

Guidance on the investigation of spaceflight accidents

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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 UKto 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 In addition, The Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations 2021 define how spaceflight accidents will be investigated and by whom. These regulations also set out the powers of the Spaceflight Accident Investigation Authority and the objective of a safety investigation, as prevention of future accidents without apportioning blame or liability.
- 1.5 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?

- 1.6 This guidance explains how any spaceflight accidents will be investigated and how licensees will be expected to support such investigations. Its purpose is to provide stakeholders with additional information to facilitate compliance with the regulatory requirements for investigation of spaceflight accidents.

- 1.7 This guidance is not intended to cover every circumstance that may be encountered in an investigation.

Who is this guidance for?

- 1.8 This guidance is for licensees under the Act.
- 1.9 The guidance may also be of relevance to:
- any people or organisations that intend to apply for a licence under the Act, as it explains what duties and responsibilities they would face in relation to accident investigation
 - people or organisations that supply or support licensees in any way, who may be required to provide information in relation to accident investigation

Using this guidance

- 1.10 The guidance is designed to provide an overview of the process of investigating any spaceflight accidents and give licensees an understanding of the information they may be asked to provide. It should be read in conjunction with [section 20 of the Space Industry Act](#) and [The Spaceflight Activities \(Investigation of Spaceflight Accidents\) Regulations 2021](#).
- 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.

The safety investigation authority

- 1.14 The UK Space Accident Investigation Authority (SAIA) will perform the functions of the safety investigation authority and is responsible for conducting independent spaceflight safety investigations to prevent further accidents without apportioning blame or liability. The purpose of having an independent authority is to avoid any conflicts of interest and external influence in the conduct of an accident investigation.

Key terms

1.15 The Act regulates:

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

that are carried out in the UK.

1.16 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

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

1.18 “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’.

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

1.20 “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.

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

1.22 [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;”

1.23 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

- 1.24 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.
- 1.25 Associated activities include the operation of spaceports and range control functions.
- 1.26 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.
- 1.27 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).”
- 1.28 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

- 1.29 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.

- 1.30 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

- 1.31 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

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

- operator licence
- spaceport licence
- range control licence

- 1.33 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 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

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.

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 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

- 1.34 Under [section 3 of the Act](#), it is a criminal 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 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.

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.

- 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 spaceflight activities and associated activities taking place from the United Kingdom. It requires any person or organisation wishing to undertake such activities to obtain the relevant licence.
- 2.2 The Outer Space Act 1986 still applies to activities taking place overseas, even if 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. If the same manufacturer procured a launch for its satellite from any other country, it would have to do so under the Outer Space Act 1986.

Section 20 of the Space Industry Act 2018

- 2.3 [Section 20](#) of the Act gives power to make regulations governing the investigation of accidents in relation to spaceflight activities, including those licensed under the Outer Space Act 1986.

The Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations 2021

- 2.4 [The Spaceflight Activities \(Investigation of Spaceflight Accidents\) Regulations 2021](#) have been drawn up using the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2018 and EU Regulation 996/2010 on the investigation and prevention of accidents and incidents in civil aviation as a baseline. There are differences between these regulations but also similarities. Both sets of regulations define the same sole objective of a safety investigation as prevention of future accidents without apportioning blame or liability.
- 2.5 Unless otherwise stated, all references to regulations in this guidance refer to [The Spaceflight Activities \(Investigation of Spaceflight Accidents\) Regulations 2021](#).
- 2.6 Under [regulation 5](#), the Secretary of State is required to appoint the SAIA to conduct independent spaceflight safety investigations. The purpose of having an independent authority is to avoid any conflicts of interest and external influence in the conduct of an accident investigation.
- 2.7 To facilitate a safety investigation, Inspectors of Spaceflight Accidents are appointed, one of whom is appointed the Chief Inspector of Spaceflight Accidents by the Secretary of State. The Chief Inspector reports directly to the Secretary of State on matters of spaceflight safety.
- 2.8 Under the Regulations:
 - a spaceflight accident means any accident that takes place during, or as a result of spaceflight activities in or over the United Kingdom, or elsewhere (if any of the circumstances referred to in [regulation 16](#) apply)
 - a serious spaceflight accident means a spaceflight accident in the course of the operation of a launch vehicle in which an individual is fatally or seriously injured, or a spaceflight accident occurring during the course of spaceflight activities where there was a high probability that such injury would occur, as a result of that accident

