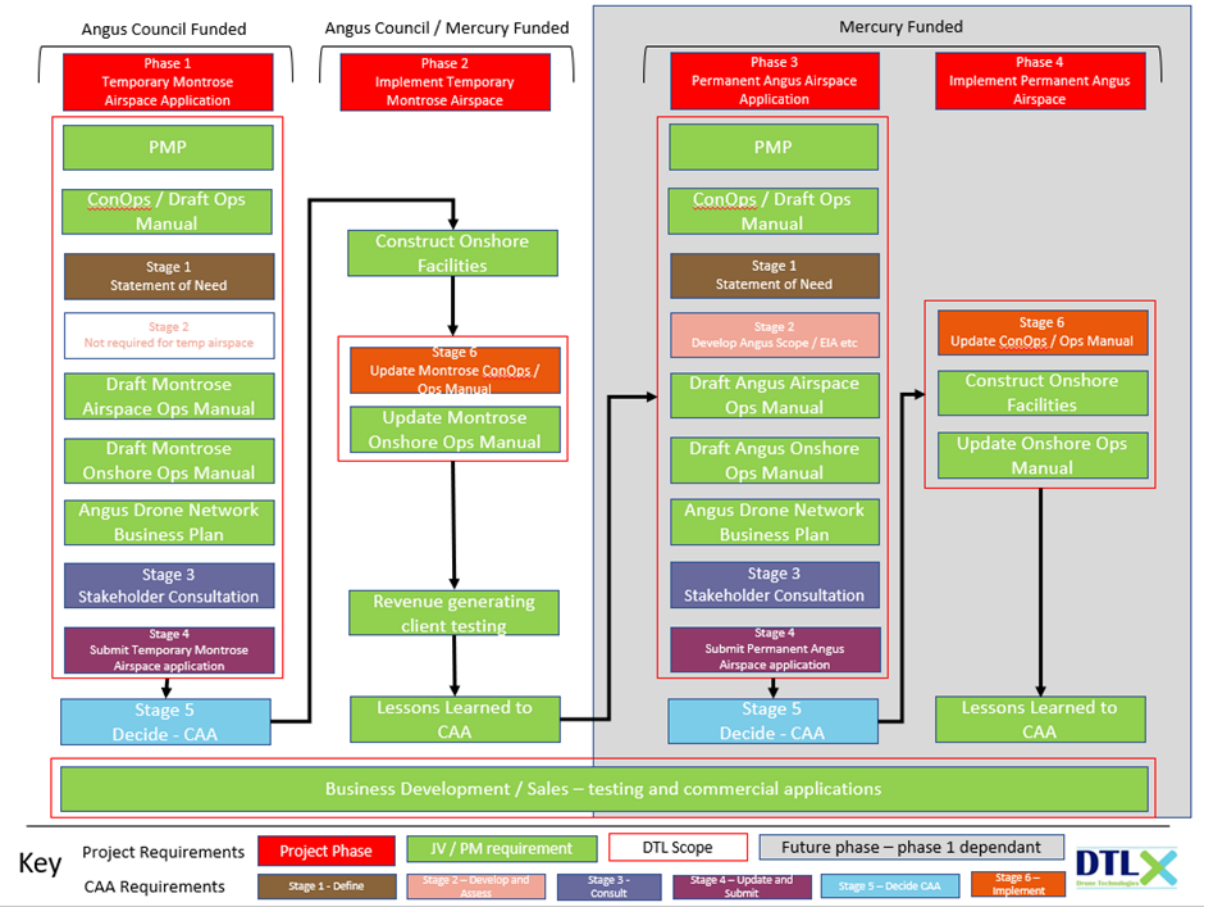
- An area of segregated airspace over the North Sea adjacent to the onshore facilities at DPM.
- Drone corridors within segregated airspace extending from Drone Port Montrose to the future windfarm developments off the Angus coast (Seagreen) and the Bell Rock Lighhouse
- An application for a temporary change of airspace classification is being made to the CAA as part of Phase 1 of the project

The ground-based support facilities will include, but not be limited to:

- UAV take-off and landing areas
- Office space and client offices
- Workshops
- Storage

2.5. PROJECT STRUCTURE

The Drone Port Montrose Project will comprise 4 phases:



An overview of the four phase Drone Port Montrose Project

2.5.1. PROJECT PHASES 1 – AIRSPACE CHANGE APPLICATION (TEMPORARY)

Phase 1 of the Drone Port Montrose Project is comprised of the application and approval for an area of segregated airspace where BVLOS, autonomous flights can be conducted as the first step in the creation of a hub for the development of drone technology. Phase 2 of the project is comprised of trials conducted by DPM's clients.

