

GUIDANCE FOR SPACEPORT LICENCE APPLICANTS AND SPACEPORT LICENSEES

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Section 1: Overview of the Guidance

- 1.1 The Space Industry Act 2018 (the Act) regulates all spaceflight activities carried out in the United Kingdom, and associated activities.
- 1.2 The Act requires any person or organisation wishing to:
- launch a launch vehicle from the UK
 - return a launch vehicle launched elsewhere than the UK to the UK landmass or the UK's territorial waters
 - operate a satellite from the UK
 - conduct sub-orbital activities from the UK
 - operate a spaceport or provide range control services from the UK
- to obtain the relevant licence.
- 1.3 It is supported by The Space Industry Regulations 2021 (the Regulations), that set out in more detail the requirements for each licence, and the Regulator's Licensing Rules, which specify which application form to use to apply for a licence and what information the regulator will require in support of an application.
- 1.4 There is then a series of guidance documents designed to help explain how to comply with the Act and the Regulations. This document is one of the guidance documents.

With the coming into force of [section 1\(3\) of the Act](#), the [Outer Space Act 1986](#) no longer applies to space activities carried on in the United Kingdom, and accordingly the Outer Space Act 1986 does not apply to a person or organisation wishing to carry out spaceflight activities or operate a spaceport in the United Kingdom. The Outer Space Act 1986 **will** continue to regulate the following activities carried out overseas by UK entities: the procurement of the overseas launch of a space object, where the procurement takes place in the UK; the operation of a satellite in orbit from an overseas facility by a UK entity. Extant licences granted under the Outer Space Act 1986 for the carrying out of space activities from within the UK will continue to be governed under that regime. Where an application for a licence has been made under the Outer Space Act 1986, it will be assessed under that Act and – where successful – will result in the award of a licence under the Outer Space Act 1986.

What is the purpose of this guidance document?

- 1.5 This guidance details the application process for a spaceport licence under the Space Industry Act 2018 and what information applicants will need to provide. It also sets out the duties of a spaceport licence holder once a licence is granted.

Who is this guidance for?

- 1.6 This guidance is for any person or organisation that wishes to operate a spaceport. That means any person or organisation that intends to obtain a spaceport licence authorising it to host:
- vertical launches of rockets

- horizontal launches, using aerodrome runways, for spaceplanes or carrier aircraft from which a space object will be launched at a certain altitude away from the spaceport (known as an air launch)
 - launches of high-altitude balloons for space experience, experiments or air-launch of rockets
 - planned landings of spacecraft
- 1.7 It explains the requirements which a location must meet in order to be considered as a spaceport and then explains the information that any prospective spaceport licensee must provide as part of a licence application. It then summarises some of the responsibilities of spaceport operators once a licence has been granted.
- 1.8 The guidance may also be of relevance to:
- people or organisations wishing to apply for other licences under the Act, as there are some areas where responsibilities overlap and where spaceport licensees may need to obtain or use information from other licensees, and vice versa
 - people or organisations likely to be affected in some way by the granting of a spaceport licence

Using this guidance

- 1.9 This guidance document should be read in conjunction with the [Act](#), [the Regulations](#) and [the Regulator’s Licensing Rules](#). Where appropriate, the guidance contains links to each of these.
- 1.10 The guidance is designed to assist in the process of applying for a spaceport licence and operating as a spaceport licensee. It sets out the key requirements of any application and what evidence the regulator will need of an applicant’s capabilities, as referred to in the [Regulator’s Licensing Rules](#). It should be read in conjunction with relevant sections of the Act (in particular, [sections 10-15](#)), Part 5 of the Regulations and the [guidance on Applying for a licence under the Space Industry Act 2018](#).
- 1.11 If applicants have any queries, they are encouraged to contact the regulator, to seek clarification or gain further information.

The regulator

- 1.12 The Civil Aviation Authority (CAA) will perform the functions of the regulator under the Act. It is referred to in this guidance as ‘the regulator’. Under [section 2 of the Act](#), the regulator must carry out its functions relating to spaceflight activities with a view to securing the health and safety of members of the public and the safety of their property. This duty has primacy over the other matters that the regulator must take into account in exercising its functions.
- 1.13 In performing its functions, the regulator will need at times to review confidential and commercially sensitive information. The regulator already has robust security processes in place that will ensure all the information sent in relation to applications, and monitoring ongoing licensed activities, is handled and protected appropriately. For more details on the regulator’s security processes and systems, please contact the regulator.

Contacting the regulator

The regulator can be contacted by email to commercialspaceflight@caa.co.uk. The regulator welcomes and encourages ongoing contact from prospective applicants before they submit an application for a licence. This can be from the earliest stages of considering whether to apply for a licence.

Key terms

1.14 The Act regulates:

- space activities
- sub-orbital activities, and
- associated activities

that are carried out in the UK.

1.15 As set out in [section 1 of the Act](#), “space activity” means

- (a) launching or procuring the launch or the return to earth of a space object or of an aircraft carrying a space object,
- (b) operating a space object, or
- (c) any activity in outer space.

1.16 “A space object” includes the component parts of a space object, its launch vehicle and the component parts of that.

1.17 “Sub-orbital activity” means launching, procuring the launch of, operating or procuring the return to earth of:

- (a) a rocket or other craft that is capable of operating above the stratosphere
- (b) a balloon that is capable of reaching the stratosphere carrying crew or passengers, or
- (c) an aircraft carrying such a craft

but does not include space activity. By way of clarification, the regulator will use the International Standard Atmosphere (47km) as the stratopause (i.e. the upper limit of the stratosphere) for the purposes of determining whether an activity is ‘sub-orbital’.

1.18 Space activities and sub-orbital activities are referred to in the Act as “spaceflight activities”.

1.19 “Spacecraft” means a space object, a rocket or other craft that is capable of operating above the stratosphere or a balloon that is capable of reaching the stratosphere carrying crew or passengers, that is used for spaceflight activities. It includes satellites.

1.20 “Launch” is defined in the Act as including causing a craft to take off (or releasing a balloon).

1.21 [Regulation 2](#) of the Space Industry Regulations defines a launch vehicle, other than in references to a “US launch vehicle”, as:

- “(a) a craft to which section 1(5) of the Act applies and the component parts of that craft,
or
- (b) a space object which is a vehicle and the component parts of that vehicle,

that is used for the purpose of the proposed spaceflight activities or the operator’s spaceflight activities, as applicable, but does not include a payload carried by the launch vehicle;”

- 1.22 The “craft to which section 1(5) of the Act applies” referred to in part (a) of this definition are:
- a rocket or other craft that is capable of operating above the stratosphere
 - a balloon that is capable of reaching the stratosphere carrying crew or passengers
- 1.23 Part (b) of the definition covers vehicles that are capable of reaching orbit, such as those used to place a satellite payload in orbit. As explained below, the operator of any satellite carried on board a launch vehicle does not require their own launch operator licence, but does require an orbital operator licence.
- 1.24 Associated activities include the operation of spaceports and range control functions.
- 1.25 Under the Act, any site from which a spacecraft or carrier aircraft is intended to launch is considered a spaceport, and must be licensed. A site at which controlled and planned landings of spacecraft are to take place is also a spaceport and must be licensed.
- 1.26 Range control services are defined in [section 6](#) of the Act as:
- “(a) identifying an appropriate range for particular spaceflight activities;
 - (b) co-ordinating arrangements for the activation and operation of the range;
 - (c) obtaining all necessary information for identifying the range and for co-ordinating its activation and operation;
 - (d) ensuring that notifications are issued for the protection of persons who might be put at risk by spacecraft or carrier aircraft within the range or in the vicinity of it;
 - (e) monitoring the range, and the spacecraft or carrier aircraft for which it is provided, to ascertain—
 - (i) whether the restrictions or exclusions to which the range is subject are complied with;
 - (ii) whether planned trajectories are adhered to;
 - (f) communicating any failure to comply with those restrictions or exclusions, or to adhere to those trajectories, for the purpose of enabling any appropriate actions to be taken in response;
 - (g) any prescribed services provided for the purposes of, or in connection with, services within any of paragraphs (a) to (f).”
- 1.27 Under [section 13\(1\) of the Act](#), the regulator has the power to include conditions in an operator licence (launch operator licence, return operator licence and orbital operator licence), spaceport licence and a range control licence. Licensees must comply with those conditions. [Schedule 1 of the Act](#) includes a list of examples of conditions, but this is not exhaustive, and the actual conditions included in a licence will vary depending on the operation planned and the type of licence issued. When deciding what conditions to include in a licence, the regulator must consult the public bodies, including the Health and Safety Executive, listed in [section 13\(6\) of the Act](#). Whenever the guidance refers to the regulator imposing conditions (other than a condition which the regulator is required to impose via the Regulations under section 13(3)), the obligation to consult these bodies applies.