- 2.9 If a serious spaceflight accident has occurred in or over the United Kingdom, the SAIA must commence a safety investigation. If the event has been classified as a spaceflight accident but not a serious spaceflight accident, the SAIA can still initiate a safety investigation if such an investigation may be expected to benefit spaceflight safety, but is not required to do this.
- 2.10 In addition, the SAIA can, in certain circumstances, conduct a safety investigation into accidents outside the UK. These circumstances are defined in [regulation 16](#).
- 2.11 The Regulations set out in detail the powers of the SAIA and its designated inspectors. They also stipulate what actions should be taken in the immediate aftermath of a spaceflight accident and how any investigation will be carried out. The Regulations also include the duties of the SAIA, including its duty to appoint an investigator-in-charge (IIC) who is responsible for the conduct of the investigation, and for producing a report.
- 2.12 Part 7 of the Regulations sets out the sanctions that may be imposed on any person or organisation that commits an offence.

Commencement of the Act

- 2.13 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
- 2.14 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
- 2.15 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.
- 2.16 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.

Section 3: First steps after a spaceflight accident

- 3.1 The SAIA must be informed as soon as possible after a spaceflight accident in or over the UK, to allow an appropriate response and to ensure evidence can be secured and collected. The notification stage is the first part of the SAIA's involvement in a safety investigation.
- 3.2 As set out in The Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations 2021:
- a spaceflight accident means any accident that takes place during, or as a result of spaceflight activities in or over the United Kingdom, or elsewhere (if any of the circumstances referred to in regulation 16 apply)
 - a serious spaceflight accident means a spaceflight accident in the course of the operation of a launch vehicle in which an individual is fatally or seriously injured, or a spaceflight accident occurring during the course of spaceflight activities where there was a high probability that such injury would occur, as a result of that accident
- 3.3 An accident includes any fortuitous or unexpected event by which the safety of any launch vehicle or person is threatened.
- 3.4 Regulation 2 of The Space Industry Regulations also refers to "major accidents". A major accident is defined as:
"an accident arising out of or in the course of spaceflight activities or preparation for spaceflight activities that is highly likely to:
(a) cause death or serious injury to, or
(b) destroy or seriously damage the property of,
persons who are not human occupants of the launch vehicle."
- As can be seen, this covers a wider range of circumstances than the definition of a spaceflight accident and can include accidents in preparation for spaceflight activities, which may not come within the definition of "accident" for the purposes of the Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations, and may therefore not be investigated by SAIA.
- 3.5 Spaceflight accidents should be reported immediately to the SAIA's dedicated accident reporting line, available 24 hours a day, 7 days a week.
- 3.6 For a spaceflight accident in or over the UK, the SAIA must be notified without delay by any person involved who has knowledge of the spaceflight accident. Under the regulations, a person involved can be:
- any licensee
 - the owner of a launch vehicle
 - a person who designed the launch vehicle
 - a person who manufactured the launch vehicle
 - a person responsible for the maintenance of the launch vehicle
 - a person responsible for training the crew
 - a person responsible for the provision of air traffic control, flight information or range control services, who has provided services for the launch vehicle
 - a person responsible in any way for the launch or operation of the launch vehicle
 - a member of the crew

