

# Guidance for Orbital Operator licence applicants and Orbital Operator Licensees

CAP 2210

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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 in the UK, 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 explains the activities which, under the Act, are authorised by an orbital operator licence. It explains how to apply for an orbital operator licence, what information applicants will need to provide and how the regulator will assess applications. It covers topics such as procuring a UK launch and the responsibilities of operators for managing the satellite or space object once it is in space.
- 1.6 It also sets out the duties of an orbital operator once a licence is granted.

## Who is this guidance for?

- 1.7 This guidance is for any person or organisation that wishes to conduct spaceflight activities in outer space from the UK. This includes, for example, the operation, from the UK, of a communications satellite, an orbital manoeuvring vehicle or an in-orbit servicing satellite.
- 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 orbital operator licensees may need to obtain or use information from other licensees, and vice versa.

## Using this guidance

- 1.9 The guidance should be read in conjunction with the [Act](#), the [Regulations](#), the [Regulator's Licensing Rules](#) and the guidance on [Applying for a licence under the Space Industry Act 2018](#). The [Regulator's Licensing Rules](#) specify the application form to be used for applying for an orbital operator licence and the information required by the regulator in connection with this application.
- 1.10 If applicants have any queries, they are encouraged to contact the regulator to seek clarification or gain further information.

## The regulator

- 1.11 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.
- 1.12 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](mailto: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

- 1.13 The Act regulates:
  - space activities
  - sub-orbital activities and
  - associated activities

that are carried out in the UK.

- 1.14 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
- 1.15 “A space object” includes the component parts of a space object, its launch vehicle and the component parts of that.
- 1.16 “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’.
- 1.17 Space activities and sub-orbital activities are referred to in the Act as “spaceflight activities”.
- 1.18 “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.
- 1.19 “Launch” is defined in the Act as including causing a craft to take off (or releasing a balloon).
- 1.20 [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;”
- 1.21 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
- 1.22 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.
- 1.23 Associated activities include the operation of spaceports and range control functions.

- 1.24 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.
- 1.25 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).”
- 1.26 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

- 1.27 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.
- 1.28 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

1.29 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

1.30 The Act refers to three types of licences that can be awarded:

- operator licence
- spaceport licence
- range control licence

1.31 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,<sup>1</sup> or in some 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,<sup>1</sup> or in some circumstances, return operator licensee.

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<sup>1</sup> 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.

- **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 place<sup>2</sup>). Spaceports can be licensed for vertical or horizontal launches (or potentially both). A horizontal spaceport must be located at an aerodrome that is already 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.

- 1.32 Where an orbital operator wishes to return a satellite to Earth for reuse or reclamation, the operator would need to hold an operator licence for the returning satellite because it would be considered a 'spaceflight activity'. The regulator will consider requests for this unique licensing provision on a case-by-case basis and discuss with potential licensees how the safety and security of such an activity might be managed using licence conditions.
- 1.33 There may also be situations in which both an orbital operator licence and a launch operator licence are required. For example, if part of a launch vehicle is designed to remain in outer space and can be operated in orbit to carry out additional activities, the launch operator may need to obtain an orbital operator licence. The requirement to hold both licence types is likely to be determined on a case-by-case basis, taking into account safety and security considerations specific to the proposed mission.

## Examples of offences and enforcement directions under the Act

- 1.34 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

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<sup>2</sup> 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.

- 1.35 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.
- 1.36 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.
- 1.37 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.
- 1.38 Under [section 27 of the Act](#), the regulator can also 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.
- 1.39 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.”
- 1.40 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)).
- 1.41 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

- 1.42 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

1.43 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 launched or controlled from the United Kingdom. This includes space activities, sub-orbital activities, and all associated spaceflight activities.
- 2.2 It requires any person or organisation wishing to undertake such activities to obtain the relevant licence.
- 2.3 The Outer Space Act 1986 (OSA) still applies to activities taking place overseas, where a UK company is involved. For example, if a UK satellite manufacturer procured a launch for its satellite from the UK, it would have to do so under the Space Industry Act 2018 (SIA). If the same manufacturer procured a launch for its satellite from any other country, it would have to do so under the OSA.
- 2.4 The following table summarises the activities that would fall under the two acts:

Space activities carried out...	... In the United Kingdom	... Overseas
... by UK nationals	SIA 2018*	OSA 1986
... by foreign parties	SIA 2018	N/A

\*space activities carried out by UK nationals in the UK will previously have been licensed under the Outer Space Act 1986

- 2.5 If a UK organisation wishes to operate satellites both from the UK and from overseas, then it will need to apply for licences under both the SIA and OSA. The UK-based spaceflight activities would need an orbital operator licence under the SIA and the overseas spaceflight activities would be licensed under the OSA. Prospective applicants who would like advice as to which licence to apply for are encouraged to contact the regulator at [commercialspaceflight@caa.co.uk](mailto:commercialspaceflight@caa.co.uk).

### Sections 8 and 9 of Act

- 2.6 There are various common matters that the regulator must be satisfied with in relation to granting all types of licence. These common matters are summarised in subsections (2) and (3) of [section 8](#) of the Act. Applicants must provide information to the regulator about these matters. Further details of the information that must be supplied for this purpose can be found in the [Regulator's Licensing Rules](#) and in the [Guidance on applying for a licence](#).
- 2.7 Sections 8 and 9 of the Space Industry Act 2018 set out the primary requirements for orbital operator licences.
- 2.8 [Section 8 of the Act](#) (Grant of a Licence) sets out a number of general matters that apply to applicants for any licence under the Act. Under section 8, the regulator has the power to grant a licence if the regulator thinks fit. It may do so only if it is 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

and that:

- the applicant has the financial and technical resources to do the things authorised by the licence, and is otherwise a fit and proper person to do them
- the persons expected to do, on the applicant's behalf, any of the things authorised by the licence are fit and proper persons to do them.

2.9 [Section 9](#) identifies the core principles in relation to safety. Section 9 provides that the regulator must not grant a licence unless it is satisfied that requirements in sections 9(2) and 9(4) are met.

- Section 9(2) requires an applicant to have carried out an assessment of the risks to the health and safety of individuals undertaking a prescribed role or capacity in the activities. For the purposes of section 9(2), there are no prescribed roles or capacities that relate to orbital only activities. Therefore, applicants for an orbital operator licence **do not** have to address this requirement.
- Section 9(4) requires an applicant to have taken all reasonable steps to ensure that risks to the health, safety and property of persons who are not acting in a prescribed role or capacity are as low as reasonably practicable. Applicants for an operator licence **must** satisfy the regulator that they have met these requirements.

### Other sections of the Act

2.10 Other sections of the Act set out various criteria for applicants or licensees. Many of these apply to applicants for any licence under the Act. For more information about applying for a licence generally, see the guidance on [Applying for a licence](#). These further criteria are referred to where appropriate in this guidance.

## Commencement of the Act

2.11 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 29 July 2021, 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

2.12 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

- 2.13 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.
- 2.14 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.

## The Space Industry Regulations 2021

- 2.15 No regulations have been made for orbital operations under section 9 (risk) or section 19(1)(b) (safety) of the SIA. Instead, the regulator intends to regulate orbital safety through licence conditions and accompanying guidance. This will be an outcomes-based approach, similar to that used for the licensing regime under the OSA.
- 2.16 Orbital activities are characterised by a wide diversity of mission profiles and technologies used. An adaptable, outcomes-based regulatory regime is therefore important to ensure that new developments in recognised standards and practices can be taken into account and that safety and security requirements can best target the specific concerns associated with a given activity.
- 2.17 To help prospective orbital operators understand which regulations may be relevant to them, this guidance sets out the regulations that may apply to them.
- 2.18 Note that in the Space Industry Regulations:
- ‘operator’s spaceflight activities’ refers to launch, sub-orbital activities or return to earth.<sup>3</sup> Regulations that relate to an operator’s spaceflight activities (as defined) do not generally apply for orbital operators<sup>4</sup>
  - similarly, regulations that apply to ‘spaceflight operators’ do not apply to orbital operators. For example, Part 4 (grant of a spaceflight operator licence: risk) only applies to applicants for launch operator or return operator licences
- 2.19 The Regulations are divided into 16 Parts and 7 Schedules. The following Parts contain regulations that may apply to orbital operator licences:
- Part 3: grant of a licence
  - Part 11: security
  - Part 13: liabilities and indemnities
  - Part 14: monitoring and enforcement
  - Part 15: civil sanctions (stop notices)
  - Part 16: occurrence reporting

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<sup>3</sup> Regulation 2: interpretation.