The Airspace Change Application submitted during Phase 1 aims to provide an area of segregated airspace on a TEMPORARY basis for a period of SIX MONTHS in order to allow DPM's business plan to be tested and funding for future development secured.

As an application for a temporary airspace change, Phase 1 will follow the shortened Temporary Airspace Change process detailed in CAP 1616 which does not require Stage 2 of the process.

2.5.2. PHASE 2 – DRONE PORT ESTBALISHMENT AND INITIAL OPERATIONS

Phase 2 of the project is comprised of 3 elements.

- Phase 2.1 VLOS operations will commence once the onshore facilities are in place using the existing permissions of visiting drone pilots and companies
- Phase 2.2 BVLOS operations will commence once the temporary change of airspace application has been accepted and the DPM Operations Manual is in place

- Phase 2.3 The construction of the ground-based support facilities

Whilst it is not envisaged that commercial revenue generating drone operations will be conducted by clients during Phase 2, should the opportunity present itself clients will be able to exploit these within the boundaries of the DPM's Operations Manual.

2.5.3. PROJECT PHASES 3 AND 4 – FUTURE PLANS

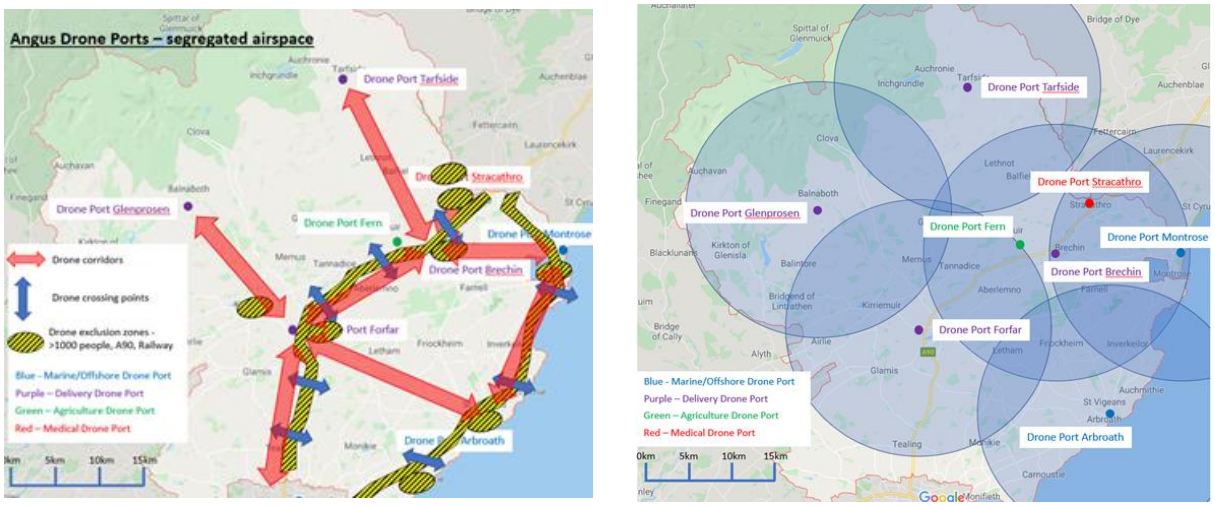
Phases 3 and 4 of the Drone Port Montrose Project will comprise the conversion of the initial temporarily segregated airspace to an area of permanently segregated airspace (Phase 3) to allow the continued conduct of UAV operations, potentially over an expanded footprint including onshore test scenarios.

At present these phases are conceptual and still under development. The decision over whether to pursue them, and if so in what form will be made during Phase 2 once the initial business case has been tested.

The phased approach to the development of DPM will allow the lessons learned and stakeholder requirements identified during the initial operations in Phase 2 to be incorporated into the permanent application to ensure DPM is not only well aligned to the needs of its clients but acts as exemplar in terms of safe operations for future drone ports to follow as drone operations increase both in number and complexity. .

If the decision is made to convert the temporarily segregated airspace to permanent, it is likely that this will require a further Airspace Change Proposal to made following the full 7-stage process as defined in CAP 1616[3].