Carrying out spaceflight activities at sea

- 1.28 If a person is proposing to launch or carry out other spaceflight activities from UK territorial waters or from a UK flagged ship elsewhere, the Act and Regulations will regulate the activities. Where appropriate, regulations which refer to land also apply to spaceflight activities from a ship – for example, where a regulation refers to a "place" or "other place" from which activities take place, in addition to activities from land. If a person is proposing to launch or carry out other spaceflight activities from a foreign flagged ship outside UK territorial waters and is a British national, UK body corporate or Scottish firm, the Outer Space Act 1986 regulates these activities.
- 1.29 Sea launch and other sea activities are a complex area; organisations wishing to conduct sea launches are advised to contact the regulator before applying for a licence. Further information on this can be found in section 2 of the guidance document [Applying for a licence under the Space Industry Act 2018](#).

Requirements and expectations

- 1.30 Where the guidance uses the term "must", this refers to a requirement in or under the Act. If applicants / licensees fail to meet that requirement, it could result in the licence not being granted or being revoked or suspended. Where it is stated that "the regulator expects" applicants to do something, this describes a preferred approach; however, it is not a legal requirement to comply with the regulator's expectations.

Types of licence

- 1.31 The Act refers to three types of licences that can be awarded:
- operator licence
 - spaceport licence
 - range control licence
- 1.32 Following the publication of the Act, it was agreed that there should be different licensing requirements for different types of operators. For example, some organisations that would want to operate space objects (such as satellites or research vehicles) would not have a launch capability, and instead would wish to procure such capability and then operate the object once it reached orbit. While these organisations clearly do not need a licence to operate a launch vehicle, they are still required to obtain an operator licence to operate their object in space. Reflecting the various circumstances, there are now five licences available:
- **Launch operator licence:** means an operator licence within [section 3 of the Act](#) which authorises a person or organisation to carry out spaceflight activities that include launching a launch vehicle or launching a carrier aircraft and a launch vehicle. This is the type of licence needed if a person or organisation wants to launch a launch vehicle or use a carrier aircraft to assist with a launch of a launch vehicle. A person or organisation holding a launch operator licence is referred to as a spaceflight operator,¹ or in some

¹ The term spaceflight operator is used in the Regulations to refer to both the holder of a launch operator licence and the holder of a return operator licence. Any references to spaceflight operator in the Regulations or guidance encompass both licence types, so any requirements for spaceflight operators are applicable to both launch operator licensees and return operator licensees. Where a requirement only applies to either a launch operator licensee or return operator licensee, this is clearly stated.

circumstances, launch operator licensee. If a launch operator licensee wishes to return a launch vehicle launched from the UK or the UK's territorial waters to land in the UK, it can apply to do so under the launch operator licence and does not need to apply for a separate return operator licence.

- **Return operator licence:** means an operator licence within section 3 of the Act which is not a launch operator licence and which authorises a person or organisation to operate a launch vehicle, launched into orbit from elsewhere than the United Kingdom, in order to cause that vehicle to land in the United Kingdom. This is the type of licence needed if a person or organisation wants to return a launch vehicle, launched elsewhere than the United Kingdom, to land in the UK or within the UK's territorial waters. A person or organisation holding a return operator licence is referred to as a spaceflight operator,¹ or in some circumstances, return operator licensee.
- **Orbital operator licence:** means an operator licence which authorises a person or organisation to procure the launch of a space object into orbit, operate a space object in orbit or conduct other activity in outer space. The most common examples of activities that would be licensed under an orbital operator licence are the procurement of a satellite launch and the operation of a satellite. However, the licence may also cover any other activity in outer space, and is not limited to activities in Earth's orbit. For example, an orbital operator licence would be needed for missions in lunar orbit, lunar surface missions, or deep space probes. A person or organisation holding an orbital operator licence is referred to as an orbital operator licensee.
- **Spaceport licence:** means a licence granted under [section 3](#) of the Act authorising a person or organisation to operate a spaceport (i.e. a site from which spacecraft or carrier aircraft can be launched or a site at which controlled and planned landings of spacecraft can take place²). Spaceports can be licensed for vertical or horizontal launches (or potentially both). A horizontal spaceport must be located at an aerodrome that is already either CAA licensed or certified and National Aviation Security Programme (NASP) directed. A person or organisation holding a spaceport licence is referred to as a spaceport licensee.
- **Range control licence:** means a licence granted under [section 7](#) of the Act authorising a person or organisation to carry out range control services in relation to spaceflight activities. That includes identifying an appropriate range; coordinating the use of a range; issuing protective notifications and monitoring the range. A person or organisation holding a range control licence is referred to as a range control licensee.

Examples of offences and enforcement directions under the Act

1.33 Under [section 3 of the Act](#), it is an offence to carry out spaceflight activities or operate a spaceport in the UK without the required licence. It is also an offence to make a false statement for the purpose of obtaining an operator licence or a spaceport licence. A person

² Ships used for sea launch or landing are not "sites" and are therefore not spaceports for the purposes of section 3 of the Act and so do not need a spaceport licence. However, certain types of installations at sea may be regarded as a "site" and so come within the definition. A person who wants to launch from, or land at, an installation at sea should contact the regulator to find out whether the installation they propose to use requires a spaceport licence.

who commits an offence under this section of the Act may be liable to a fine or imprisonment for a term not exceeding 2 years, or both.

- 1.34 Under [section 7 of the Act](#), it is an offence for range control services to be provided by anyone other than the Secretary of State, or a person or organisation authorised to provide them by a range control licence. It is also an offence for a person to make a false statement for the purpose of obtaining a range control licence. A person who commits an offence under this section of the Act may be liable to a fine or imprisonment for a term not exceeding 2 years, or both.
- 1.35 Under [section 13 of the Act](#), the regulator can grant a licence subject to conditions it thinks appropriate or must include a licence condition if required to do so by a regulation (see regulations 9(5) and 10(2)). When a condition is imposed, it is an offence for a licensee to fail to comply with that condition.
- 1.36 Under [section 17 of the Act](#), it is an offence for a spaceflight operator to allow any person to take part in spaceflight activities without them having given their informed consent and fulfilling the age and mental capacity criteria referred to in Part 12 of the Regulations. Under [section 18 of the Act](#), it is an offence a licensee to allow any unqualified individual to take part in activities authorised by the licence or work in a specified role.
- 1.37 Under [section 27 of the Act](#), the regulator can issue directions that enable effective enforcement action to be taken, where it appears to the regulator that a person is carrying out spaceflight activities or associated activities without a licence, in contravention of licence conditions or in contravention of the Act or rules made under it.
- 1.38 Under section 27(2), “the regulator may give any directions to that person that appear necessary to be in the interests of safety or for the purposes of securing compliance with—
(a) the conditions of a licence,
(b) provisions contained in or made under this Act, or
(c) the international obligations of the United Kingdom.”
- 1.39 It is an offence for a person in receipt of a section 27 direction to fail to comply with it (see [section 31\(3\)\(a\) of the Act](#)). The regulator could also, if it wished to do so, enforce compliance by way of an injunction or equivalent (see section 31(4)).
- 1.40 There are further direction-making powers in the Act, including power for the Secretary of State to give directions under [section 28\(3\)-\(4\)](#) and [section 29\(1\)](#).

The full list of guidance documents issued in relation to the Act

- 1.41 The following guidance documents are available in relation to licences that can be granted under the Act (and any statutory instruments made under the Act):
- Applying for a licence under the Space Industry Act 2018
 - Guidance for launch operator and return operator licence applicants and licensees
 - Guidance for spaceport licence applicants and licensees
 - Guidance for range control licence applicants and licensees
 - Guidance for orbital operator licence applicants and licensees
 - Guidance for the assessment of environmental effects

- Guidance on security matters for applicants and licensees
- Guidance on the investigation of spaceflight accidents
- Guidance on appealing decisions made under the Space Industry Act 2018 and the Outer Space Act 1986
- Guidance on insurance requirements and liabilities under the Space Industry Act 2018
- Guidance on duties for all licensees under the Space Industry Act 2018 including monitoring and enforcement by the regulator

1.42 In addition, applicants and licensees must follow the Regulator's Licensing Rules and are advised to read the Principles and guidelines for the spaceflight regulator in assessing ALARP and acceptable risk.

Section 2: Legislative Background

The Space Industry Act 2018

- 2.1 As set out above, the Space Industry Act 2018 regulates all spaceflight activities and associated activities carried out in the United Kingdom.
- 2.2 The Act requires any person or organisation wishing to undertake such activities, including to operate a spaceport, to obtain the relevant licence.
- 2.3 It supersedes the Outer Space Act 1986 for all activities carried out in the UK.
- 2.4 [Section 3\(2\)](#) of the Act defines a spaceport as:
 - “(a) a site from which spacecraft or carrier aircraft are launched or (as the case may be) are to be launched, or
 - (b) a site at which controlled and planned landings of spacecraft take place or (as the case may be) are to take place”
- 2.5 [Section 3\(3\)](#) of the Act, however, makes clear that:
 - “the reference to a site in paragraph (b) of the definition of “spaceport” does not include an installation at sea that can be moved from place to place without major dismantling or modification.”