<sup>4</sup> The definition of ‘operator’s spaceflight activities’ in Regulation 2 does include orbital activities ‘only in so far as they are necessary’ to complete an assignment to carry a spaceflight participant, carry a payload until its release or separation from a launch vehicle, carry out sub-orbital activities, or to return a launch vehicle or carrier aircraft to earth and complete its flight’.

- Part 17: miscellaneous

2.20 There are no schedules in the Regulations that apply to orbital operators.

## Specific regulations that may apply to orbital operator licences

2.21 The following regulations may apply to orbital operator applicants or licensees. Not all regulations will be relevant to every operator.

Part 3: Grant of a licence	
Regulation no.	Chapter 1
5	Applicability of eligibility criteria
6	Eligibility criteria
8	Prescribed roles: all operators
10	Additional prescribed role for operators to whom regulation 9 does not apply
12	Licensee's duty to ensure necessary resources for individuals in prescribed roles
13	Duty to inform regulator of changes: individuals in prescribed roles
14	Offence of failure to inform regulator of changes: individuals in prescribed roles
	Chapter 3
16 – 24	Grant of a licence: general

2.20 The [Regulator's Licensing Rules](#) set out further information about the information required for an application.

Part 11: Security – all licensees	
Regulation no.	
168	Interpretation
170	Access control to space sites
172	Access control to space sites: further provisions
173	Access control to space sites: emergency services
174	Space site restricted area and controlled area <sup>5</sup>
176	Security controls for prohibited articles
177	Security controls for supplies
179	Access control to space sites: approval of suppliers
180	Surveillance of space sites
181	Security controls: hazardous material <sup>6</sup>
185	Spaceflight cyber security strategy
186	Duty to report a notifiable incident to the regulator
1	National security vetting procedures
189	Training records and qualifications
190	Renewal of security training
191	Critical national infrastructure and essential services <sup>7</sup>

<sup>5</sup> Regulation 174 applies if the Secretary of State accepts the licensee's proposal to restrict access to their mission management facility.

<sup>6</sup> This is unlikely to be relevant to orbital operators.

<sup>7</sup> Regulation 191 applies where the Secretary of State and Centre for Protection of National Infrastructure determine that a space site is critical national infrastructure or spaceflight activities are essential services.



<b>Security regulations that only apply if a security manager is required under regulation 10(2)<sup>8</sup></b>	
<b>169</b>	Responsibilities of a security manager
<b>170</b>	Space site security programme
<b>171</b>	Operator security programme
<b>188</b>	Appropriate security training and qualifications

2.21 The Guidance on security matters for applicants and licensees provides more information about liabilities and indemnities.

<b>Part 13: Liabilities and indemnities</b>	
<b>Regulation no.</b>	
<b>218</b>	Prescribed description of individual to whom section 34(2) does not apply
<b>219</b>	Prescribed cases or circumstances under which a limit on the operator's liability to the government does not apply
<b>220</b>	Limit on the amount of operator's liability
<b>221</b>	Duty of the Secretary of State to indemnify

2.22 The Guidance on insurance requirements and liabilities under the Space Industry Act 2018 provides more information about liabilities and indemnities.

<b>Part 14: Monitoring and enforcement</b>	
<b>Chapter 1</b>	General
<b>Chapter 2</b>	Obligation to provide information to the regulator
<b>Chapter 3</b>	Inspectors
<b>Chapter 4</b>	Sharing of information between regulator and other bodies
<b>Chapter 5</b>	Restrictions on disclosure of information

<b>Part 15: Civil sanctions (stop notices)</b>	
<b>Regulations 265 - 269</b>	Civil sanctions (stop notices)

<b>Part 16: Occurrence reporting</b>	
<b>Chapter 1</b>	Interpretation
<b>Chapter 2</b>	Duty to report an occurrence and the objective of that report
<b>Chapter 3</b>	Events elsewhere which could threaten safety
<b>Chapter 4</b>	Contents of the occurrence report
<b>Chapter 5</b>	The regulator's actions when it receives an occurrence report
<b>Chapter 6</b>	Confidential information
<b>Chapter 7</b>	Offences and penalties

<b>Part 17: Miscellaneous (duty to inform regulator of changes)</b>	
<b>Regulation no.</b>	

<sup>8</sup> Regulation 10(2) requires an orbital operator to appoint a security manager if the licenced activities 'may give rise to an issue of national security'. See section 7 of this guidance for examples as to when the regulator may consider activities to give rise to an issue of national security.

<b>282</b>	Duty on licensee to inform regulator of changes
<b>283</b>	Offence of failure to inform regulator of changes
<b>284</b>	Penalty for failure to inform regulator of changes
<b>285</b>	Sending of notices and other documents
<b>286</b>	Use of records and documentary evidence: prescribed persons
<b>287</b>	Review

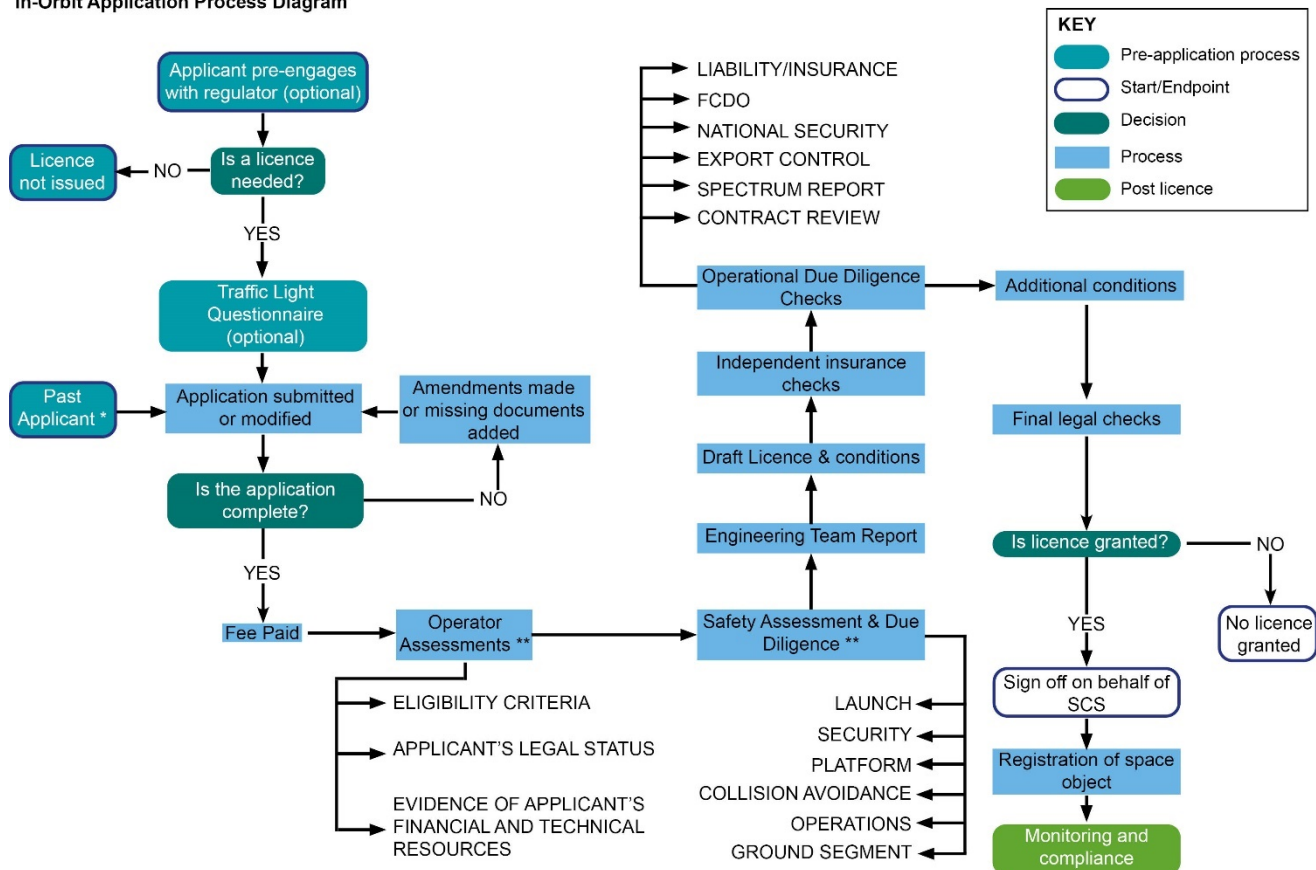
- 2.23 The Guidance on duties for all licensees under the Space Industry Act 2018 including monitoring and enforcement by the regulator provides more information about these matters.