It is envisaged that commercial, revenue generating drone operations, as well as the ongoing trials, will be conducted by clients from DPM.



Early concepts for the future Angus Drone Port Network to be discussed during the initial consultation period

Any expansion of the Drone Port Montrose Project is subject to approval by Angus Council and the CAA and will form the basis of a new ConOps. It has been included in this document to provide context and the potential of the programme.

[3] CAP 1616 https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8127

2.6. CURRENT STATUS – AUG 2020

The project is currently in Phase 1.

Planning permission for a temporary ground-based facility located on the north east corner of The Crown Estate Scotland's Zero Four development has been lodged by Angus Council.

An application for the temporary segregation of airspace over the North Sea adjacent to Drone Port is being prepared for submission to the Civil Aviation Authority (CAA).

3. OPERATIONS

3.1. DRONE PORT MONTROSE – PURPOSE AND VISION

3.1.1. PURPOSE

Drone Port Montrose (DPM) has been established by DTL and Angus Council who, together, intend to capitalise on the next leap forward in UAS technology; the widespread adoption of BVLOS, autonomous flight that will ultimately take place routinely in unsegregated airspace.

DTL is a commercial organisation who see the opportunity to be pioneers in a rapidly evolving sector, laying sound foundations upon which to build a successful long-term business. Angus Council seek economic development of the region and see the potential to be at the vanguard of an expanding industry and as an opportunity to attract inward investment and create long term, high quality jobs to the region. DPM's purpose is therefore two-fold: commercial viability and public good – equally weighted.

Together, our shared view is that the technology exists to make this next leap forward in UAS technology a reality today. The hurdle to be overcome is the regulation which requires demonstrable evidence that the integration of additional UAS into the existing aviation poses no greater risk to air users or the populations living and working below than the status quo.

In proactively establishing DPM we understand that we have no official role in supporting the Regulator and have no authority to impose our aims upon existing air users. We do however seek to collaborate and align our goals and operations with the needs and priorities of the Regulator and stakeholders to establish mutually beneficial relationships to provide future-proof, safer, greener skies for all.

3.1.2. VISION

In seeking to pioneer the widespread adoption of new technology, which ultimately requires the evolution of the existing regulatory regime, Drone Port Montrose has aligned its vision to that of the Regulator:

- **CAA Vision**: We see a world where everyone who chooses to fly, as well as anyone who does not, has confidence in a safe and secure aviation sector that takes its responsibilities seriously, backed by a regulatory system that actively manages risk and supports consistently high performance[4].
- **Drone Port Montrose Vision:** We see a world where everyone who chooses to utilise the enhanced services drones can offer, as well as anyone who does not, has confidence that operations conducted at our facilities to support the development of this capability will be conducted safely and securely by an organisation which takes its responsibilities seriously by actively managing risk to consistently high performance in a manner aligned to the Regulator's vision.

[4] CAA, 2020. Our Vision. CAA website accessed 10 Apr 2020. https://www.caa.co.uk/Our-work/Corporate-reports/Strategic-Plan/Our-vision/

3.2. DRONE PORT MONTROSE – OPERATING PRINCIPLES

3.2.1. SAFETY FIRST

Air travel is one of the safest modes of transport people use to move from one point to another. However, humans are not designed to fly and therefore by doing so significant risks are introduced both to the people in the air and the population below who are likely to be threatened by aircraft malfunction or crash.

Air travel has achieved its enviable safety record within the wider transport system not only because of technology development but through becoming an exemplar in the implementation of procedural safety. The impending future addition of large numbers of UAVs, flying BVLOS and increasingly autonomously, into the existing system introduces additional risk which the Regulator requires to be managed effectively to ensure that manned aviation is at no greater risk from UAV operations than they would have been from existing operations today.

As a new concept, within an expanding industry, DPM intends to establish a Safety Management System (SMS) and culture which will act as an exemplar of good practice in the operation of drone ports for those who follow.

In order to achieve this, safety will be the first consideration of all who utilise Drone Port Montrose, extending from the ergonomics of its design, to its prominence in procedures and all the way through to post flight reporting and the ongoing audit programme. A culture of openness and transparency[5] is a pre-requisite for anyone using the facilities. DPM aims to ensure this is achieved through the design and adoption of systems and procedures that are easy to adopt and based on the foundations of safe operational practice.