Sections 10 and 19 of the Act – Spaceport Safety

- 2.6 [Section 10](#) of the Act provides that the regulator must not grant a spaceport licence unless it is satisfied that:
 - “(a) the applicant has taken all reasonable steps to ensure that risks to public safety arising from the operation of the spaceport are as low as reasonably practicable, and
 - (b) any prescribed criteria or requirements are met.”
- 2.7 [Section 19\(1\)\(a\) of the Act](#) contains the power to make regulations for the purposes of securing the safe operation of spaceports. This provision has been used to establish safety regulations for holders of a spaceport licence.

Section 11 of the Act

- 2.8 [Section 11 of the Act](#) sets out the requirement for any applicant for a spaceport licence or launch operator licence to conduct an assessment of environmental effects, as part of their application. This is covered in more detail in [separate guidance](#).

Other sections of the Act

- 2.9 Applicants for a spaceport licence must also meet other requirements as set out in the Act. These include the requirements in [section 18](#), and in regulations made under that section regarding training, and in regulations made under [section 23](#), regarding security.

The Space Industry Regulations 2021

- 2.10 The Act provided for detailed regulations to be made in a number of fundamental subject areas, e.g. regulations embodying safety principles and objectives. In support of this, and

pursuant to the powers given to the Secretary of State in the Act, the Space Industry Regulations 2021 (the Regulations) provide substantially more information on how the regulator will assess applications for a spaceport licence and how spaceport licensees must carry out their activities.

Part 5 of the Regulations

2.11 Part 5 of the Regulations is titled “Grant of a spaceport licence”. It sets out the requirements for applicants to:

- meet prescribed criteria as to location (for horizontal spaceports)
- carry out a safety case that complies with the requirements of regulation 36
- demonstrate that it will be able, where the safety case demonstrates that it is required, to put in place an appropriate safety clear zone
- conduct a siting assessment

2.12 This guidance provides more details on what sort of information the regulator will expect to see in relation to these requirements.

Part 10 of the Regulations

2.13 Part 10 of the Regulations addresses the safety of a spaceport licensee’s licensed activities once a licence is granted. It includes the spaceport licensee’s safety duty and requirements for spaceport licensees (among other things) to:

- retain and review the safety case on an ongoing basis
- put in place, promulgate and monitor an appropriate safety clear zone (where required by the safety case)
- designate appropriate areas for the safe storage of any hazardous material and the conduct of static engine or other tests
- have in place a safety management system that meets the requirements in Schedule 4
- produce and make available to all spaceport operating staff a spaceport manual

2.14 This guidance provides more details on what sort of information the regulator will expect to see in relation to these requirements.

Commencement of the Act

2.15 The Space Industry Act 2018 received Royal Assent on 15 March 2020, providing a legislative framework for the licensing of space activities, sub-orbital activities, and associated activities carried out in the UK. However, many of the Act’s provisions will only come into force on [date], when the Space Industry Regulations come into force. From that date, people and organisations will be able to apply for a licence to:

- launch a launch vehicle from the UK for sub-orbital missions involving human occupants, or return such a launch vehicle to the UK
- launch a launch vehicle from the UK for orbital missions that do not involve human occupants, or return such a launch vehicle to the UK
- procure the launch from the UK of a space object (such as a satellite) into orbit
- operate a satellite from the UK
- operate a spaceport in the UK, or
- provide range control services in the UK

- 2.16 However, at the point the Regulations come into force, it will not be possible to apply for a licence for some activities that are permitted under the Act. These include:
- the licensing of space activities involving an orbital launch vehicle with human occupants
 - the licensing of spaceflight activities involving hypersonic (or any other experimental) transport from A to B
- 2.17 Such activities are technically complex and difficult to regulate. By their very nature, they will require global collaboration on common standards to a much higher threshold than is achievable with current technologies.
- 2.18 These restrictions are set out in Commencement Regulations, which also include provisions to ensure that the licensing of a procurement of an overseas launch carried out under the Outer Space Act can continue to be done under that Act, whether such a procurement takes place in the UK or overseas.

Other relevant legislation

- 2.19 There is a range of other legislation / regulation that is relevant to the operation of spaceports. This includes:
- [CAP168 Licensing of Aerodromes](#), which applies to any proposed horizontal spaceport
 - [The Control of Major Accident Hazards Regulations 2015 \(COMAH\)](#), which relate to the storage and safe handling of chemicals and explosive materials, in quantities above specified thresholds, such as propellant that may be used in spaceflight activities
 - [The Civil Contingencies Act 2004](#) and associated regulations, which set out rules and responsibilities for organisations involved in the preparation for and response to emergencies

The relevance of this legislation is described at appropriate points in this guidance.

Section 3: Applying for a spaceport licence

- 3.1 As set out above, when applying for a spaceport licence, there are a series of steps that applicants must take and information that they must provide to the regulator.
- 3.2 Some of this information is required from all licence applicants. This includes evidence that the applicant fulfils the eligibility criteria and has appointed eligible, competent, people to all prescribed roles. The information required is listed in the [Regulator's Licensing Rules](#) and supporting details can be found in the separate guidance document on [Applying for a licence under the Space Industry Act 2018](#).
- 3.3 There are also training requirements which a spaceport licence applicant must meet, including the provision of a training management system, training manual and training programme. For further details on training, refer to the guidance on [Applying for a licence](#).
- 3.4 There is also separate guidance on completing an [assessment of environmental effects](#).

Structure of this guidance

- 3.5 Section 4 of this guidance document provides more detail relevant to applicants who intend to host horizontal launches.
- 3.6 Section 5 provides more details to help applicants produce their safety case and identify (in that safety case) when a safety clear zone is required.
- 3.7 Section 6 provides further details on how applicants can meet the requirement to conduct a siting assessment.
- 3.8 Section 7 covers the ongoing safety duties of spaceport licensees once they have obtained a spaceport licence.

Additional information that may be required during the application stage

- 3.9 The regulator is obliged to gather any other information it needs to be satisfied that the applicant is eligible to be a licensee for that particular type of licence and has met all relevant criteria and requirements.
- 3.10 After reviewing the application and the information submitted with it, to assist in considering the application, the regulator may request the applicant in writing to:
 - make available for inspection by the regulator any site, facility, equipment, craft such as the launch vehicle and carrier aircraft to be used in connection with the activities which are the subject of the application as the regulator may specify
 - produce for inspection any document or record in possession or control of the applicant as the regulator may specify
 - make available for interview any officer or employee of the applicant or any other person acting on the applicant's behalf

- 3.11 The applicant must comply with a request made under paragraph 3.10 within the timescales specified by the regulator. In addition, the applicant must provide such assistance as a person appointed by the regulator to carry out an inspection may reasonably request, such as:
- making available relevant officers or employees to provide information relating to the inspection
 - unlocking doors
 - disassembling equipment, or
 - demonstrating its use

The person appointed by the regulator to carry out an inspection may take samples, photographs and measurements when carrying out the inspection and make a record of any information from the inspection.

- 3.12 Regulation 19(6) provides that the regulator may:
- take copies of a document or record produced by the applicant
 - record an interview with an officer or employee of the applicant or another person acting on the applicant's behalf
 - disclose information it holds relating to the application (including copies of documents or records or any recording referred to above) to:
 - the Secretary of State
 - a person acting on behalf of the country which is a party to an agreement between the United Kingdom and another country, for the purposes of consulting that country about the application
 - the Space Accident Investigation Authority, or any other national or international body investigating spaceflight accidents, for the purposes of obtaining information about any safety recommendations relevant to the activities referred to in the application
 - any person consulted under [section 13\(6\)](#) of the Act (conditions of licences) or any other person consulted about conditions to be included in the licence
 - any other public authority or international organisation responsible for regulating any aspect of spaceflight activities
 - any person for the purposes of them providing a technical assessment of the activities which are the subject of the application, or legal advice or information relevant to such activities

- 3.13 The regulator can only disclose US technical data with the consent of the Government of the United States, after consultation between the regulator, the Secretary of State and the Government of the United States. US technical data is defined in the [Technology Safeguards Agreement](#) (TSA), which is the Agreement between the UK and US governments on technology safeguards associated with US participation in space launches from the UK.

- 3.14 Given the quantity of information required and the time needed to assess that information, applications should be submitted well in advance of any planned dates for when it is intended spaceflight activities or associated activities will take place. Further guidance on how to submit an application and the information that is required can be found in the document [Applying for a licence under the Space Industry Act 2018](#) and in the [Regulator's Licensing Rules](#).