## Section 3: Applying for an orbital operator licence

- 3.1 The general process for applying for a licence is set out in the [Applying for a licence](#) guidance document. This guidance focuses on the provision of information about the proposed activity and the demonstration of technical capability for an orbital operator licence.
- 3.2 Figure 1 gives an overview of the licensing process for orbital operator licences.

Figure 1

In-Orbit Application Process Diagram



\* Past applicants who have previously engaged with the regulator can bypass a lot of the pre-application process steps.

\*\* These steps happen concurrently based on the application.

- 3.3 The processes shown in Figure 1 are iterative, and any irregularities or missing information at any point in the process may result in the current steps being paused whilst waiting for response(s).
- 3.4 To apply for an orbital operator licence, a person or organisation must provide information to the regulator so that the regulator can make a reasoned assessment on the suitability of the application. For orbital operator licence applicants, much of this information will be provided by answering the regulator's 'Assessment Questions' contained in the application form for

orbital operator licences.<sup>9</sup> The Regulator's Licensing Rules set out the information that must be sent to the regulator in connection with an application.

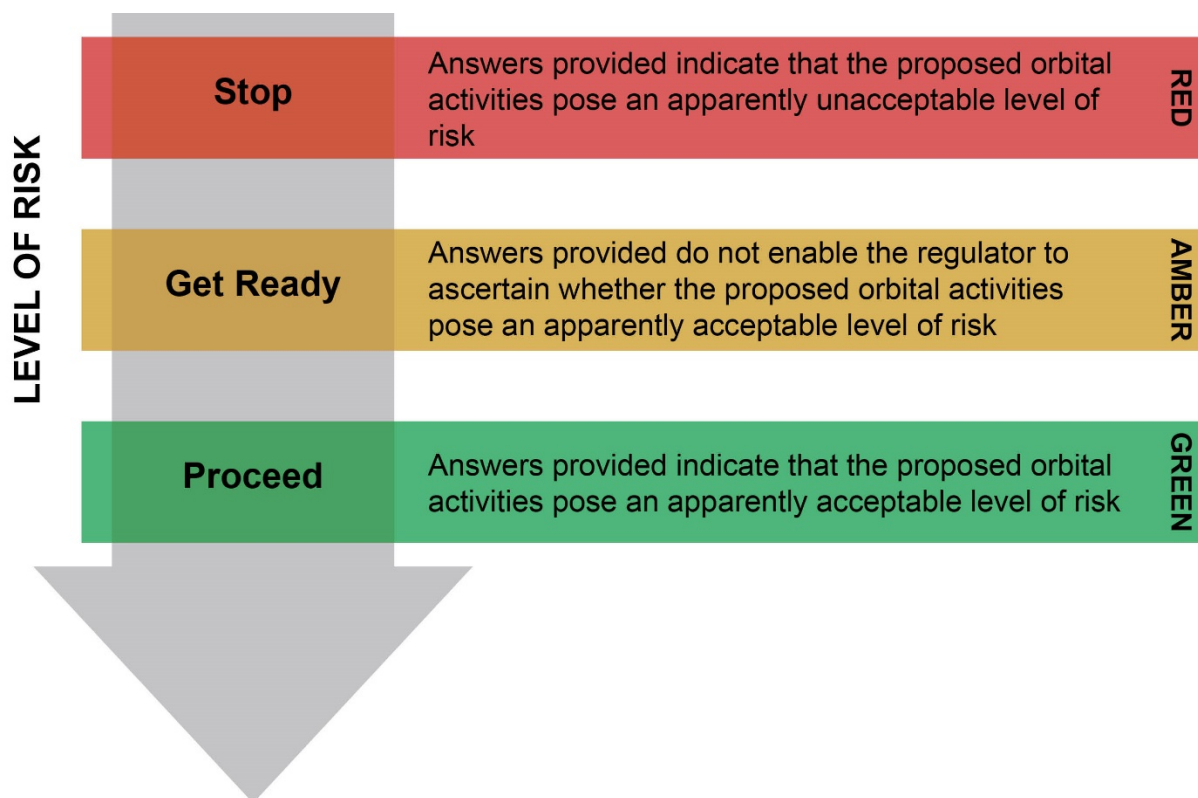
- 3.5 The regulator will only grant a licence if it is satisfied that the applicant has the necessary resources, skills and capabilities to undertake the proposed activities. The regulator will assess an applicant's responses to the Assessment Questions according to the Assessment Principles of safety, security, sustainability and responsibility, which are detailed in section 5 of this guidance.
- 3.6 Given the quantity of information required and the time needed to assess that information, applications should be submitted well in advance of any planned date for a launch or operations. In general, the length of the period of assessment will reflect the complexity of the application.
- 3.7 When the regulator issues an orbital operator licence for a space object, the licence will usually cover the full operational lifetime of the space object as well including end of life.
- 3.8 As set out in Applying for a licence guidance and Section 1 of this guidance, the regulator may attach conditions to any licence it issues.

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<sup>9</sup> The Assessment Questions are in development and will be available alongside the application form for orbital operator licences. They will be similar to the questions that are asked of licensees under the Outer Space Act. Section 5 of this guidance (Assessment Principles) helps explain what applicants will be expected to demonstrate in their responses to the Assessment Questions.

## Section 4: The Traffic Light System for pre-application engagement

- 4.1 In addition to the core application process, prospective orbital operators can also choose to use the Traffic Light System (TLS) to help them determine whether to complete an application and prepare for the application itself.
- 4.2 The TLS is an interactive pre-application process provided to prospective applicants on an optional basis and free of charge. The TLS consists of a series of questions about the applicant's business and the proposed spaceflight activities. Based on those answers, the regulator will give prospective licence applicants a pre-application Red/Amber/Green rating and basic feedback.
- 4.3 The ratings will provide an early, non-binding and approximate indication of the potential level of risk to safety, security and sustainability of the proposed orbital activity.
- A 'green' rating means that the proposed orbital activities appear to pose an acceptable level of risk to safety, security and sustainability but subject to the regulator's review on any actual application being made and any issues arising from it.
  - An 'amber' rating means that the proposed orbital activities appear to pose an uncertain level of risk to safety, security and sustainability.
  - A 'red' rating means that the proposed orbital activities appear to pose an unacceptable level of risk to safety, security and sustainability.