- a spaceflight participant
 - the regulator, or
 - the European Space Agency or any other national or international body involved with the spaceflight activities
- 3.7 As the definition of a spaceflight accident is generic, if persons involved are in any doubt as to whether an event is classified as a spaceflight accident, they should still notify the SAIA.
- 3.8 The police must also be notified.
- 3.9 Failure to report a spaceflight accident to the SAIA is an offence under the Regulations.
- 3.10 The obligation to notify the SAIA is important as any delay can affect evidence collection and the subsequent quality of the safety investigation.
- 3.11 When the SAIA has received a notification, it will review the information available and decide on an appropriate course of action. Depending on the circumstances, the SAIA response will range from no further action to launching a full investigation.
- 3.12 If an accident involving a UK licensee, or a launch vehicle designed, manufactured or maintained by a UK company occurs outside the UK, the licensee or any other person involved is encouraged to notify the SAIA as soon as possible.
- 3.13 Due to the nature of the spaceflight industry, it is likely that there will be an international element to an investigation. The Regulations require the SAIA to notify any state concerned in relation to the spaceflight accident. These states may have rights of participation in the investigation and may be requested to provide the SAIA with information regarding the spaceflight operation.

Required information

- 3.14 As part of the initial notification, the spaceflight operator must provide the SAIA with:
- a list of all persons on board, and
 - details of all dangerous goods on the launch vehicle
- 3.15 The list of dangerous goods is essential so that emergency services and the SAIA can take appropriate safety measures at the accident site. It must be provided immediately after the accident.
- 3.16 In this context, dangerous goods means any article or substance which is identified as such in the 2019–2020 English language edition of the [Technical Instructions for the Safe Transport of Dangerous Goods by Air](#), approved and published by decision of the Council of the International Civil Aviation Organisation. Examples include propellant on the launch vehicle and/or payload, explosives used in separation systems, and high-pressure systems.
- 3.17 The list of persons on board allows for all persons to be accounted for, and enables liaison with relatives. It is also needed to assist the emergency services. The spaceflight operator must provide this list to the SAIA within two hours of the accident

- 3.18 It is recommended that operators have this information readily available as part of pre-launch preparations. Under [regulation 43](#), it is an offence for the operator to fail to supply this information in the event of a spaceflight accident.

Unauthorised disclosure of the names of persons on board a launch vehicle is an offence under [regulation 44](#).

Preservation of evidence

- 3.19 If a spaceflight accident has occurred, priority will always be given to the saving of life with the search and rescue of survivors. However, investigators may be involved at this stage to ensure that any disturbance of evidence in the rescue phase is recorded.
- 3.20 The initial actions are to ensure, as far as possible, that all relevant evidence is preserved. This includes ensuring that:
- the accident site is preserved as much as possible, and
 - any other relevant evidence, such as documentation and recorded data, is prevented from being destroyed or modified.
- 3.21 To facilitate this, [regulation 9](#) states that until the investigator-in-charge has arrived, no-one is allowed to move the launch vehicle and/or space object involved, take samples from the site or in any way modify the state of the site. The only exceptions to this are if these actions are being taken for safety reasons, to tend to injuries, or if express permission has been given by the authorities in control of the site. The investigator-in-charge will liaise as appropriate to facilitate this.
- 3.22 Some evidence may have a short life, for example, leaking fuel or data recordings which can be overwritten. This evidence is often prioritised and is isolated and collected by the investigators on-site at the early stages. Any evidence removed for further analysis is first recorded in situ and then removed with preservation in mind. Evidence collection can take time and be hampered by on-site hazards such as dangerous cargo, flammable or toxic materials and vapours, and sharp or heavy objects.
- 3.23 As evidence may be located in a number of different sites, following a spaceflight accident, persons involved must take appropriate action to secure evidence for the investigation. This can include preserving recorded data, documentation and tracking/surveillance data at a remote site.
- 3.24 To assist with the process, licensees should include plans for the preservation of evidence within their emergency planning.

Coordination of investigations

- 3.25 In some accidents, there may be a requirement for multiple investigations. For example, if there are fatalities, a coronial inquest (or, in Scotland, a fatal accident inquiry by the Procurator Fiscal) may be required, or the police may need to investigate whether a crime has been committed. Regulation 10 makes it clear that SAIA inspectors must perform their statutory duties in cooperation with the authorities responsible for any judicial inquiry.