Drone Port Montrose's Safety Statement

As a fundamental principle of its approach to safety, Drone Port Montrose will continually embrace a culture of openness and a willingness to continually adapt and develop its safety management system in order to facilitate a safe operating environment and demonstrate procedural excellence and transparency to the Regulator (CAA)

3.2.2. PROCEDURAL EXCELLENCE

The testing of new technology carries inherent risk which must be managed effectively if the safety of both those involved, and the surrounding populations is to be ensured. Whilst DPM aims to attract pioneers to push the limits of the possible, it is not a place for mavericks.

Such inherent risk must be managed through sound procedures and a culture which encourages a willingness to admit to mistakes and embrace lessons learnt from any weaknesses or incidents. By adopting such an approach DPM intends to ensure that the possibility of incidents occurring are recognised before they take place as part of a safety management system based on proactive and continuous improvement.

DPM is therefore committed to the goal of achieving procedural excellence.

[5] Also referred to as a 'Just Culture' within CAA document CAP 1059 - https://publicapps.caa.co.uk/docs/33/CAP%201059%20SMS%20for%20small%20organisations%20(p).pdf

Whilst applicable to all aviation systems, the ability to demonstrate procedural excellence to the Regulator is particularly important to new facilities and even more so to new facilities aiming to exploit a new niche. DPM not only understands this requirement but, because of our focus on continuous improvement, see the benefits of embracing the findings of both internal and external audits into operations conducted from our facilities.

DPM intends to develop a comprehensive body of evidence to demonstrate that the facility not only operate safely and achieve procedural excellence but also that we can maintain and demonstrate it on an ongoing basis by establishing processes which provide transparency and ease of access to the Regulator (CAA), whose priorities may lie elsewhere and whose resources may be thinly spread.

3.2.3. POSTIVE CONTRIBUTION TO ALL STAKEHOLDERS

DPM has been established on the foundation of establishing mutually beneficial partnerships with companies and organisations with interests in the evolving drone sector and the requirement to deliver public benefit. Perhaps the project's key, potentially unique, strength is that as a joint venture with a local authority making it directly accountable to elected officials – the project can only happen and continue with widespread local support addressing one of the major issues associated with widespread adoption of UAS operations, societal acceptance. It is therefore important that DPM operates in a way which limits or mitigates any of the negative effects our operations may have on stakeholders with other priorities.

For our clients DPM aims to provide trial scenarios and commercial use cases to meet their needs. These will be supported by ground-based facilities which we hope will evolve into an offering which can compete with anything offered elsewhere. With an aim to attract inward investment and jobs to Angus we will regularly canvas our clients to ensure our service meets, and ideally exceeds, their expectations.

Whilst the Regulator has not asked for our support in the development of regulations to integrate BVLOS, autonomous UAV flight in unsegregated airspace into the existing system, our vison has purposely been aligned to theirs in order to encourage the achievement of a mutually beneficial outcome. We seek an open and transparent relationship that offers benefits to both parties whilst maintaining each party's independence to innovate and operate in order to achieve the same goal.

The widespread adoption of BVLOS, autonomous UAV operations offers safer, greener and mostly cost-effective solutions to the status quo to many sectors and the wider population. It also introduces additional concerns over safety and privacy to many who do not either realise the potential benefits drone technology can bring, or who may ultimately lose out from its adoption. In pursuing its goals DPM has consulted widely and incorporated the issues and concerns raised into its plans. Where consensus or compromise cannot be reached, we seek to mitigate any deleterious effects have (and will continue to be made) to limit any impacts. In pursing the opportunities on offer, whilst remaining cognisant of wider stakeholder concerns, DPM has a strong and influential partner in Angus Council whose actions are ultimately dictated by representatives elected by the population locally, regionally and nationally.

3.3. DELIVERING SAFE OPERATIONS

3.3.1. OPERATING PHILOSOPHY

Demonstrable Competence

The conduct of safe operations requires those conducting them to be competent in the areas in which they are involved. Being able to demonstrate this competence is important in order to provide the Regulator, other air users and the surrounding population sufficient confidence in DPM's operations that the risks to their safety is no greater than the current status quo. This demonstration is also critical in ensuring suitable insurance premiums can be obtained to ensure the financial resources are available in the event of any incident occurring.