- 3.15 In addition to the safety aspects of granting a licence, the regulator, under [section 8\(2\)](#) of the Act, may grant a licence only if satisfied that doing so:
- will not impair the national security of the United Kingdom
 - is consistent with the international obligations of the United Kingdom
 - is not contrary to the national interest
- 3.16 The regulator may set terms and attach conditions to any licence it issues. Licences can be granted for an indefinite or set period.
- 3.17 Once granted a licence, the licensee must comply with the duties and requirements imposed by the Act, the Regulations and licence conditions. The document [Guidance for all licensees under the Space Industry Act 2018 including monitoring and enforcement by the regulator](#) explains the core duties of licensees once they have been granted a licence. These include duties to provide information to the regulator on an ongoing basis, following any occurrence (as defined in [regulation 272](#)) and in response to specific requests from the regulator to enable it to fulfil its monitoring responsibilities. In support of these duties, the licensee has certain duties around record keeping.

Use of agents

- 3.18 Applicants for a spaceport licence may propose to appoint an agent to carry out certain elements of the activities to be authorised by the licence on their behalf.
- 3.19 As set out in Table 5 of the Regulator’s Licensing Rules, applicants are required to provide certain information concerning any proposal to appoint an agent to carry out any element of the licensed activities on its behalf. The information to be supplied under the Regulator’s Licensing Rules is:
- identity information regarding any such agent, as set out in Section 1 of Table A of the [Regulator’s Licensing Rules](#),
 - documents which evidence the capability of such an agent to carry out the activities, and
 - the agency contract
- 3.20 The documents that provide evidence of the capability of an agent to carry out the activities on behalf of an applicant or licensee must include a detailed description of the activities that the agent will carry out. In addition, the agency contract with the licensee should be in writing and include:
- an authorisation for the agent to carry out the agreed activities, and
 - a schedule of the terms on which the agent will carry out the agreed activities on behalf of the licensee
- 3.21 Prior to the commencement of licensing by the regulator, the regulator will publish a schedule of minimum required terms to be included in any agency contract between the licensee and its agents.

Section 4: Specific requirements for a horizontal spaceport licence application

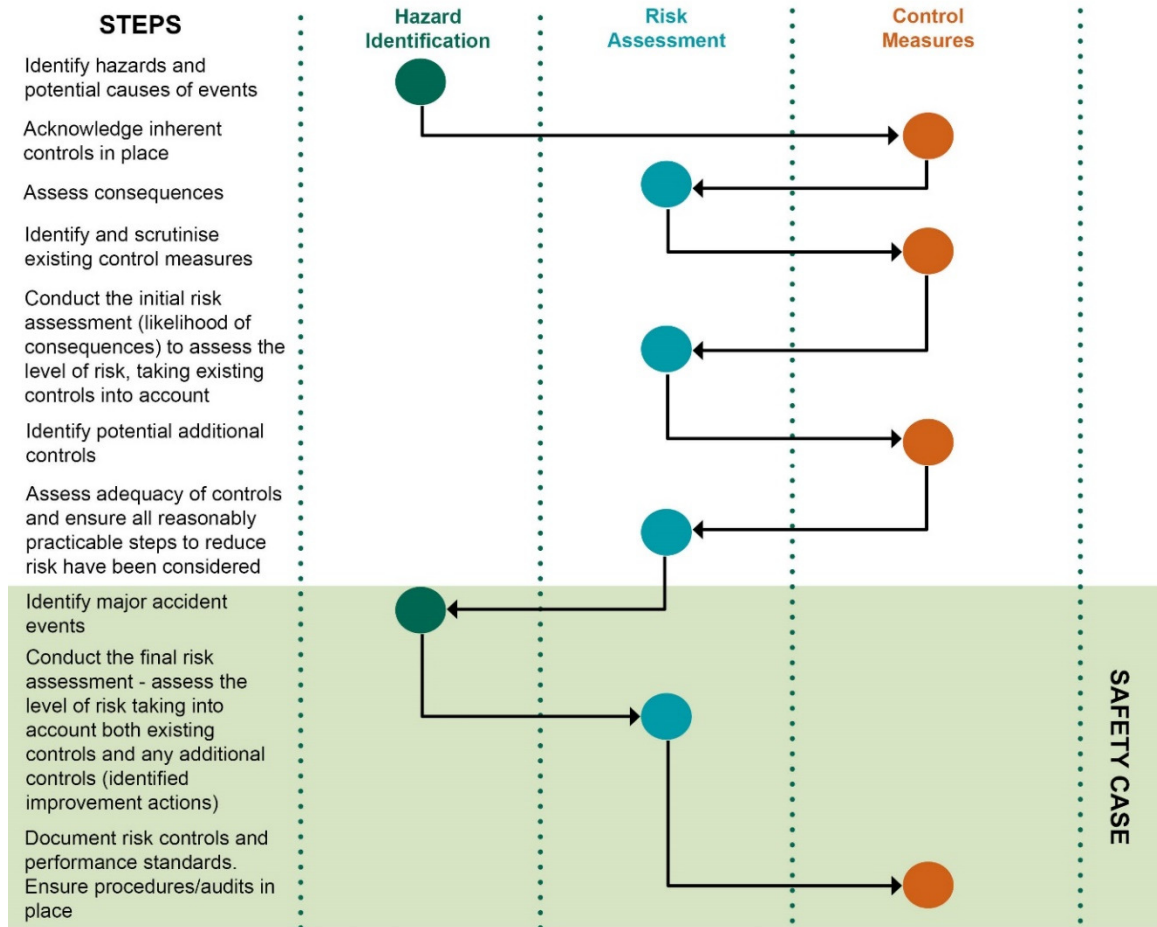
- 4.1 Regulation 35 provides that a proposed horizontal spaceport (i.e. a spaceport at which spaceflight activities requiring the use of a runway can be carried out) must be located at a certified or CAA licensed aerodrome.
- 4.2 Having such certification or licence demonstrates that the proposed spaceport has the appropriate infrastructure, equipment and services to support horizontally-launched spaceflight activities. Examples of appropriate infrastructure include a runway, taxiway and apron areas.
- 4.3 If the proposed horizontal spaceport is not already a certified or licensed aerodrome, it will need to become one before an application for a spaceport licence can be made. For further information on obtaining a certification or a CAA licence, see [Guidance on applying for an aerodrome licence | UK Civil Aviation Authority](#).
- 4.4 Regulation 35 also provides that the regulator may only grant a licence for a horizontal spaceport if the aerodrome at which the proposed spaceport is to be sited is subject to the direction of the Secretary of State under the Aviation Security Act 1982.
- 4.5 These requirements do not apply to applicants that only intend to host vertical launches or balloon launches.

Section 5: What is required in a safety case for a spaceport?

The purpose of a safety case

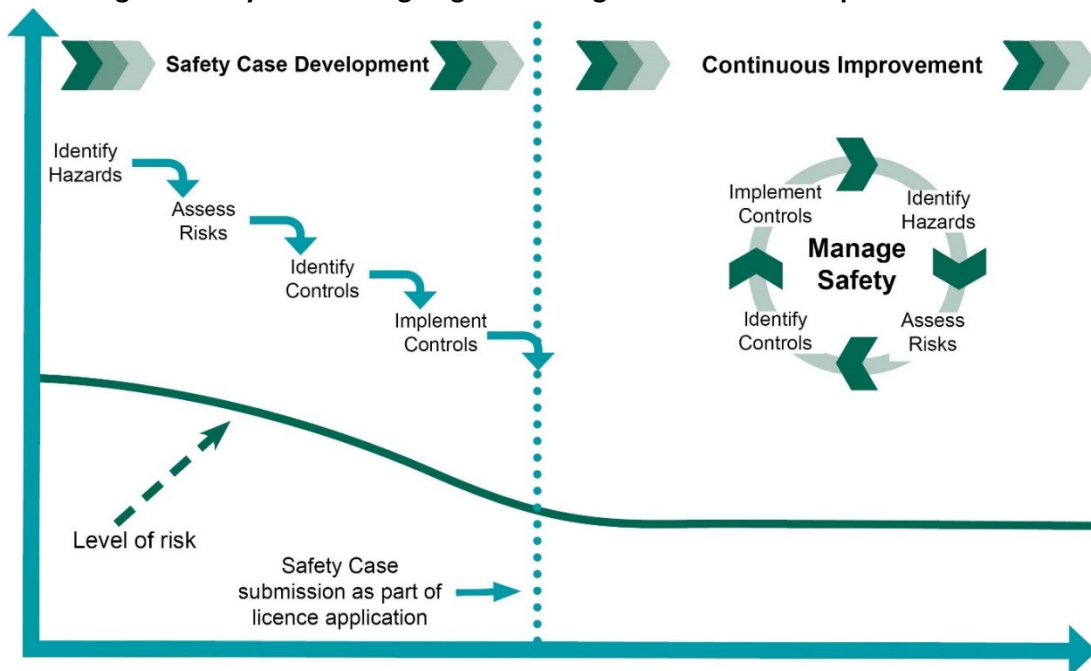
- 5.1 The safety case is the main way in which an applicant for a spaceport licence identifies potential hazards and risks at the spaceport and demonstrates how those risks will be managed. The safety case must be submitted to the regulator (see [regulation 36](#) and [Table E of the Regulator’s Licensing Rules](#)) who will assess whether the applicant has made a compelling argument, supported by relevant evidence to demonstrate they have taken the necessary steps to manage the risks to public safety from the operation of the spaceport to as low as reasonably practicable. In the safety case, the applicant must demonstrate that it has:
- identified the potential major accident hazards at the spaceport and made an assessment of the likelihood and severity of the consequences ([regulation 36\(5\)](#))
 - taken steps to put in place mitigation measures to manage those risks so that they are as low as reasonably practicable ([section 10\(a\) of the Act](#) and [regulation 36\(5\)](#))
- 5.2 A major accident hazard is a hazard that could cause a major accident. A major accident with regard to a spaceport licensee is defined in regulation 2 as:
- “an accident at the spaceport that is highly likely to:
- (a) cause death or serious injury to any person, or
 - (b) destroy or seriously damage the property of members of the public.”
- These persons could include the spaceport’s own staff; spaceflight operator’s staff or contractors; persons in the vicinity of the spaceport; and persons in nearby habitations. People who are not regarded as “members of the public” are defined in regulation 40.
- 5.3 The regulator expects the safety case to demonstrate that the applicant has taken safety into account in the design, construction, operation and maintenance of any installation, propellant or other hazardous material storage facility, equipment and infrastructure connected with the spaceport’s operation.
- 5.4 Figure 1 below provides a high-level summary of the typical process involved in developing a safety case.