3.26 The SAIA will make every effort to establish and maintain liaison and cooperation with the investigating authority throughout the technical investigation. The aim is to ensure that investigations proceed in parallel without either body obstructing the other. To accomplish this, the SAIA is required to engage with relevant authorities in advance of any spaceflight accident investigation, to define how cooperation will be achieved in practice.

Judicial proceedings

3.27 Following a spaceflight accident, judicial proceedings may take place concurrently with an accident investigation.

3.28 SAIA inspectors can provide factual evidence to assist inquests and fatal accident enquiries. However, under regulation 32(8), if providing evidence on a spaceflight accident in a judicial proceeding,³ SAIA Inspectors are not required to provide an opinion on or analysis of evidence provided to them in the Court.

3.29 In judicial proceedings which seek to apportion or attribute blame or liability, inspectors are not required to provide information that they have gathered using their powers to investigate. In addition, where the safety investigation report contains information gathered using an inspector's powers to investigate, that part of the report is, under regulation 32(7), inadmissible in the judicial proceedings.

3.30 The purpose of these provisions is to preserve the necessary separation between safety and judicial investigations.

3.31 For any judicial proceedings, an application can be made to the High Court (or in Scotland the Court of Session) which may determine, after a public interest test, that inspectors shall provide the protected information that is requested, or analysis/opinion of the relevant facts.

³ "Judicial proceeding" is defined as any civil or criminal proceedings before any court, or person having by law power to hear, receive and examine evidence on oath.

Section 4: The safety investigation and inspectors' powers

The extent of a safety investigation

- 4.1 When it is notified of a spaceflight accident, the SAIA will decide whether to investigate and what the scope of the investigation should be. This will be proportionate to the severity of the event and the likely lessons to be learnt to improve safety of spaceflight activities. The SAIA may also decide it will not investigate a reported event.

The duty to investigate and powers to investigate

- 4.2 If a serious spaceflight accident has occurred in or over the United Kingdom – i.e. an accident during the course of the operation of a launch vehicle that resulted in fatalities or serious injuries, or there was a high probability that such an injury would occur – then the SAIA **must** commence a safety investigation. If the event has been classified as a spaceflight accident but not a serious spaceflight accident, the SAIA can still initiate a safety investigation, if such an investigation may be expected to benefit spaceflight safety.

Power to investigate spaceflight accidents occurring elsewhere than the United Kingdom

- 4.3 Due to the global nature of the space industry, it may be the case that a spaceflight accident occurs outside of the UK, but there are UK interests. If the launch took place in the UK, or UK authorities have jurisdiction over the designer, manufacturer or maintainer of the launch vehicle, the SAIA is entitled to investigate to ensure that any potential safety lessons can be identified to improve spaceflight safety from the UK.
- 4.4 However, if another state has initiated an investigation, the SAIA will not commence its own. This is to ensure that there is a single, focussed safety investigation.
- 4.5 The SAIA may be permitted to participate in an investigation conducted by another state. In this case, the investigating state would notify the SAIA of the accident.
- 4.6 Any individual acting on behalf of the SAIA in an investigation outside the UK must comply with the laws of the state conducting the investigation. The powers of an inspector do not apply.
- 4.7 Although not required to by regulations, any licensee who is involved in a spaceflight accident outside the UK is encouraged to notify the SAIA directly.

Assistance with UK safety investigations

- 4.8 The SAIA may request assistance from other states to progress the safety investigation. This assistance may be wide ranging from evidence gathering on the SAIA's behalf to provision of detailed technical assistance. Often, due to the sensitive nature of spaceflight activities, this assistance may necessitate provision of confidential information. Information provided to the SAIA as part of a safety investigation can be used only for the purposes of safety investigation and its disclosure is prohibited by the regulations (see [Part 5 of the regulations](#), and section 5 of this guidance).

Accredited representatives, advisers, experts and observers

- 4.9 Where another state has an interest in a safety investigation in the United Kingdom, that state may appoint an 'accredited representative' to act as a focal point for that state and help

facilitate the flow of information and assistance for the investigating authority. Where the spaceflight accident has taken place in another state, the Chief Inspector can appoint an accredited representative if requested to do so by another state.