- 4.4 The rating is indicative and non-binding, meaning that a “green” rating at the TLS stage does not guarantee a successful outcome at the formal application stage. Furthermore, the TLS does not reflect on any additional information which will be required by the regulator, e.g. under the Regulator’s Licensing Rules, or further information required or requirements which must be met under the Regulations and is therefore not indicative of matters beyond safety, security and sustainability. If a prospective applicant does not meet those additional requirements when making its formal application, it is unlikely that a licence will be granted, even if it receives a “green” assessment.
- 4.5 The TLS is similar to the process that has been used under the OSA for several years and, as under the OSA, it is not a formal part of the application process. Its purpose is:
- to help less experienced operators to better understand safety, security, and sustainability requirements, as reflected in the regulator’s licensing process
  - to help operators understand their readiness to apply and the barriers they may face at an early stage, where re-design of the proposed mission concept is less onerous.
- 4.6 Prospective applicants are not obliged to use the TLS and can submit an application for an orbital operator licence under the Act without having first received a Traffic Light rating. However, new operators, and all operators hoping to launch new types of missions, may benefit from using the TLS to identify potential issues at an early stage.
- 4.7 Prospective applicants must note that any guidance they receive from the regulator before they submit a licence application will **not** form part of the regulator’s decision-making process relating to granting or refusing the application for the licence. The process for obtaining a licence starts at the point when the regulator receives the application and the information in connection with it (see [regulation 18](#) and the [Regulator’s Licensing Rules](#)). The regulator will only begin to consider an application once it has received all necessary documentation.

## Section 5: Assessment principles for orbital operator licences

- 5.1 In assessing applications for an orbital operator licence, the regulator will follow four core principles:
- safety
  - security
  - sustainability
  - responsibility
- 5.2 There are standard factors that must be considered under each principle.
- 5.3 Applicants are advised to use the list of Best Practice Standards in Annex A to help determine which standards apply to their activities – and then carry out their own standards survey. Where applicants are using standards outside those listed in Annex A, the regulator expects applicants to clearly identify what those standards are and explain why they are using them.

### Safety

- 5.4 As noted above, under [section 9 of the Act](#), to grant a licence the regulator must be satisfied that the applicant has taken all reasonable steps to ensure that risks to the health, safety and property of persons are as low as reasonably practicable and that the level of those risks is acceptable.
- 5.5 The focus of this principle is to ensure that the risks of licensed orbital activities to public health or the safety of persons or property are as low as reasonably practicable. In practice, this principle is concerned with mitigating the likelihood and impact of unforeseen, non-malicious events that might occur as a direct or indirect result of a licensed activity, and making sure that accidental interference with the activities of others in the peaceful exploration and use of outer space is minimised.
- 5.6 Unlike applications for a launch operator licence, there is no requirement for an applicant for an orbital operator licence to provide a safety case. However, applicants will be expected to demonstrate how they will work to ensure their operations are safe and that the risks are as low as reasonably possible and at an acceptable level. They will demonstrate this through their answers to the Assessment Questions and in any supporting evidence.
- 5.7 Under this principle, the regulator expects applicants for an orbital operator licence to:
- demonstrate how their chosen launch operation(s) have been planned to minimise the risk to public safety and the impact on the orbital environment. In doing so, applicants are expected to demonstrate how they have considered the reliability and heritage of the chosen launch vehicle
  - consider the reliability of the spacecraft the applicant intends to operate in orbit, including appropriate design standards, functionality and capability during all mission phases including launch
  - explain how they will adhere to appropriate plans, procedures, rules and criteria to ensure safe operations during all mission phases

- ensure the ground-based elements of the spacecraft system have suitable functionality and capability to ensure safe operations during all mission phases
- meet, where appropriate, international standards and guidelines on spacecraft and launch vehicle design, qualification, operation and disposal, testing and ground segment and mission operations

## Security

5.8 The focus of this principle is to ensure that activities licensed in orbit are secure, both to the operator and third parties. This is primarily concerned with mitigating the likelihood and impact of malicious events that might occur as a direct or indirect result of a licensed activity.

5.9 The regulator therefore expects applicants to:

- demonstrate that their proposed activities will not impair UK national security
- demonstrate that their proposed activities will not actively interfere with the activities of others in the peaceful exploration and use of outer space
- ensure that all aspects of their spaceflight activities and associated activities, including any ground-based activities, are adequately protected against malicious external interference that may compromise an operator's ability to control the activity in orbit or grant access to sensitive data pertaining to the activity
- demonstrate that the security requirements under the regulations are being met

## Sustainability

5.10 The focus of this principle is to ensure that activities licensed in orbit are sustainable. A sustainable activity (or mission) is one that meets the requirements of the present without compromising the ability of subsequent generations to embark on activities (or missions) to meet their own requirements in the future. Sustainability is inherently linked to safety and security: whereas safety and security look to mitigate impacts of spacecraft activities on the operations of existing spacecraft, sustainability attempts to mitigate the impacts of spacecraft activities on the future environment.

5.11 Applicants must demonstrate how they will adhere to the same orbital sustainability objectives as currently licensed operators,<sup>10</sup> by demonstrating how they will:

- prevent on-orbit break-ups, either from collisions with other objects in orbit or fragmentation
- limit the number of objects released during normal operations
- remove spacecraft and orbital stages that have reached the end of their operations from the most used, useful and densely populated orbital regions

## Responsibility

5.12 The focus of this principle is to ensure that activities licensed in orbit are performed in a responsible manner throughout the duration of the mission. This requires the licensee to act responsibly by attempting to minimise risks and taking accountability for the mission's activities and its impacts.

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<sup>10</sup> That is, operators licensed under the Outer Space Act 1986.



5.13 Applicants must therefore demonstrate to the regulator how they will:

- avoid breaching the UK's international obligations, including but not limited to international registration and liability obligations
- not cause or be perceived to cause undue financial or reputational risk to the UK and work with the UK government to ensure that these risks are mitigated appropriately
- be proactive in ensuring compliance with licence conditions, as well as identifying and communicating in a timely manner any issues or necessary changes that require coordination with the regulator

## Section 6: Information required as part of an orbital operator licence application

- 6.1 The Regulator's Licensing Rules lists the information that applicants must provide to the regulator.
- 6.2 Annex D of the Regulator's Licensing Rules specifies that applicants for orbital operator licences are required to provide information about matters including the safety and sustainability of the mission. The regulator will use this information to assess the application against the Assessment Principles outlined in section 5 of this guidance. Applicants for orbital operator licences will provide this information by answering a series of 'Assessment Questions'.<sup>11</sup>
- 6.3 As set out in regulation 19, the regulator has the right to request other information as it deems necessary to evaluate the licence application. For example, the regulator may request evidence to support an applicant's answers to the Assessment Questions. For further information on the regulator's powers to request information, refer to Figure 2, paragraph 4.10 and paragraphs 4.23 to 4.27 of the guidance on Applying for a licence under the Space Industry Act 2018.

### Personnel

- 6.4 Applicants must provide details of the individuals they propose to appoint to prescribed roles. For orbital operator licences, the prescribed roles are:
- accountable manager
  - security manager (where applicable)
- 6.5 The responsibilities for these roles are set out in regulations and are summarised in the guidance document Applying for a licence.

Regulation 10(2) provides that where the licence would authorise the carrying out of activities which may give rise to any issue of national security, the regulator must include a condition in the licence requiring that operator to appoint a security manager. For more information on the role and responsibilities of a security manager, if required, see paragraphs 3.32-3.35 of the document Guidance on security matters for applicants and licensees.

- 6.6 As set out in the guidance on Applying for a licence and specified in the Regulator's Licensing Rules, applicants must provide evidence of the experience, skills and qualifications of any individual nominated for a prescribed role.