Iterative Development

As a facility where new technology and processes will undergo testing and development an iterative approach will be employed both by DPM in its establishment, and its clients utilising the drone port to test their systems. The approach required in all Trial Programmes will be one of incremental gain as opposed to order-of-magnitude change, limiting the number of variables under test during each trial and with it the risk associated with the inherent uncertainty of development.

Empowerment of All Stakeholders

Whilst the concept of DPM has been based upon a vision whose foundations are commercial viability and economic development. Its practical establishment and ongoing management should, and will, be led by considerations of safety and societal acceptance.

In order to identify the risks which could impact DPM, reaching acceptable solutions is important to all involved. All stakeholders, be they conducting operations at the facility or the public beneath, are encouraged to identify potential hazards and be involved in their elimination or mitigation. The governance system of DPM has been designed to incorporate Council oversight to provide this empowerment in a practical, manageable manner.

3.3.2. DPM OPERATIONS MANUAL

All operations at DPM are conducted using the procedures within the Operations Manual. It is the *Bible* of the facility - if a query can't be answered by the Operations Manual, it should not be conducted without seeking guidance from the Safety Manager[6].

The Operations Manual is comprised of five documents:

1. The Concept of Operations (This document)
    - Provides an overview of Drone Port Montrose's approach to operations and explains the philosophy, application and accessibility of its SMS.
2. The Safety Management System (SMS)
    - A proactive and integrated approach to managing safety including the necessary organisational structures, accountabilities, policies and procedures
3. Safety Risk Assessment

[6] See section XYZ for the role of the Safety Manager

- The live document which facilitates the identification, assessment, analysis and resolution of the risks associated with the activities conducted at DPM

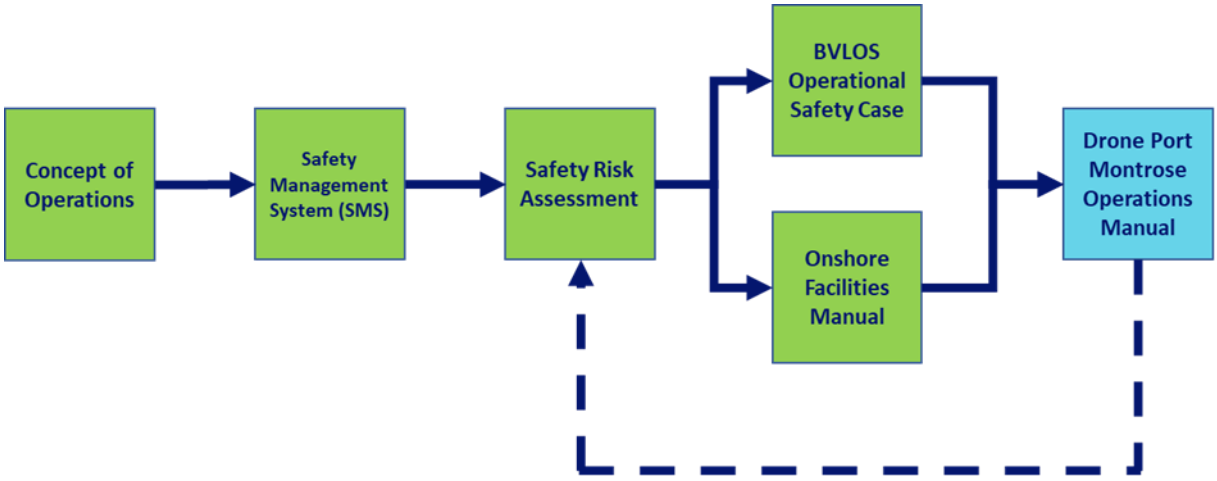
4. The BVLOS Trials Area Manual

   - Detailed information providing rules, guidance and constraints for the safe use of the Trials airspace associated with DPM. Its contents are the product of the analysis of the Safety Risk Assessment.
   - This document will be provided to the CAA and form the basis for UAV operations insurance.

5. The Onshore Facilities Operations Manual

   - Detailed information on the elements of the ground-based facilities which do not affect BVLOS UAV operations at DPM, including the rules, guidance and constraints in place for their safe use. Its contents are the product of the analysis of the Safety Risk Assessment.
   - VLOS operations are covered within this manual
   - This document will be available to the CAA should it be requested. Its contents will form the basis for Drone Port Montrose's property and non-UAV company insurances.