- 4.10 Currently, there are no international conventions relating to the investigation of spaceflight accidents, so any UK accredited representative does not have any rights in relation to an investigation.
- 4.11 Both the investigator-in-charge and accredited representatives may appoint advisers to assist the investigation, based on their qualifications and professional capability, in order to assist in developing a complete and accurate factual record.
- 4.12 The SAIA can invite organisations that can provide the necessary operational and technical assistance to the investigation to appoint advisers. These organisations may include the operator, launch vehicle manufacturer, systems and powerplant manufacturer, the regulatory bodies or other relevant technical specialists. A state which is asked for assistance is entitled to appoint an accredited representative to the investigation, who may act as a conduit for providing assistance to the investigator-in-charge.
- 4.13 Where necessary, the investigator-in-charge will provide guidance for accredited representatives and advisers with respect to the scope, requirements and limitations of their involvement in the investigation.
- 4.14 The Regulations define a number of rights of participation for accredited representatives. Participation of advisers is more at the discretion of the investigator-in-charge and accredited representatives. Advisers of accredited representatives may only participate in an investigation so far as is necessary to enable the accredited representative to participate effectively in that investigation.
- 4.15 Advisers may also wish to represent the interests of their organisation. While it is appropriate that they do so, the potential for a conflict of interest may arise. Licensees are understandably eager for information, especially during the early stages of an investigation, and it is important that they are kept informed and have timely access to facts regarding the accident that will facilitate prompt preventative and / or corrective action. However, to avoid jeopardising the investigation and to ensure that only validated information is provided, neither accredited representatives nor their advisers may release any information from the investigation to their organisation, to the media, or into the public domain without prior approval from the investigator-in-charge. Unapproved release of information is an offence under the Regulations. Licensees should be aware of this and act accordingly.
- 4.16 A state that has an interest in an investigation into a spaceflight accident in the UK by virtue of fatalities or serious injuries sustained to its citizens may also appoint experts to participate in the investigation. The permitted roles of experts include assisting in the identification of victims and attending meetings with the survivors from that state. They have the right to be given information on the progress of the investigation, and any information published in relation to the investigation, such as factual information provided to associations of victims, or their relatives, or preliminary reports.

4.17 The following persons will not be permitted to participate in an investigation:

- any person representing an organisation that has interests beyond the safety objective of the investigation
- any person whose appointment would create a conflict of interest, including legal representatives or those representing insurers or claimants

Regulators

4.18 After a spaceflight accident, there may be concern regarding the continued safety of operation. Provided that there is no conflict of interest, the SAIA may invite any appropriate regulator to participate as an adviser to the investigator-in-charge.

4.19 Regulators may be able to access information gathered during the investigation, for the purposes of improving spaceflight safety. However, regulators must not release any such information to their organisation, to the media, or into the public domain without prior approval from the investigator-in-charge.

Investigator-in-charge and delegation of powers

4.20 For any investigation, the SAIA will appoint an investigator-in-charge (IIC), who will be responsible to the Chief Inspector for the overall organisation, conduct, and control of the investigation. During the investigation, the IIC is likely to require information and assistance from all licensees involved.

Inspectors' powers

4.21 Regulations grant the IIC and any other inspector involved in a spaceflight accident investigation certain powers. The purpose of the inspectors' powers is to enable them to have unhampered access to the best possible evidence as part of the investigation. These powers include:

- immediate and unrestricted access and removal rights to all relevant records and sites, including the accident site, data from recording systems, the launch vehicle, its contents and its wreckage
- access to maintenance areas, other similarly equipped launch vehicles, flight-crew training facilities, terminal facilities, flight-crew briefing areas, launch vehicle flight-decks and office facilities, wherever such access is necessary for the purposes of the safety investigation
- the power to summon for interview any witness they consider has information relevant to the investigation
- access to various documentation and records relevant to the spaceflight's operation during the course of an investigation

4.22 The IIC may choose to authorise individuals⁴ who are not SAIA inspectors to exercise some of an inspector's powers. This authorisation is to be only as far as necessary to enable the individual's successful participation in the investigation.