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<sup>11</sup> The Assessment Questions are in development and will be available alongside the application form for orbital operator licences. They will be similar to the questions that are asked of licensees under the Outer Space Act. Section 5 of this guidance (Assessment Principles) helps explain what applicants will be expected to demonstrate in their responses to the Assessment Questions.

- 6.7 The regulator has the discretion to require a licensee to appoint someone to fulfil a particular role if necessary for the operation(s). An example of such a role is a 'safety manager'. Any such roles will be set out in conditions in a licence; however, in practice the regulator will normally advise the applicant, during the application process, if such additional roles are likely to be required. In deciding whether to impose such a condition, the regulator will consider factors such as mission profile and satellite capabilities.
- 6.8 In addition to prescribed roles, applicants are encouraged to provide details of the experience, skills and qualifications of any individuals who will play a key role in their operations – for example, controlling the object in space and working with the launch operator.

#### Use of agents

- 6.9 As set out in Tables B,C and D of the Regulator's Licensing Rules, applicants for a launch operator licence, return operator licence or an orbital operator licence are required to provide certain information concerning any proposal to appoint an agent to carry out spaceflight activities on their behalf. This requirement is derived from [section 3\(4\) of the Act](#):

"A person does not require an operator licence to carry out, as employee or agent of another person, spaceflight activities that are authorised by an operator licence granted to that other person."

**Note:** A person **does** require a licence to carry out spaceflight activities authorised by an operator licence on the operator's behalf, if that person is not an employee or agent of the operator, or the person may commit an offence under section 3(6) of the Act.

- 6.10 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, and
  - any documents which evidence the capability of such an agent to carry out those activities, and
  - the agency contract
- 6.11 The documents that provide evidence of the capability of an agent to carry out the spaceflight activities on behalf of an applicant or licensee must include a detailed description of the spaceflight 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 spaceflight activities, and
  - a schedule of the terms on which the agent will carry out the agreed spaceflight activities on behalf of the licensee
- 6.12 Prior to the issuing of any licences/commencement of licensing by the regulator, the regulator will publish a schedule of minimum required terms to be included in a written agency agreement which the licensee must include in any agency agreement with its agents.

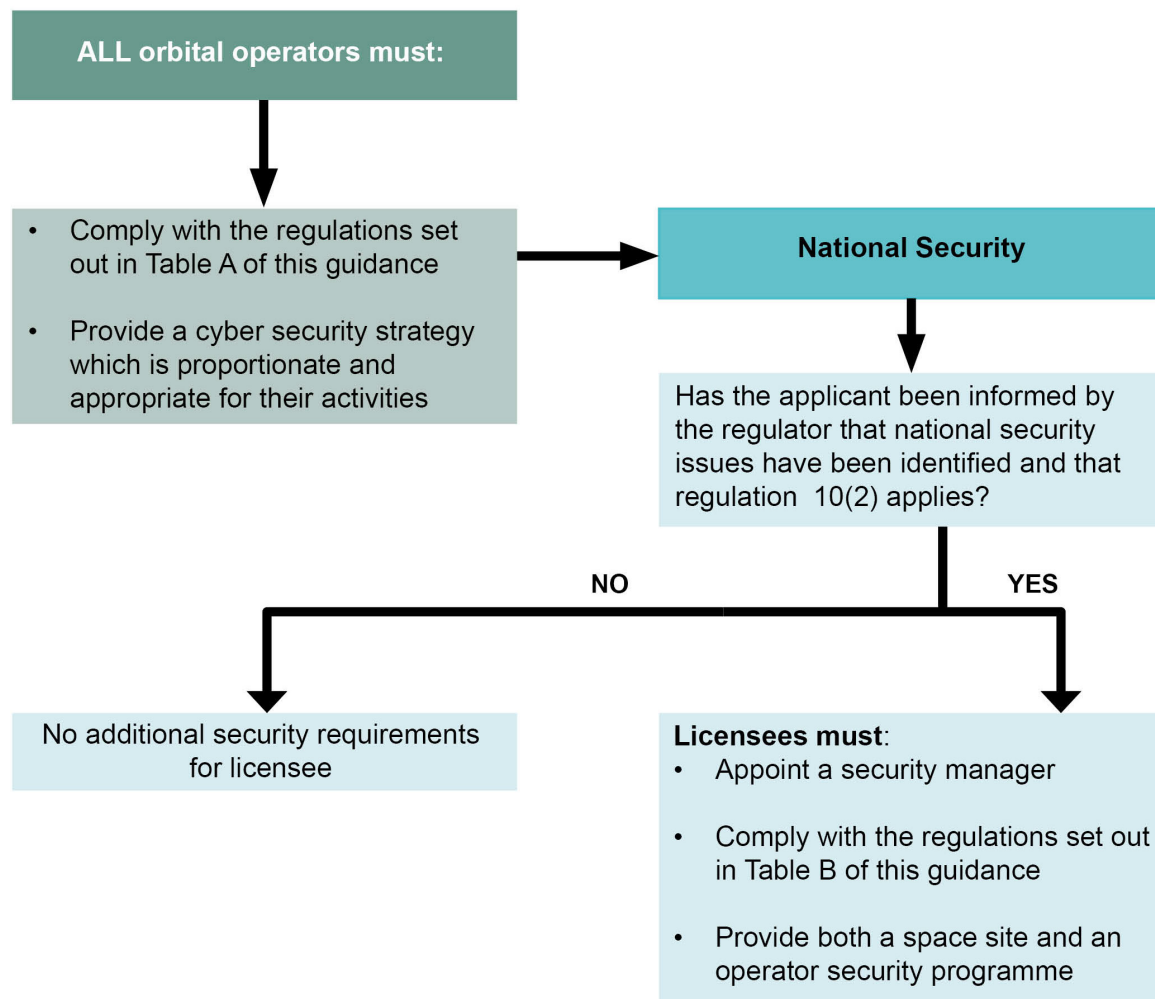
## Section 7: Security requirements for all licensees

- 7.1 Security requirements for spaceflight operations should be applied in a manner that is appropriate to the activity being undertaken and proportionate to the risks entailed. These should be based on a security risk assessment for the space site and operation(s) taking place.
- 7.2 Given the wide range of spaceflight activities potentially covered by an orbital operator licence, what is appropriate and proportionate for one activity may be very different from what is appropriate and proportionate for another. Some examples include:
- Regulation 173 (access control to space sites: further provisions) requires an identification card for individuals seeking access to the space site. Where the operator is a satellite club at a school that operates a single cubesat, based on a risk assessment, it may be appropriate and proportionate for the identification to be a 'satellite club card' for each member of the club. Conversely, where the operator is an earth observation satellite with considerable security concerns, the applicant should consider greater access controls.
  - Regulation 177 (security controls for supplies) requires a licensee to ensure supplies are not tampered with before they are delivered to the space site. For smaller space sites such as a mission management facility at a university, it may be appropriate and proportionate for the licensee to provide the regulator with a self-declaration that, based on its security procedures and measures, no tampering of the supplies has occurred. Where a mission management facility is used to control sensitive satellites, however, the scrutiny required for supplies entering the site would require more detailed security procedures and measures.
- 7.3 Further guidance about security requirements under the Regulations may be found in the Guidance on security matters for applicants and licensees.

### **Security regulations for orbital operators**

- 7.4 Figure 2 summarises which security regulations apply to orbital operators.