The five separate documents are maintained and stored together (both hard copy and soft copy) to ensure all operational requirements can be available and accessible simply, quickly and without confusion.



A schematic detailing process followed to create Drone Port Montrose's Operations Manual (solid arrows) and the ongoing review cycle (dashed arrow)

3.3.3. CONTINUAL IMPROVEMENT THROUGH ONGOING STAKEHOLDER ENGAGEMENT

The Operations Manual for DPM has not been compiled in isolation. It is a document which reflects not just the technical issues identified by the project to establish the facilities, but the knowledge and concerns of a broad range of stakeholders[7] who were consulted during its production. In order for it to remain current, and for DPM to establish a reputation as an example of best practice within a rapidly evolving industry, proactive consultation will continue

[7] Available in document L3-DTL-309-Stakeholder Consultation List

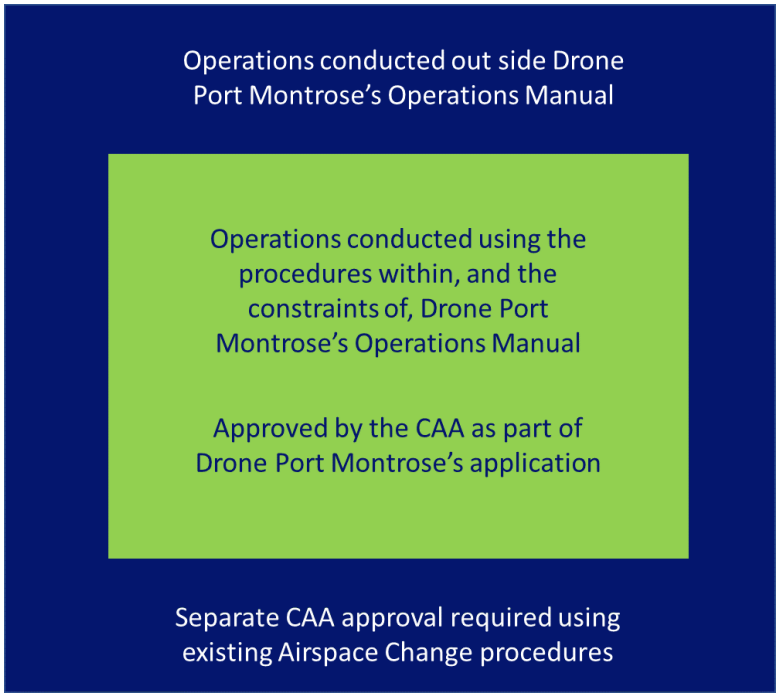
to be conducted with Stakeholders and a simple pathway to report issues maintained for those who may otherwise have been overlooked in error.

3.3.4. TRIALS PROGRAMME PLANNING

DPM is being established to provide a service to its clients which is simpler, quicker and cheaper than the alternatives available for them to conduct UAS flight trials i.e. the planning and implementing of an area of segregated airspace, on a case-by-case basis, with each application being approved by the CAA.

DPM aims to provide a pre-designated area of airspace where clients can come to trial their equipment and systems in a safe environment, segregated from other Air Users.

Trials conducted within the constraints of DPM's Operations Manual will be able to be conducted without the need for additional CAA approval, reducing the cost and allocation of resource (both client and CAA) which would otherwise be required to conduct BVLOS, autonomous flight trials. Clients wishing to conduct flight operations outside those detailed in Drone Port Montrose's Operations Manual will still require CAA approval on a case-by-case basis and incur costs as per the CAA's Scheme of Charges[8].



A schematic demonstrating the operations can be conducted at Drone Port Montrose without the requirement for additional CAA approval

Clients using DPM to conduct trials are required to submit a Trials Programme, as part of the Flight Planning Bridging Document, to DPM prior to arrival on site to allow for a detailed review. The Flight Planning Bridging Document will be shared with the CAA and be retained as part of DPM's audit schedule. The CAA has the right to request changes to, or reject, the client's intended trials programme at any time.