Figure 1: The process of developing a safety case



5.5 Once a spaceport licence is granted, the safety case will be used as the basis for ongoing monitoring and assessment of spaceport activities, as shown in Figure 2.

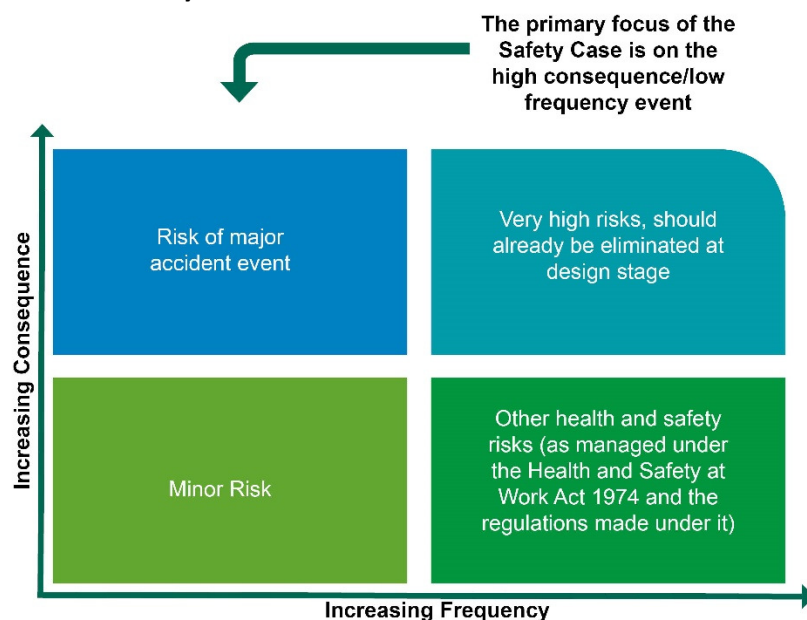
Figure 2: Using the safety case for ongoing monitoring and continuous improvement



Scope of the spaceport safety case

- 5.6 The spaceport safety case will inform any safety-related conditions to the licence. Therefore, before starting work on the safety case, applicants should take time to clearly define the scope of the safety case and ensure the material they present to the regulator is an accurate reflection of the intended spaceport operations. Applicants must take account of the interests of other users of the spaceport when developing the safety case (see [regulation 36\(3\)](#)). In defining the scope, careful consideration should be given to the interaction needed between the spaceport licensee and other licensees to effectively manage the risks arising from licensed activities.
- 5.7 The focus of the safety case should be on the management of potentially catastrophic events rather than on minor risks, as summarised in Figure 3.

Figure 3: The focus of the safety case



Information required in the spaceport safety case

- 5.8 The requirement to produce a safety case is set out in [regulation 36](#), which also prescribes the minimum requirements for a safety case for spaceport licence applications.
- 5.9 However, the regulation does **not** prescribe how applicants should present information and demonstrations in the spaceport safety case. The guidance below is based on the approaches taken in other regulatory regimes that require the submission of a safety case and is designed to help applicants understand the level of detail that will be required. It divides the safety case into four parts:
- site, environment, and management information
 - hazard identification and assessment of major accident scenarios
 - measures to prevent or limit the consequences of a major accident
 - demonstrating that the risk is ALARP

Site, environment and management information

5.10 As provided in [regulation 36\(4\)](#), the safety case must include certain factual information. The regulator will use this information to form a clear picture of the location, activities and therefore the intrinsic hazards at the proposed spaceport. The regulator expects the level of detail provided to be sufficient to allow both the applicant and the regulator to identify the potential hazards and risks.

Spaceport infrastructure & licensed activities

5.11 [Regulation 36\(4\)\(a\)](#) requires a description of the proposed spaceport. The regulator expects the required information to be presented as a combination of narrative text supported by appropriately scaled plans which clearly identify the key infrastructure specified in [regulation 36\(4\)\(d\)](#). The regulator expects the focus of the description to be on what is important from the point of view of safety: in practice, this means the sources of major accident risks and the conditions under which a major accident could happen.

5.12 Applicants who wish to operate a horizontal spaceport must also include a description of the aerodrome as required under [regulation 36\(4\)\(b\)](#). Plans of the aerodrome showing relevant infrastructure will also assist the regulator's consideration of the application.

5.13 The regulator expects maps and plans to clearly differentiate between existing infrastructure and facilities and any planned new infrastructure and facilities.

5.14 If the security measures to ensure the spaceport is secure from unauthorised access are to include a temporary or permanent physical barrier around the site (see [regulation 172\(2\)](#)), the regulator would expect to see such a barrier clearly marked on the maps and plans provided. See the separate document [Guidance on security matters for applicants and licensees](#).

Environment around the spaceport

5.15 The applicant must provide a description of the environment around the spaceport (see [regulation 36\(4\)\(c\)](#)). This must include the natural and built environment in the vicinity of the spaceport as well as populations, particularly vulnerable populations³, and those where large numbers may gather. This same information is likely to be needed for the assessment of environmental effects; see the [Guidance for the assessment of environmental effects](#) for more details on what may be considered relevant.

5.16 The regulator expects the applicant to provide appropriately scaled maps showing the spaceport and surrounding land use within the area that could be affected by major accidents to demonstrate to the regulator that the applicant has adequately assessed the hazards posed to safe operation of the spaceport as well as the vulnerability of the area to the impact of such hazards and risks.

Launch vehicles and spaceflight activities planned

5.17 [Regulation 36\(4\)\(e\)](#) requires a description of any spaceflight activities which the applicant believes likely to be carried out from the spaceport. Where it is possible to do so, applicants

³ The Health and Safety Executive defines 'vulnerable populations' as people who require an element of care, protection or education. Examples include school children; residents of a care home; and hospital patients, amongst others. See www.hse.gov.uk/landuseplanning/methodology.htm

must provide the regulator with details of the actual launch vehicle, or vehicles, that will be used if the spaceport licence application is successful and any hazardous materials that will be used (regulation 36(4)(e)(v)). In practice, this is likely to require the spaceport licence applicant to obtain information from any prospective launch operator licensees who are applying or intend to apply for a launch operator licence from the site.

- 5.18 Regulation 36(8) sets out the safety case requirements where a launch vehicle has not been confirmed. The applicant must base its safety case on a representative vehicle which is consistent with its business plan and planned activities (see regulation 36(8)(a)). For example, if a prospective horizontal spaceport intends to attract launch operator licensees that would use carrier aircraft to enable air-launch of rockets, then it must base its safety case on that type of technology.
- 5.19 Where a launch vehicle has not been confirmed, it will be necessary for the spaceport licence applicant to make assumptions, including about the types and quantities of hazardous materials on site. Any such assumptions must be consistent with the representative vehicle selected.