Figure 2: Summary of orbital operator security requirements



7.5 The following security regulations apply to **all orbital operator licensees**:

Table A

Regulation no.	Regulation
168	Interpretation
172	Access control to space sites
173	Access control to space sites: further provisions
175	Access control to space sites: emergency services
176	Security controls for prohibited articles
177	Security controls for supplies
179	Access control to space sites: approval of suppliers
180	Surveillance of space sites
181	Security controls: hazardous material
185	Spaceflight cyber security strategy
186	Duty to report a notifiable incident to the regulator
187	National security vetting procedures
189	Training records and qualifications
190	Renewal of security training

## Regulations that apply if a security manager is required

- 7.6 Regulation 10(2) specifies that where the licensed activities of an orbital operator “may give rise to any issue of national security”, the regulator must include a condition in that licence requiring the operator to appoint a security manager. The security manager is responsible for all security aspects of the operator’s licensed activities.
- 7.7 Examples of when the regulator may identify issues of national security arising from licensed activities include when the activities have been designed as Critical National Infrastructure or essential services or when classified information is involved.
- 7.8 The following regulations apply to orbital operators that require a **security manager**:

**Table B**

Regulation no.	Regulation
<b>169</b>	Responsibilities of a security manager
<b>170</b>	Space site security programme
<b>171</b>	Operator security programme
<b>187</b>	National security vetting procedures
<b>188</b>	Appropriate security training and qualifications

## Section 8: Reporting requirements for orbital operations licensees

- 8.1 For the purpose of monitoring an orbital operator's spaceflight activities, once a licence has been granted, the regulator envisages the operator reporting certain matters to the regulator on an ongoing basis.
- 8.2 The regulator will use the information provided by the orbital operator licensee to help it satisfy aspects of its duties under the SIA and to meet the international obligations of the UK.
- 8.3 It should be noted that these reporting requirements are independent of the regulator's powers in [regulation 19](#) to request the applicant, for example make documents and records available for inspection (see paragraph 6.3 above) and in addition to requirements for licensees to provide the regulator with occurrence reports (Part 16 of the Regulations). Furthermore, the extent of the reporting requirements is dependent on the scope of the licence.
- 8.4 It is envisaged that there will be two overall types of reporting conditions to be complied with by an orbital operator licensee:
- generic reporting conditions: these conditions will be substantially the same for all orbital operator licensees
  - specific reporting conditions: these conditions will be specific to the individual orbital operator licensee or even tailored to each operation
- 8.5 Table 1 in Annex B of this guidance provides further details of the kinds of information that an orbital operator licensee may need to report as a condition on a licence. The regulator will specify the frequency of reporting and any time periods in which information must be provided.
- 8.6 The regulator continues to have the right to request monitoring information from any licensee (or all licensees) as it determines necessary to fulfil its duties. Licensees must respond to such requests in a timely fashion. For more details, see the separate document [Guidance on duties for all licensees under the Space Industry Act 2018 including monitoring and enforcement by the regulator](#).

### Registration

- 8.7 The UK is party to the [UN Convention on Registration of Objects Launched into Outer Space](#) 1975 (the "Registration Convention"). The Registration Convention imposes international obligations on 'launching States' to register space objects.
- 8.8 Under section 61(1) of the Act the Secretary of State must maintain a register of launches that have taken place from spaceports in the UK. This includes both space and suborbital launches.
- 8.9 This is in addition to the duty on the Secretary of State, set out in section 7 of the Outer Space Act 1986 and as amended by Schedule 12 of the Space Industry Act, to maintain a register of space objects (whether launched in the UK or elsewhere) as the Secretary of State considers

appropriate to comply with the UK's international obligations.

- 8.10 To enable the Secretary of State to fulfil the duty under section 61(1) of the Act, for each launch, the Secretary of State may require as much of the following information from the holder of an orbital operator licence as is appropriate:
- the date of the launch
  - the site from which the launch took place
  - the nature of each launch vehicle launched
  - the purpose of the launch
  - name, designation, and catalogue number of the space objects launched
  - orbital position and orbital parameters of the space objects launched
  - general function of the space objects launched
- 8.11 The Secretary of State may also request further information, as deemed appropriate. The information provided may also be used to notify other international bodies or organisations of UK launches and space objects as is required.
- 8.12 Details of what information must be provided to the Secretary of State will be confirmed at a later date.
- 8.13 Prior to the UK launch (including from a UK site, sea or air launch) of a satellite which is to be operated from outside the UK by a non-UK company the regulator may request written confirmation from the relevant State in which operations are to be carried out that they will be responsible, to the extent appropriate, for the registration of the satellite or be listed as an interested party to the registration.
- 8.14 The information within the register will be available to the public to view, free of charge.



## Annex A: Best Practice Standards

The following set of standards is a non-exhaustive list that may be applicable to orbital operators in the management, design or operation of the spacecraft or mission. The standards listed are guidance on what the regulator considers to be industry/government best practice. Operators may choose to tailor these standards to their own activities or develop their own best practice. Applicants are expected, as part of their licence application, to demonstrate to the regulator how they have adopted industry best practice/standards or, if they have chosen to use an alternative approach, to explain this and demonstrate why it is appropriate. This list was current at the time of compilation: however, the applicant should refer to the standards bodies for the most up-to-date versions.

Type	Standard ID	Standard Title
Spacecraft	ECSS Q70C Rev.1	Materials, Mechanical Parts and Processes
Spacecraft	ECSS-E-ST-20C	Electrical and Optical Engineering - Electrical and Electronic
Spacecraft	ECSS-E-ST-31C	Mechanical Engineering - Thermal Control General Requirements
Spacecraft	ECSS-E-ST-32C Rev.1	Mechanical Engineering - Structural General Requirements
Spacecraft	ECSS-E-ST-32-08C Rev.1	Mechanical Engineering – Materials
Spacecraft	ECSS-E-ST-32-01C Rev.1	Mechanical Engineering - Fracture Control
Spacecraft	ISO 14302:2002	Space systems – Electromagnetic compatibility requirements
Spacecraft	ISO 14303:2002	Space systems – Launch-vehicle-to-spacecraft interfaces
Spacecraft	ISO 14622:2000	Space systems – Structural design – Loads and induced environment
Spacecraft	ISO 14624-1:2003	Space systems – Safety and compatibility of materials – Part 1: Determination of upward flammability of materials
Spacecraft	ISO 14624-2:2003	Space systems – Safety and compatibility of materials – Part 2: Determination of flammability of electrical-wire insulation and accessory materials
Spacecraft	ISO 14624-3:2005	Space systems – Safety and compatibility of materials – Part 3: Determination of offgassed products from materials and assembled articles
Spacecraft	ISO 14624-4:2003	Space systems – Safety and compatibility of materials – Part 4: Determination of upward flammability of materials in pressurized gaseous oxygen or oxygen-enriched environments

Spacecraft	ISO 14624-5:2006	Space systems – Safety and compatibility of materials – Part 5: Determination of reactivity of system/component materials with aerospace propellants
Spacecraft	ISO 14624-6:2006	Space systems – Safety and compatibility of materials – Part 6: Determination of reactivity of processing materials with aerospace fluids
Spacecraft	ISO 14624-7:2006	Space systems – Safety and compatibility of materials – Part 7: Determination of permeability and penetration of materials to aerospace fluids
Spacecraft	ISO 14953:2000	Space systems – Structural design – Determination of loading levels for static qualification testing of launch vehicles
Spacecraft	ISO 15389:2001	Space systems – Flight-to-ground umbilicals
Spacecraft	ISO 15389:2001/Amd 1:2005	Prevention of accidental cross-connection
Spacecraft	ISO 15389:2001/Cor 1:2006	
Spacecraft	BS ISO 15859-1:2004	Space systems – Fluid characteristics, sampling and test methods – Part 1: Oxygen
Spacecraft	BS ISO 15859-2:2004	Space systems – Fluid characteristics, sampling and test methods – Part 2: Hydrogen
Spacecraft	BS ISO 15859-3:2004	Space systems – Fluid characteristics, sampling and test methods – Part 3: Nitrogen
Spacecraft	BS ISO 15859-4:2004	Space systems – Fluid characteristics, sampling and test methods – Part 4: Helium
Spacecraft	BS ISO 15859-5:2004	Space systems – Fluid characteristics, sampling and test methods – Part 5: Nitrogen tetroxide propellants
Spacecraft	BS ISO 15859-6:2004	Space systems – Fluid characteristics, sampling and test methods – Part 6: Monomethylhydrazine propellant
Spacecraft	BS ISO 15859-7:2004	Space systems – Fluid characteristics, sampling and test methods – Part 7: Hydrazine propellant
Spacecraft	BS ISO 15859-8:2004	Space systems – Fluid characteristics, sampling and test methods – Part 8: Kerosine propellant
Spacecraft	BS ISO 15859-9:2004	Space systems – Fluid characteristics, sampling and test methods – Part 9: Argon
Spacecraft	BS ISO 15859-10:2004	Space systems – Fluid characteristics, sampling and test methods – Part 10: Water
Spacecraft	BS ISO 15859-11:2004	Space systems – Fluid characteristics, sampling and test methods – Part 11: Ammonia
Spacecraft	BS ISO 15859-12:2004	Space systems – Fluid characteristics, sampling and test methods – Part 12: Carbon dioxide