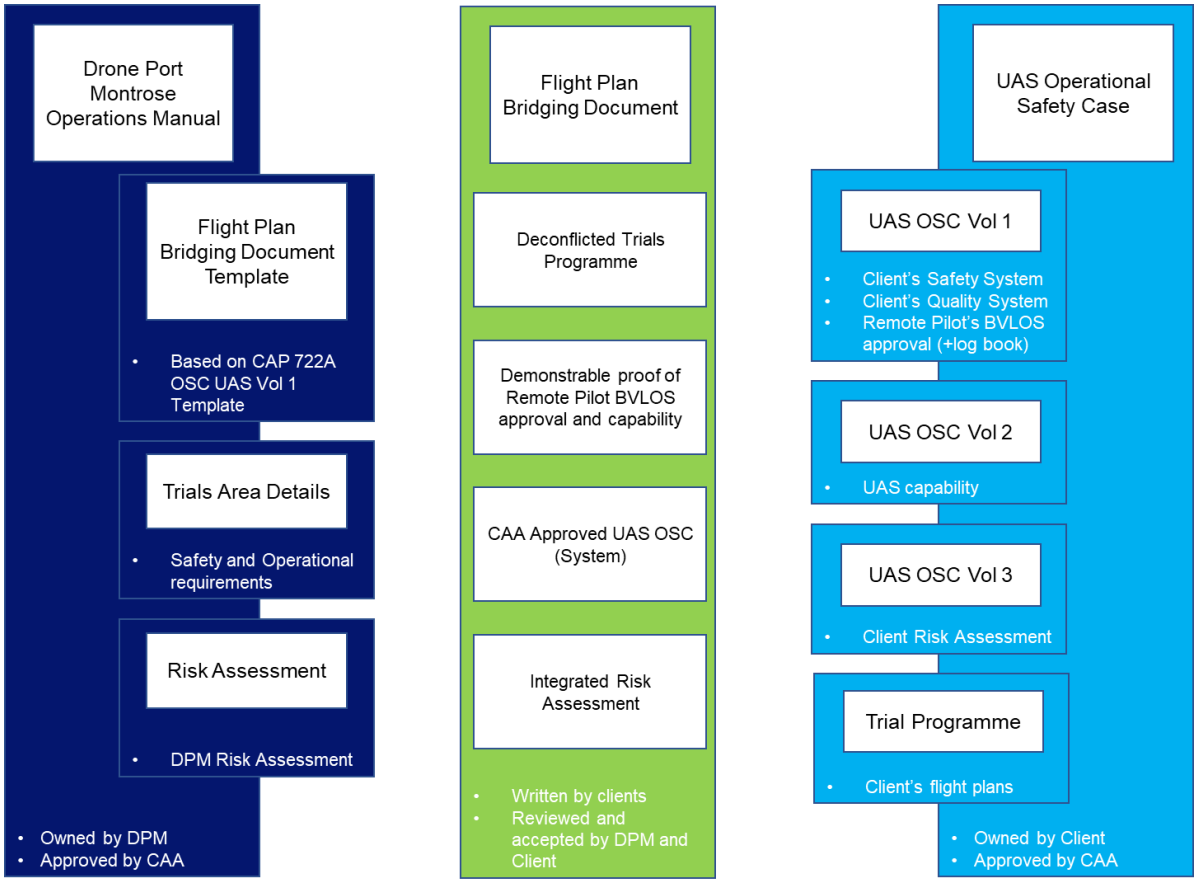
[8] See CAA Scheme of Charges - https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=list&type=sercat&id=10

Clients' Trials Programmes must be planned in accordance with DPM's Operating Philosophy; demonstrable competence, iterative development and empowerment of all stakeholders. By doing so the intent is that the inherent risk of technology development, and the potential impacts on other air users and the local population, is managed in accordance with the ALARP (As Low As Reasonably Practicable), thus addressing any safety and societal concerns.

3.3.5. ALIGNMENT OF DRONE PORT MONTROSE AND CLIENTS' OPERATIONS AND REGULATORY PERMISSIONS

Operations within the airspace accessible from DPM are conducted within the requirements of the Regulator (CAA).

- VLOS flights are conducted in accordance with CAP 722 and 722A and within the permissions held by the client (either their PfCO or Operational Safety Case) and the Drone Code with the approval of DPM as the land/facility owner.
- BVLOS flights within the Trials Area (i.e. the segregated airspace) adjacent to DPM are conducted under either:
  - The Client's standalone Operational Safety Case written specifically for DPM in accordance with CAP 722A or;
  - The Flight Plan Bridging Document which details the requirements of the DPM Operations Manual, demonstrates the Remote Pilot's capability to operate BVLOS and uses the Client's UAS OSC Vol 2 (Systems) to align the boundaries of the Trials Programme with the Regulator's existing approvals



A schematic of the relationship between the Flight Plan Bridging Document and the Operations Manuals of Drone Port Montrose and its client's Operational Safety Case.