4.23 An inspector may not enter a private dwelling without the consent of the occupier, unless entry is authorised by a warrant issued by judicial authorities.

⁴ In this context, individuals are experts, advisors and accredited representatives.

- 4.24 On occasions, SAIA inspectors may also need to observe a routine flight, simulator training session or maintenance procedure being performed to assist in understanding the operational context of the accident.
- 4.25 Anyone who obstructs or impedes an inspector in the exercise of any duties, powers or entitlements detailed in the paragraphs above, without reasonable excuse, commits an offence under the Regulations.

Inspectors' powers to call, examine and take evidence from a witness

- 4.26 Inspectors can summon any witness they consider has information relevant to the investigation. This is to ensure the best evidence is collected as part of a thorough, independent safety investigation. Anyone failing to comply with a summons for interview commits an offence under the Regulations.
- 4.27 The sole purpose of an interview is to provide the SAIA inspector with a record of what a witness saw or heard of the accident, or knew of the events leading up to it. Interviews can be recorded by the inspector and/or the witness can be asked to sign a written statement.
- 4.28 Any details given by a witness, whether in a written statement or not, should only be used by the SAIA in its own investigation.
- 4.29 SAIA inspectors may require access to various documentation and records relevant to the spaceflight activity during the course of an investigation. These include, but are not limited to:
- operating manuals
 - training records
 - rosters
 - maintenance records and procedures
 - engineering drawings
 - safety database records
 - historic data
 - minutes of safety meetings
 - SMS manuals
 - audit reports
 - the safety cases produced by launch operator licensees and spaceport licensees
- 4.30 Licensees are expected to provide immediate and unrestricted access to any such information requested by the inspector.
- 4.31 Documents provided to the SAIA will not be made available to other entities participating in the investigation without permission from the originator. Sensitive safety information is protected from disclosure as part of the Regulations (see section 5). The SAIA also has robust procedures for handling and storing information provided, including where this is confidential or commercially sensitive.

Release of evidence to owners

- 4.32 It is inevitable that, on occasion, a safety investigation will disrupt commercial operations. The SAIA will endeavour to keep such disruption to a minimum, subject to the requirements of the investigation.

- 4.33 Any property impounded will be released promptly once it is no longer required. The SAIA will notify the property owner, who must then arrange for collection of the property in accordance with the notification.
- 4.34 If the property owner does not collect the property within a required time period, the SAIA may arrange for its destruction or disposal. The SAIA is entitled to recover any associated costs from the property owner.

Expenses

- 4.35 The SAIA is entitled to recover reasonable expenses in carrying out a safety investigation from the licensee. These expenses include (but are not limited to) costs incurred in recovering, transporting and storing evidence, costs incurred in disposal of evidence and additional time, travel and subsistence costs incurred by SAIA staff in connection with the investigation. It is the operator's responsibility to ensure they have adequate financial capital and/or insurance to cover any potential costs.

Section 5: Safety information

- 5.1 To help develop an honest and systematic reporting system, non-punitive reporting of safety related issues is encouraged. This concept also applies to safety investigations, to allow investigators to gather the best possible evidence, without anyone providing evidence being concerned as to the possible consequences.
- 5.2 In support of this, the SAIA is afforded rights during an investigation which allows them to collect the best evidence for a safety investigation. To help promote an open method of gathering information, the evidence provided to the SAIA is afforded a number of protections against disclosure, especially as some of this information may be particularly sensitive.
- 5.3 Information may be disclosed to specific parties during the investigation but solely for the purposes of improving safety. For example, if a safety issue is identified with a particular type of launch vehicle which other operators also use, they may also be informed about the issue.
- 5.4 Any technical data sourced from the United States (US) requires specific controls, and agreement is required with the US government prior to disclosure, even for safety purposes.
- 5.5 During the investigation, the SAIA may provide licensees with early sight of relevant information to ensure the ongoing safety of their operations. Licensees must not release any information from the investigation to their organisation, to the media, or into the public domain without prior approval from the IIC. Doing so is an offence.