Spacecraft	BS ISO 15859-13:2004	Space systems – Fluid characteristics, sampling and test methods – Part 13: Breathing air
Spacecraft	ISO 15860:2006	Space systems – Gas contamination – Measurement methods for field tests
Spacecraft	ISO 15863:2003	Space systems – Spacecraft-to-launch-vehicle interface control document
Spacecraft	ISO 15864:2004	Space systems – General test methods for space craft, subsystems and units
Spacecraft	ISO 15865:2005	Space systems – Qualification assessment
Spacecraft	ISO 21961:2003	Space data and information transfer systems – Data entity dictionary specification language (DEDSL) – Abstract syntax
Spacecraft	ISO 21962:2003	Space data and information transfer systems – Data entity dictionary specification language (DEDSL) – PVL syntax
Spacecraft	ISO 22643:2003	Space data and information transfer systems – Data entity dictionary specification language (DEDSL) – XML/DTD Syntax
Spacecraft	ISO 23038:2018	Space systems – Space solar cells – Electron and proton irradiation test methods
Spacecraft	ISO 16454:2007	Space systems – Structural design – Stress analysis requirements
Spacecraft	ISO 17566:2011	Space systems — General test documentation
Spacecraft	ISO 19933:2007	Space systems — Format for spacecraft launch environment test report
Spacecraft	ISO 21350:2007	Space systems — Off-the-shelf item utilization
Spacecraft	ISO 24638:2008	Space systems — Pressure components and pressure system integration
Spacecraft	ISO 26871:2012	Space systems — Explosive systems and devices
Spacecraft	ISO 11227:2012	Test procedures for HV1 material ejecta
Operations / Spacecraft	IADC-02-01 (Revision 1 - September 2007)	IADC Space Debris Mitigation Guidelines
Operations / Spacecraft	IADC-04-06 (Rev 5.5 May 2014)	Support to the IADC Space Debris Mitigation Guidelines
Operations / Spacecraft	European-CoC (Issue 1 28 Jun 04)	European Code of Conduct for Space Debris Mitigation
Operations / Spacecraft	ISO 26872:2019	Space systems -- Disposal of satellites operating at geosynchronous altitude
Operations / Spacecraft	ISO 27875:2019	Space systems. Re-entry risk management for unmanned spacecraft and launch vehicle orbital stages

Operations / Spacecraft	ECSS Q30-02C	Failure Modes, Effects, And Criticality Analysis
Operations / Spacecraft	ECSS Q40-02C	Hazard Analysis
Operations / Spacecraft	ECSS Q40C Rev.1	Safety
Operations / Spacecraft	ECSS-E-ST-10-06C	System Engineering -Technical Requirements Specification
Operations / Spacecraft	ECSS-E-ST-35C Rev.1	Mechanical Engineering - Propulsion General Requirements
Operations / Spacecraft	ECSS-E-ST-33-11C Rev.1	Mechanical Engineering - Explosive subsystems and devices
Operations / Spacecraft	ECSS-E-ST-33-01C Rev.2	Mechanical Engineering – Mechanisms
Operations / Spacecraft	ECSS E70	Ground Systems And Operations
Operations / Spacecraft	ISO 11104:2011	Space data and information transfer systems -- Time code formats
Operations / Spacecraft	ISO 11754:2003	Space data and information transfer systems -- Telemetry channel coding
Operations / Spacecraft	ISO 12171:2002	Space data and information transfer systems -- Telecommand -- Channel service
Operations / Spacecraft	ISO 12173:2003	Space data and information transfer systems -- Telecommand -- Command operation procedures
Operations / Spacecraft	ISO 12174:2003	Space data and information transfer systems -- Telecommand -- Architectural specification for the data management service
Operations / Spacecraft	ISO 12175:1994 + A1:2015	Space data and information transfer systems -- Standard formatted data units -- Structure and construction rules
Operations / Spacecraft	ISO 13420:1997	Space data and information transfer systems -- Advanced orbiting systems -- Networks and data links -- Architectural specification

Operations / Spacecraft	ISO 13764:1996	Space data and information transfer systems -- Standard formatted data units -- Control authority procedures
Operations / Spacecraft	ISO 14619:2003	Space systems – Space experiments – General requirements
Operations / Spacecraft	ISO 14623:2003	Space systems – Pressure vessels and pressurized structures – Design and operation
Operations / Spacecraft	ISO 14625:2007	Space systems – Ground support equipment for use at launch, landing, or retrieval sites–General requirements
Operations / Spacecraft	ISO 14721:2012	Space data and information transfer systems – Open archival information system – Reference model
Operations / Spacecraft	ISO 14952-1:2003	Space systems – Surface cleanliness of fluid systems – Part 1: Vocabulary
Operations / Spacecraft	ISO 14952-2:2003	Space systems – Surface cleanliness of fluid systems – Part 2: Cleanliness levels
Operations / Spacecraft	ISO 14952-3:2003	Space systems – Surface cleanliness of fluid systems – Part 3: Analytical procedures for the determination of on-volatile residues and particulate contamination
Operations / Spacecraft	ISO 14952-4:2003	Space systems – Surface cleanliness of fluid systems – Part 4: Rough-cleaning processes
Operations / Spacecraft	ISO 14952-5:2003	Space systems – Surface cleanliness of fluid systems – Part 5: Drying processes
Operations / Spacecraft	ISO 14952-6:2003	Space systems – Surface cleanliness of fluid systems – Part 6: Precision-cleaning processes
Operations / Spacecraft	ISO 14961:2002	Space data and information transfer systems – Parameter value language specification
Operations / Spacecraft	ISO 14962:1997	Space data and information transfer systems – ASCII encoded English
Operations / Spacecraft	ISO 15387:2005	Space systems – Single-junction solar cells – Measurements and calibration procedures
Operations / Spacecraft	ISO 15395:1998	Space data and information transfer systems – Standard formatted data units – Control authority data structures

Operations / Spacecraft	ISO 15396:2007	Space data and information transfer systems – Cross support reference model – Space link extension services
Operations / Spacecraft	ISO 15887:2013	Space data and information transfer systems – Data systems – Lossless data compression
Operations / Spacecraft	ISO 15888:2000	Space data and information transfer systems – Standard formatted data units – Referencing environment
Operations / Spacecraft	ISO 15889:2011	Space data and information transfer systems – Data description language – EAST specification
Operations / Spacecraft	ISO 15893:2010	Space data and information transfer systems – Protocol specification for space communications – Transport protocol
Operations / Spacecraft	ISO 21351:2005	Space systems – Functional and technical specifications
Operations / Spacecraft	ISO 21459:2015	Space data and information transfer systems – Proximity-1 space link protocol – Coding and synchronization sublayer
Operations / Spacecraft	ISO 21460:2015	Space data and information transfer systems – Proximity-1 space link protocol – Physical layer
Operations / Spacecraft	ISO 22641:2012	Space data and information transfer systems – TM (telemetry) synchronization and channel coding
Operations / Spacecraft	ISO 22642:2015	Space data and information transfer systems – TC (telecommand) synchronization and channel coding
Operations / Spacecraft	BS ISO 22644:2006	Space data and information transfer systems – Orbit data messages
Operations / Spacecraft	ISO 22645:2016	Space data and information transfer systems – TM (telemetry) space data link protocol
Operations / Spacecraft	ISO 22646:2005	Space data and information transfer systems – Space packet protocol
Operations / Spacecraft	ISO 22646:2005/AMD 1:2015	Space Data And Information Transfer Systems — Space Packet Protocol — Amendment 1