4. SAFETY MANAGEMENT SYSTEM (SMS)

4.1. SCOPE OF THE SAFETY MANAGEMENT SYSTEM (SMS)

A Safety Management System (SMS) is a proactive and integrated approach to managing safety including the necessary organisational structures, accountabilities, policies and procedures.

In line with its principles DPM has aligned its Safety Management System (SMS) to those of the CAA. It is therefore comprised of four elements, each of which is broken down into several sub-elements. These are further defined in CAP 795[9].

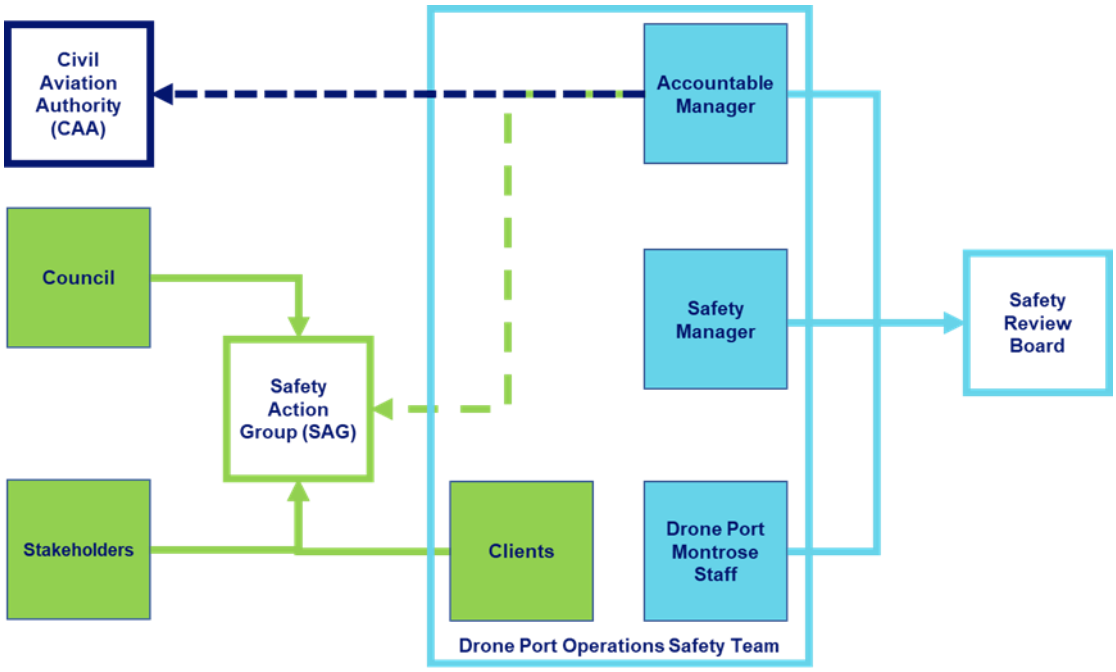
1. Safety Policy and Objectives
    - Management commitment and responsibility
    - Safety accountabilities
    - Appointment of key safety personnel
    - Coordination of emergency response planning
    - SMS documentation
2. Safety Risk Management
    - Hazard identification processes
    - Risk assessment and mitigation processes
    - Internal safety investigation
3. Safety Assurance
    - Safety performance monitoring, measurement and review
    - The management of change
    - Continuous improvement of the safety system
4. Safety Promotion
    - Training and education
    - Safety communication

4.2. SAFETY GOVERNANCE

Safety is managed at three levels at DPM:

- Operational: Day-to-day management of the Trials Programmes by DPM and Client Personnel
- Tactical: Routine and ad hoc operational review by DPM personnel as part of the Safety Review Board (SRB)
- Strategic: Routine review of DPM operations by board of Council and external stakeholders as part of the Safety Action Group (SAG)

[9] CAA, 2014. Safety Management Systems (SMS) guidance for organisations – CAP 795. Accessed 10 Apr 20 https://publicapps.caa.co.uk/docs/33/CAP795_SMS_guidance_to_organisations.pdf



The Safety Management System (SMS) for DPM is found in its own document within the DPM Operations Manual. See Doc: XXXXXX