Propellants and other hazardous materials

- 5.20 There are typically four types of propulsion systems used for space applications which are categorised as either liquid, solid, hybrid (a combination of liquid and solid) and electric.
- 5.21 Where known, the regulator expects applicants to include in their safety case an inventory of all propellants and other hazardous materials that will be stored or used at the spaceport. Relevant information would include:
- the classification of each material under www.hse.gov.uk/chemical-classification/legal/clp-regulation.htm; the chemical name; its Chemical Abstracts Service (CAS) registry number; and its name according to International Union of Pure and Applied Chemistry (IUPAC) nomenclature
 - the hazard type of each material (if applicable – see The Explosives Regulations 2014)
 - the maximum quantity of each hazardous material present or likely to be present
 - the physical, chemical, toxicological characteristics and indication of hazards, both immediate and delayed, to human health
 - the physical and chemical behaviour of these materials under normal conditions of use and under foreseeable accident conditions

Safety management system

- 5.22 A safety management system is an important mitigation measure (regulation 36(5)). The applicant's safety case should therefore include a description of the safety management system the applicant proposes to use to identify hazards and mitigate risks. The requirements and matters to be addressed by the safety management system are set out in Schedule 4.
- 5.23 It is not necessary to submit the safety management system in full. Instead, the regulator expects the applicant to show how it will deliver and maintain the measures described in the safety case. To demonstrate an effective safety management system, the description will need to cover how the applicant will:

- ensure co-operation and co-ordination with any other licensees or other organisation with whom the spaceport must interact during the provision of its licensed activities
- monitor the validity of assumptions made in the hazard identification and risk assessment process
- continually monitor control effectiveness and the performance of the control measures
- ensure that the control measures are not compromised

Hazard identification and assessment of major accident scenarios

5.24 In relation to, as a minimum, the activities specified in regulation 36(5)(a) - (d), applicants must include in their safety case:

- identification of the possible major accident scenarios at the spaceport
- an assessment of the likelihood and severity of the consequences
- the prevention and mitigation measures that will be applied

5.25 The regulator expects the safety case to set out how the applicant has identified hazards and assessed the risks, taking into account:

- human factors in the initiation, prevention, control and mitigation of the hazards and risk
- the security risk assessment, as described in the separate document Guidance on security matters for applicants and licensees

The depth of the analysis should be proportionate to the hazards and risks presented by the operation of the spaceport. The regulator does not expect a fully quantified risk assessment, but it does expect the applicant to have carried out, where necessary, some consequence modelling to understand the extent and severity of major accident scenarios e.g. those which could cause fatalities.

5.26 As part of the application for a spaceport licence, the regulator expects the safety case to present the main results and main arguments of the hazard analysis and assessment of the risk. In addition, the source documents must be made available to the regulator on request. Further, the regulator expects that the safety case will refer to such documents, particularly those which contain information on the assumptions made and criteria used.

Measures to prevent or limit the consequences of a major accident hazard

5.27 Regulation 36(5) requires the safety case to include the mitigation measures that will be put in place to manage the risk identified. In its safety case, the applicant should therefore describe:

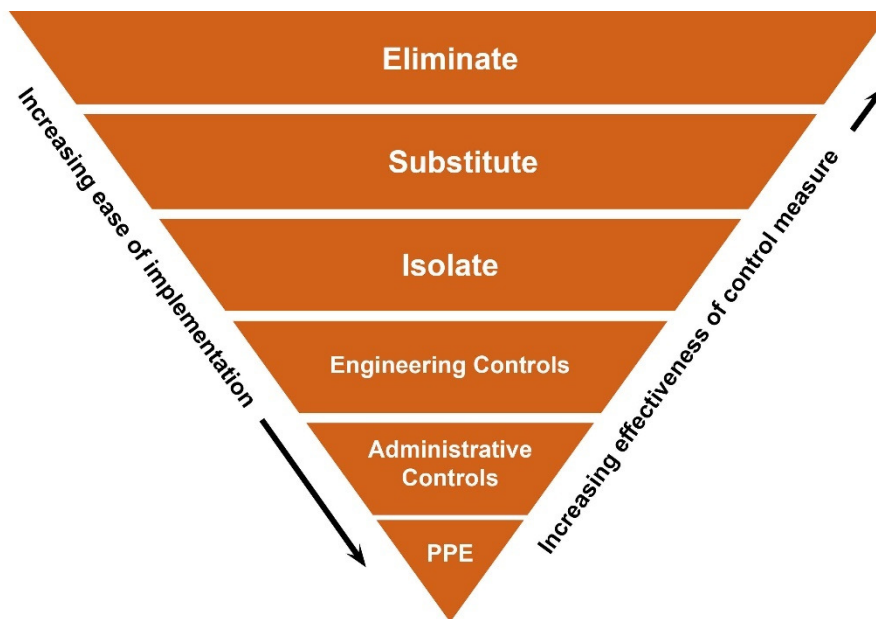
- the technical parameters and equipment used for the safety of the spaceport (especially in relation to handling propellants and other hazardous materials)
- the available equipment installed or used to limit the severity of the consequence of a major accident

Applicants might find it useful to consider the requirements of regulations 158 to 162 when describing these mitigation measures.

5.28 The most effective controls are those which eliminate the risk. Where there is a possibility of a major accident occurring, no matter how small that possibility, it is essential to include the mitigation measures identified to limit the consequence of major accident hazards.

5.29 The regulator expects applicants to demonstrate how they have applied the hierarchy of control measures, as suggested in Figure 4, and that the people involved in the decision-making have a thorough knowledge of the use and possible failure modes of the control measures. A range of different types of controls generally provides more effective protection than a single type as they help provide independence and layers of protection.

Figure 4: Hierarchy of control measures⁴



5.30 There should be a clear link between the measures in place and the major accident scenarios that they are controlling. To ensure that sufficient information about potential hazards and consequences is included, it may be useful for the applicant to include a table clearly linking the hazards and consequences to the measures provided, or a bow-tie diagram that links the measures to the major accident scenarios that they are controlling.

5.31 Although all spaceport licensees are required to prepare an emergency response plan ([regulation 165](#)), it is not necessary to include this in full as part of the safety case. However, the safety case must outline the emergency arrangements that will be put in place to limit the consequence of the major accident scenarios identified.

Demonstrating that the risk is ALARP

5.32 The regulator cannot grant a spaceport licence unless it is satisfied that the applicant has taken all reasonable steps to ensure that the risk to public safety arising from the operation of the spaceport is as low as reasonably practicable (ALARP), in line with [section 10\(a\)](#) of the Act. A safety case that complies with the criteria and requirements prescribed in the Regulations under section 10(b) of the Act is vital in demonstrating to the regulator that the necessary steps have been taken.

5.33 The regulator therefore expects that the applicant's safety case will:

⁴ PPE here refers to personal protective equipment.

- allow the regulator to draw conclusions about whether the level of residual risk is ALARP, taking into account the sensitivity and uncertainty in the assessment of the risks
- describe the decision-making process in determining whether further risk reduction measures are reasonably practicable

5.34 The regulator expects the applicant's safety case to include a suitable and sufficient consideration of the effectiveness of the mitigation measures it has identified for each major accident hazard scenario and document **what more could be done**. Consideration should be given to:

- the scope for hazard elimination
- the adoption of inherently safer designs
- whether good practice has been adopted
- the application of risk-reducing measures where relevant good practice is not yet established
- the functionality, availability, reliability, independence, survivability, compatibility and maintainability of mitigation measures

5.35 Where additional measures are identified but not implemented, the onus is on the applicant to demonstrate that the cost of any additional measures (in terms of money, time or trouble) would be grossly disproportionate to the further risk reduction that would be achieved. Further information can be found at www.hse.gov.uk/risk/theory/index.htm.

Working with the regulator

5.36 The regulator is likely to offer applicants an initial meeting to discuss the safety case requirements. Thereafter, it remains the responsibility of the applicant to produce the safety case, although the regulator can answer relevant queries about what information is required and the level of detail needed.

Safety clear zone requirement

5.37 A safety clear zone is an area to which access is restricted for safety reasons during hazardous pre-flight and post-flight operations which potentially include propellant loading and static engine testing, as well as launch. The purpose of setting up a safety clear zone is to ensure that the risk to any person from blast overpressure, fragmentation debris, thermal radiation or toxic release is ALARP.

5.38 Under regulation 36(7)(a), applicants must identify whether a safety clear zone is required based on the hazards identified and assessments required under regulation 36(5). Where a safety clear zone is required, they must then (see regulation 36(7)(b) - (e)):

- define the area of the safety clear zone
- stipulate the times at which it will be in place
- set out the measures they will take to ensure that it is in place, is monitored and how they will enforce it

5.39 Some aspects of enforcement could be addressed through the security programme – but additional measures to monitor and enforce exclusions may be required in addition to security measures implemented through the security programme. Further information on the security programme can be found in the Guidance on security matters for applicants and licensees.