Operations / Spacecraft	BS ISO 22647:2010	Space data and information transfer systems – Space link identifiers
Operations / Spacecraft	ISO 22663:2015	Space data and information transfer systems – Proximity-1 space link protocol – Data link layer
Operations / Spacecraft	ISO 22664:2016	Space data and information transfer systems – TC (telecommand) space data link protocol
Operations / Spacecraft	ISO 22666:2016	Space data and information transfer systems – AOS (advanced orbiting systems) space data link protocol
Operations / Spacecraft	ISO 22667:2013	Space data and information transfer systems – Communication operations Procedure-1
Operations / Spacecraft	ISO 22669:2013	Space data and information transfer systems – Space link extension (SLE) – Return-all-frames service
Operations / Spacecraft	ISO 22670:2013	Space data and information transfer systems – Space link extension (SLE) – Return-channel-frames service
Operations / Spacecraft	ISO 22671:2011	Space data and information transfer systems – Space link extension (SLE) – Forward command link transmission unit (CLTU)
Operations / Spacecraft	ISO 22672:2011	Space data and information transfer systems – Space link extension (SLE) – Forward space packet service
Operations / Spacecraft	ISO 15862:2009	Space systems — Launch-vehicle-to-spacecraft flight environments telemetry data processing
Operations / Spacecraft	ISO 21348:2007	Space environment (natural and artificial) — Process for determining solar irradiances
Operations / Spacecraft	ISO 24917:2010	Space systems — General test requirements for launch vehicles
Operations / Spacecraft	ISO 26143:2013	Space data and information transfer systems — Space link extension (SLE) — Return operational control fields service
Operations / Spacecraft	ISO 26868:2009	Space data and information transfer systems — Image data compression
Operations / Spacecraft	ISO 26870:2009	Space systems — Launch pad and integration site operational documents

Operations / Spacecraft	ISO/TR 11233:2014	Orbit determination and estimation
Operations / Spacecraft	ISO 14222:2013	Atmosphere density models
Operations / Spacecraft	ISO 14200:2012	Process based meteoroid/debris environment models
Operations / Spacecraft	ECSS E ST 10-04C	Space environment
Operations / Spacecraft	ECSS E ST 10-04C Rev1.	Space environment (Rev 1. 15 February 2017)
Operations / Spacecraft	ISO 16679:2015	Space systems — Relative motion analysis elements after LV/SC separation
Operations / Spacecraft	ISO 16164:2015	Space systems — Disposal of satellites operating in or crossing Low Earth Orbit
Operations / Spacecraft	ISO 16126:2014	Space systems — Assessment of survivability of unmanned spacecraft against space debris and meteoroid impacts to ensure successful post-mission disposal
Operations / Spacecraft	ISO/TS 20991:2018	Space systems — Requirements for small spacecraft
Operations / Management	ISO 17666:2016	Space systems -- Risk management
Operations / Management	ISO 16091:2018	Space systems – Integrated logistic support
Operations / Management	ISO 20652:2006	Space data and information transfer systems – Producer-archive interface – Methodology abstract standard
Operations	ITU-R S 1003-2 (01/12/2010)	Environmental protection of the geostationary-satellite orbit (ITU Radiocommunication Assembly Recommendation)
Operations	A/AC.105/C.1/L.284 [V.09-88517 January 2010]	Revised draft space debris mitigation guidelines of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space
Operations	ISO 14620-1 2018	Space systems -- Safety requirements -- Part 1: System safety



Operations	ISO 14620-2 2019	Space systems -- Safety requirements -- Part 2: Launch site operations
Operations	ISO 14620-3 2005	Space systems -- Safety requirements -- Part 3: Flight safety systems
Operations	ISO 23339:2010	Space systems -- Unmanned spacecraft residual propellant mass estimation for disposal manoeuvres
Operations	ISO 24113:2019	Space systems -- Space debris mitigation requirements
Operations	ISO 27852:2016	Space systems -- Estimation of orbit lifetime
Operations	ISO 14711:2003	Space systems – Unmanned mission operations concepts – Guidelines for defining and assessing concept products
Operations	ISO 14950:2004	Space systems – Unmanned spacecraft operability
Management / Spacecraft	ISO 14954:2005	Space systems – Dynamic and static analysis – Exchange of mathematical models
Management / Spacecraft	ISO 15388:2012	Space systems – Contamination and cleanliness control
Management / Spacecraft	ISO 15390:2004	Space environment (natural and artificial) – Galactic cosmic ray model
Management / Spacecraft	ISO 16458:2004	Space systems – Unmanned spacecraft transportation – General requirements
Management / Spacecraft	ISO 17355:2007	Space data and information transfer systems – CCSDS file delivery protocol
Management / Spacecraft	BS ISO 17399:2003	Space systems – Man-systems integration
Management / Spacecraft	ISO/TR 17400:2003	Space systems – Space launch complexes, integration sites and other facilities – General testing guidelines
Management / Spacecraft	ISO 17401:2004	Space systems – Spacecraft interface requirements document for launch vehicle services
Management / Spacecraft	ISO 21347:2005	Space systems – Fracture and damage control
Management / Spacecraft	ISO 22010:2007	Space systems — Mass properties control
Management / Spacecraft	ISO 24637:2009	Space systems — Electromagnetic interference (EMI) test reporting requirements

Management / Spacecraft	ISO 26869:2012	Space systems — Small-auxiliary-spacecraft (SASC)-to- launch- vehicle interface control document
Management	ISO 14300-1:2011	Space systems -- Programme management -- Part 1: Structuring of a programme
Management	ISO 14300-2:2011	Space systems -- Programme management -- Part 2: Product assurance
Management	ISO 14621-1:2019	Space systems – Electrical, electronic and electromechanical (EEE) parts – Part 1: Parts management
Management	ISO 14621-2:2019	Space systems – Electrical, electronic and electromechanical (EEE) parts – Part 2: Control programme requirements
Management	ISO 21349:2007	Space systems – Project reviews
Management	ISO 23041:2018	Space systems — Unmanned spacecraft operational procedures — Documentation
Management	ISO 23460:2011	Space projects — Programme management — Dependability assurance requirements
Management	ISO 23461:2010	Space systems — Programme management — Non-conformance control system
Management	ISO 23462:2014	Space systems — Guidelines to define the management framework for a space project
Management	ISO 27025:2010	Space systems — Programme management — Quality assurance requirements
Management	ISO 27026:2011	Space systems — Programme management — Breakdown of project management structures

## Annex B : Examples of conditions on an orbital operator licence related to generic reporting requirements

Reporting Requirement	Description
Flight Information	(1) Launch Date and Time (earliest and latest possible launch time (GMT)) (2) List of payloads on launch
Mission Information - LEOP	(1) Injection parameters for the initial orbit of the payload (2) Confirmation that the payload has reached its final operational orbit (3) Confirmation that the payload has completed its check-out and will enter normal operations
Mission Information - Nominal Operation	(1) Annual health check on the spacecraft (telemetry information to be provided by operator)
Mission Information - End-of-life Operation	(1) Intention that spacecraft will initiate its end-of-life operations (2) Confirmation that the spacecraft has successfully completed its end-of-life operations