Applications for disclosure

- 5.6 Applications for disclosure of evidence may be made to the High Court (or in Scotland the Court of Session). The courts must then carry out a public interest test and decide whether the benefits of the proposed disclosure outweigh the adverse domestic and international impact that such action may have on that, or any future, safety investigation.

Section 6: The safety investigation report and safety recommendations

- 6.1 At the end of each investigation, the SAIA must produce a final report. The content and form of the final report can vary depending on the type and circumstances of the accident or incident.
- 6.2 The report will be issued in the shortest time possible, but without compromising the quality of the investigation. If the final report cannot be issued within 12 months of the occurrence, the SAIA must publish an interim statement, detailing the progress of the investigation and any safety issues raised.
- 6.3 Reports will not name individuals involved to respect their anonymity and the requirements for non-disclosure of certain information. In addition, the SAIA will seek to protect any confidential and/or sensitive information shared during the course of the investigation.
- 6.4 Reports broadly consist of four main sections:
- factual information
 - analysis
 - conclusions
 - safety recommendations
- 6.5 The report is expected to conclude with the identification of the findings, causes and contributing factors to the accident. Not all investigations can achieve this, as it depends on the evidence available for analysis.
- 6.6 The report is produced for safety purposes only and should not be used to infer blame or liability; the report will contain a statement to this effect.

Notice of safety investigation report

- 6.7 Once the final draft of an interim or final report has been completed, the IIC must circulate the draft report to persons whose reputation may be adversely affected. This allows persons to make representations on the contents of the final draft.
- 6.8 Representations must be received within 28 days (although the IIC has the discretion to extend this period). The IIC is required to consider all representations received before the deadline, but there is no obligation on the IIC to incorporate them in the published report.
- 6.9 The draft report is a confidential document and unauthorised disclosure is an offence.

Safety recommendations

- 6.10 Safety recommendations are the means by which the SAIA publishes and communicates its concerns addressing safety deficiencies identified during an investigation, or the analysis of spaceflight safety-related information.
- 6.11 A safety recommendation can be made at any time if an immediate safety concern is identified by the investigation.

- 6.12 Each safety recommendation is addressed to the authority or person best placed to address the safety issue and must not apportion blame or liability. It will clearly identify the safety issue but will not be prescriptive how to address the issue.
- 6.13 All safety recommendations should be considered in context and alongside the factual information and analysis in the final report.
- 6.14 A safety concern identified by the investigation is normally discussed with the appropriate organisation as soon as possible, so the organisation can take safety action as soon as possible. If appropriate safety action is being taken to address the safety issue, a safety recommendation may not be required but the safety action taken would be included in the investigation report.
- 6.15 The SAIA may decide to issue a safety recommendation for an investigation for which the UK is not the investigating state. This course of action is only to be considered if the investigating authority declines to make a safety recommendation identified as necessary by the SAIA. In such circumstances the issue of such a safety recommendation must be closely coordinated with the state conducting the investigation.
- 6.16 The SAIA does not have the legal basis to enforce safety recommendations. Addressees are obliged to reply to the recommendation with their intended actions and timescales. The status is also published, including whether the responses are adequate and any proposed actions have been completed.

Other reports

Special Bulletins

- 6.17 Safety investigations can be a complex and time-consuming task. Special Bulletins are reports published during an investigation to highlight the initial facts and where appropriate make urgent safety recommendations. These reports contain facts which have been determined up to the time of publication. This information is published to inform the industry and the public of the general circumstances of accidents.

Safety Studies

- 6.18 Safety Studies can be an extension of safety investigations or topics of interest which may impact spaceflight safety. They may take place alongside an investigation, to complement a specific concern, or form a separate investigation not linked to a specific occurrence. The study may be performed in conjunction with other research bodies or industrial groups.
- 6.19 The SAIA may issue safety recommendations based on studies or analysis of a series of investigations or any other activities conducted for accident prevention purposes.

Annual Safety Review

- 6.20 The SAIA will publish an Annual Safety Review at national level which includes statistics and safety recommendation status.