5.40 The restrictions, exclusions and warnings that are applied to a safety clear zone will differ depending on the activity that is being carried out. In some cases, it may be necessary to prevent any person accessing the area that comprises the safety clear zone; in other cases, it will be sufficient to restrict access to it. For example, a safety clear zone might be subject to a restriction which allows an authorised spaceflight operator or spaceport operating staff to carry out essential activities related to spaceflight activities, but prevents any unauthorised staff or members of the public from accessing the area (see [regulation 157\(3\)\(d\)](#)).

5.41 Within the safety case, applicants must demonstrate to the regulator that they:

- are able to define an appropriate safety clear zone and access rules for different tasks, reflecting the nature of the activities and risks involved as set out in their safety case
- can put in place suitable measures to prevent unauthorised access to the safety clear zone for the required time with reference to the requirements of [regulation 157\(3\)\(a\) - \(c\)](#). For example, for a safety clear zone within the spaceport, it may be sufficient to notify other spaceport staff and users, at relatively short notice. However, where the safety clear zone extends beyond the spaceport, including any roads, private land or property – for example, for a launch – it may be necessary to provide notice earlier and to a wider group of people and organisations.

Section 6: What is required in the spaceport's siting assessment?

- 6.1 In addition to producing a safety case and identifying appropriate safety clear zones for the proposed spaceport, licence applicants are required to conduct a siting assessment.
- 6.2 The siting assessment will enable the regulator to consider the suitability of the site as a location from which to conduct the proposed spaceflight activities.
- 6.3 As set out in regulation 38, the siting assessment must result in a numerical estimate of the annualised risk of death or serious injury to members of the public posed by the proposed spaceflight activities. This estimate must be based on the total proposed number of launches a year and, where more than one spaceflight operator will use the spaceport, be based on all proposed launches. The siting assessment requires applicants to assess the risks to members of the public from the proposed spaceflight activities, based on the actual or proposed launch vehicle characteristics, proposed trajectories, and local land use.
- 6.4 The regulator expects applicants to provide it with comprehensive evidence of how they have arrived at this numerical estimate, as well as the estimate itself. The regulator will then decide whether such a level of risk is acceptable.
- 6.5 If a prospective launch operator licensee has already submitted an application for a licence to launch from the proposed spaceport, the spaceport licence applicant must base its siting assessment on the spaceflight operator's launch vehicle or vehicles. The regulator expects that the spaceport licence applicant will be able to use the information being provided by the prospective launch operator in support of its licence application – in particular, the flight safety analysis required under regulation 26. If necessary, the spaceport licence applicant can consult the regulator for further details.
- 6.6 Where the spaceport licence applicant plans to host more than one spaceflight operator at the spaceport, then the siting assessment must reflect the flight safety analysis of all of these spaceflight operators.
- 6.7 If an applicant is seeking a spaceport licence in advance of any launch operator licence application, the siting assessment must be based on the representative launch vehicle that the spaceport licence applicant considers most likely to be used to carry out spaceflight activities at its spaceport (see regulation 38(4)). This must be the same vehicle that is used for developing the safety case under regulation 36.

Section 7: Spaceport safety regulations

- 7.1 Part 9 of the Regulations focuses on the safe operation of a spaceport once it has been licensed. These regulations are made under [section 19 \(1\)\(a\) of the Act](#) and the requirements they place on spaceport licensees are ongoing and apply for the duration of the spaceport licence. It is important for prospective spaceport licensees to consider the grant of a spaceport licence regulations and the safety regulations together, since both have important elements that are interlinked.

The spaceport licensee's safety duty

- 7.2 [Chapter 2 of Part 10](#) of the Regulations sets out the spaceport licensee's duty to secure that its licensed activities are carried out safely. Under [regulation 152 \(2\)](#), the spaceport licensee does this by carrying them out in accordance with the safety case by:
- (a) preventing a major accident from occurring, and
 - (b) mitigating the consequences of such an accident if it does occur
- 7.3 The purpose of this duty on the spaceport licensee is to establish a clear link to the safety case that was supplied to the regulator during the application phase. The safety case, having been used to demonstrate that the levels of risk to public safety from the operation of the spaceport are as low as reasonably practicable (ALARP), then becomes the standard of safety in relation to the safety regulations.

Retention, review and revision of the safety case

- 7.4 [Chapter 4 of Part 10](#) of the Regulations covers requirements relating to the retention, review and revision of the safety case.
- 7.5 Under [regulation 154](#), a spaceport licensee is required to retain its safety case for the duration of the licence.
- 7.6 A spaceport licensee must review and, where necessary, revise its safety case at least every five years or in the circumstances listed in [regulation 155\(2\)](#). In carrying out a review of its safety case, the licensee must take into account its safety duty under [regulation 152](#)
- 7.7 Any change to the safety case could alter the underlying basis of safety on which the licence was granted. Therefore, after any review and revision, the spaceport licensee must supply the revised safety case to the regulator. Where [regulation 155\(2\)\(e\)](#) applies, the licensee must supply the revised safety case to the regulator in advance of the proposed change: in any other instance, it must supply it to the regulator without delay (see [regulation 156\(1\)](#)).
- 7.8 If the safety case has been reviewed but not revised, the licensee must again inform the regulator in writing without delay setting out its reasons ([regulation 156\(2\)](#)).
- 7.9 A spaceport licensee must supply its revised safety case to the regulator before it implements certain listed changes. These changes are set out at [regulation 155\(e\)](#) and are any of the following where they could have significant consequences for risk:
- Before:
- making modifications to the spaceport

- making changes to the licensed activities
- a new carrier aircraft or launch vehicle operates from the spaceport
- a new payload is to be carried by a launch vehicle operating at the spaceport, or
- introducing new types of hazardous material to the spaceport (or increasing the quantities of hazardous material that are to be transported on or stored at the spaceport)

7.10 The licensee must not implement any changes to its licensed activities until it has received written confirmation from the regulator that its revised safety case is acceptable.

Siting of propellant storage, propellant handling and static engine testing

7.11 When applying for a spaceport licence, the applicant will have identified on the spaceport site plan required under [regulation 36\(1\)\(d\)](#) appropriate areas for any storage, handling and venting of propellant (or other hazardous materials) and static engine or other testing.

7.12 Appropriate siting of these activities was determined by the spaceport’s safety case based on the type and quantity of propellant or other hazardous material and type and frequency of static engine or other testing, following assessment of hazards and risks to the public.

7.13 The spaceport licensee must ensure that these activities only take place in the designated areas.

7.14 In the case of propellant storage facilities (referred to as “hazardous material storage facilities” in the Regulations), the site plan must indicate the types and maximum quantities of propellant etc being stored and identify the hazard type (if applicable). The site plan must show both the minimum permitted, and actual, separation distances between the hazardous material storage facility and:

- any other hazardous material storage facility at the spaceport
- any inhabited building
- a public road or railway line
- a public area within, or in the vicinity of, the spaceport and to which members of the public are allowed access

7.15 Areas for handling and venting of propellant or other hazardous material must also have a surface that is compatible with that type of material.

Propellant integrity

7.16 If a spaceport licensee is responsible for storing, transporting or handling any propellant or other hazardous material, it must ensure that the propellant does not get contaminated and is otherwise kept fit for use in a carrier aircraft or spacecraft ([regulation 160](#)). This is to avoid endangering a spacecraft and any people on board. There is a similar provision in aviation regulations ([ANO 2016, Article 220\(2\)](#)), in respect of aviation fuel which will be relevant to storage etc of fuel for carrier aircraft which do not have a spacecraft attached.

7.17 The spaceport licensee must put in place appropriate procedures for propellant and hazardous material storage, management, handling and distribution – including where the

propellant is owned by a launch operator licensee using the spaceport. Relevant procedures may need to cover how the spaceport licensee will:

- identify and document the key responsibilities of individuals involved in the management and distribution of propellant in its spaceport manual
- store propellant in installations that meet manufacturers' specifications
- ensure that all personnel involved in the processes of receiving, storing, and dispensing of propellant are suitably trained and competent to carry out the associated tasks
- audit all propellant installations on the spaceport to ensure compliance with the spaceport manual and procedures (NB: the regulator may wish to see records of these audits)
- ensure quality control and maintenance procedures for preventing the deterioration or contamination of propellant stored in the installation
- deliver propellant safely into a spacecraft so that it is fit for use, and
- retain records of all propellant on site

Maintenance and testing of safety equipment

7.18 If a spaceport licensee owns, manages or controls any safety equipment on site, regulation 162 requires the licensee to maintain the equipment in efficient working order, keep it in good repair, and test it at suitable intervals.

7.19 As a minimum, the regulator will expect any safety equipment to be inspected, serviced and maintained in accordance with manufacturers' recommendations and will expect the licensee to:

- document inspection and service schedules and maintenance processes in the spaceport manual
- maintain a documentary record of inspections, servicing and maintenance undertaken

The regulator may wish to inspect these records.

Safety Management System

7.20 Regulation 163 requires a spaceport licensee to have a safety management system (SMS) in place. The SMS is a crucial mechanism for managing the safety of licenced activities, as demonstrated within the spaceport safety case (see section 5 of this guidance).

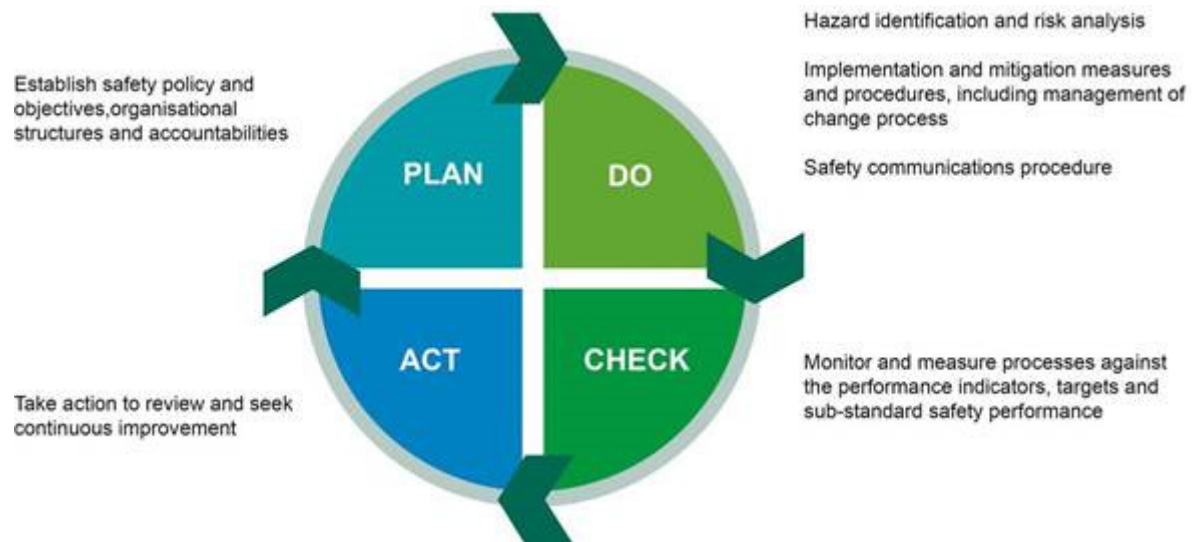
7.21 Schedule 4 specifies the requirements and matters to be addressed by the SMS. Licensees can comply by developing their own processes/procedures; developing joint processes/procedures; or by reference to the procedures of another licensee. The decision should be whichever is best suited to supporting the safety of the overall site and operation. The CAA has produced detailed guidance on the implementation and assessment of safety management systems and its Civil Aviation Publication (CAP) 795 contains a lot of useful information for organisations that have not previously developed an SMS.

7.22 Other formal SMS models are available. Examples include:

- international standards such as ISO 45001:2018 Occupational health and safety management
- generic guidance such as HSE's Managing for health and safety (HSG65) (see www.hse.gov.uk/pubns/books/hsg65.htm)

7.23 Although the language and methodology vary, the key actions can usually be traced back to Plan, Do, Check, Act (Figure 5).

Figure 5: Development and maintenance of a safety management system



7.24 SMS documentation should be kept functional and concise, with the emphasis on the effectiveness of all measures. Care should be taken to avoid focusing too much on the processes of a safety management system at the expense of addressing the human elements of its implementation in practically controlling the risks.

7.25 The licensee's accountable manager is responsible for the implementation of and continuing compliance with the SMS, even if this is overseen day-to-day by the safety manager. However, safety is a shared responsibility across the whole organisation and needs the involvement of all staff at all levels. The success of whatever process or system is in place hinges on the attitudes and behaviours of people in the organisation (this is sometimes referred to as the 'safety culture'). The regulator expects this to be reflected within the SMS.

Spaceport manual

7.26 Regulation 164 sets out the requirement for spaceport licensees to have a spaceport manual in place which contains all the information necessary to enable the spaceport operating staff to perform their duties. As a minimum, the manual must include information and instructions relating to the matters specified in Schedule 8, including:

- the details of the accountable manager and senior management teams, as well as their roles in rapid response
- details of the safety management system
- procedures for sharing information about the status of the spaceport
- the processes and procedures regarding reviewing, revising and testing safety measures such as the emergency response plan and any safety equipment, as well as ensuring that these measures are working, (for example, ensuring that the storage of hazardous materials complies with regulation 158)

- what happens in the event of a loss of access to rescue and fire service facilities during an emergency, and
 - the processes and procedures to ensure licensed activities will be safely integrated with spaceflight activities undertaken at the spaceport (and with aviation and aerodrome activities, in the case of a horizontal spaceport)
- 7.27 The spaceport licensee is responsible for developing and maintaining the spaceport manual and must make the manual, or relevant parts of it, available to its operating staff where the manual (or the parts of it) are relevant to their duties. The spaceport manual must be kept up to date and the licensee must take all reasonable steps to ensure that all members of the spaceport operating staff:
- are aware of the contents of every part of the spaceport manual which is relevant to their duties, and
 - undertakes those duties in conformity with the relevant provisions of the spaceport manual (see [regulation 164\(5\)](#))
- 7.28 The regulator expects licensees to keep a record of the individuals who have a copy of the manual.
- 7.29 Spaceport licensees must supply the regulator with any additions or amendments to the spaceport manual as soon as they come into effect, and ideally before (see [regulation 164\(3\)\(a\)](#)).
- 7.30 The regulator may also require additions or amendments to be made to the spaceport manual in the interests of safety (see [regulation 164\(3\)\(b\)](#)).
- 7.31 The regulator expects there to be a dedicated amendment page at the front of each copy of the manual which has a record of all amendments made, showing the amendment numbers, date of incorporation, signature of the persons amending and the page or paragraph affected.
- 7.32 The spaceport manual for a horizontal spaceport should be aligned with the aerodrome manual in place at that aerodrome to ensure a fully integrated SMS. If the spaceport licensee is also the aerodrome licence holder, it can produce a combined aerodrome/spaceport manual, to avoid duplicating information (see [regulation 164\(1\)](#)).
- 7.33 The regulator expects the spaceport manual either to include all spaceport safety policies, operational procedures and instructions in full, or to provide specific cross-references to other required documents such as the safety case and emergency response plan.

Emergency planning, rescue and fire fighting

- 7.34 [Regulation 165](#) requires spaceport licensees to have in place an emergency response plan which details how the spaceport will respond in an emergency. The assessment made in the spaceport's current safety case will determine the actions to take and the level and type of rescue and firefighting provision required (see section 5 of this guidance and [regulation 166\(2\)](#)). The regulator also expects the licensee to take account of the findings of the assessment of environmental effects, following the principle of ensuring environmental protection where possible.

- 7.35 The emergency response plan must reflect the size, nature and complexity of the licenced activities at the spaceport such as the storage, transport and handling of propellant and other hazardous materials, and static engine and other tests as well as spaceflight activities (regulation 165(2)(b)). The spaceport licensee should ensure that key personnel have easy access to the emergency response plan at all times.
- 7.36 An effective emergency response plan will ensure:
- an orderly and efficient transition from normal to emergency operations, including the timely provision of spaceport rescue and firefighting personnel, facilities and equipment (regulation 166). Horizontal spaceports may be able to use the rescue and fire-fighting capability sited at the aerodrome
 - designation of emergency authority and responsibilities, taking into account the powers of members of the rescue and fire-fighting service at a spaceport (regulation 167)
 - authorisation by key personnel for actions contained in the plan
 - consultation and coordination with other organisations and their emergency response plans (regulation 165(2)(c) - (d))
 - safe continuation of operations or return to normal operations as soon as practicable (notably, how the licensee will ensure that there have been no breaches of security after an emergency response). For more detail on this, see Guidance on security matters for applicants and licensees
- 7.37 The spaceport licensee must test and review (and, where necessary, revise) its emergency response plan at least every three years (regulation 165(3)).
- 7.38 The spaceport licensee must supply the regulator with the results of any test of the emergency response plan, including the details of any revisions made to the emergency response plan as a result of a review (regulation 165(4)) before, or immediately after, any revisions come into effect.
- 7.39 Licensees may find the detailed guidance regarding emergency planning and the Civil Contingencies Act 2004 a useful reference when preparing the emergency response plan. It can be found online at www.gov.uk/government/publications/emergency-preparedness

Security

- 7.40 Spaceport licensees must ensure appropriate and proportionate levels of security at the spaceport. This includes physical security of the site, access arrangements to the site and to controlled or restricted areas, security of any supplies, security for the control of hazardous materials and procedures for reporting security incidents. Where possible, the regulator expects safety and security approaches to be both integrated and complementary. Further details of spaceport security requirements are set out in the separate Guidance on security matters for applicants and licensees.