UK Civil Aviation Authority

Guidance for Range Control licence applicants and licensees

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Civil Aviation Authority
Aviation House
Beehive Ring Road
Crawley
West Sussex
RH6 0YR

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Enquiries regarding the content of this publication should be addressed to:
commercialspaceflight@caa.co.uk

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Chapter 1
Introduction

1.1 This guidance document explains how to apply for a range control licence under the Space Industry Act 2018 (SIA). It tells you about how we will assess your application and how long an application can take. It also summarises the duties you will have as a range control licensee, if your application is successful.

1.2 Range control services in relation to spaceflight activities include co-ordinating activities on the range, tracking a space launch vehicle, identification and surveillance of hazard areas and issuing notifications to other airspace and marine users. You can apply for a licence to provide all the range control services defined in the SIA and the Space Industry Regulations 2021, or just some of them. You must follow the same process in each case. The only difference is in the amount of information you will be required to provide.

Requirement to obtain a licence

1.3 Under the SIA, if you want to carry out space activities, sub-orbital activities, and associated activities in the UK, you must get a licence.

1.4 There are different types of licence covering different activities.

- If you want to provide range control services in relation to spaceflight activities, then you need a **range control licence.**
- If you want 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 – then you need a **spaceport licence**.
- If you want to launch a launch vehicle from the UK (including UK territorial waters) above the stratosphere, you need a **launch operator licence**. This is for a launch that involves a vehicle launched vertically from a licensed spaceport, released from a carrier aircraft, and for suborbital spaceplanes and balloons. The same licence can cover a single launch, or a series of launches.
- If you want to return a vehicle that was launched into orbit from outside the UK to land in the UK, you need a **return operator licence.**

1.5 If you want to carry out more than one licensed activity – for example, to operate a spaceport and provide range control services – you will need to apply for separate licences for each activity.

How to get a licence

1.6 To get any of these licences, you need to apply to the CAA. We are the UK's spaceflight regulator. There is no charge for applying for a range control, spaceport, launch operator or return operator licence.

1.7 The application process is slightly different for each licence type, but there are some core requirements.

1.8 This guidance document explains how to apply for a range control licence and what information you have to provide. It also tells you about how we will assess your application and how long an application can take.

1.9 This document is written for people and organisations applying for a range control licence. Because of the link between range control activities, launch activities and spaceport operations, it may also be of interest to applicants for a launch operator or spaceport licence.

Our approach

1.10 As the regulator we enable space activities which are safe for the public, in line with UK national security and interests and meet the UK's international obligations.

1.11 To do this, we review a range of information about your organisation and the activities you want to undertake. We need to understand how you propose to provide range control services in support of spaceflight activities and how you will ensure the integrity of your proposed services. We know that there are lots of different approaches, so we examine each application individually, focusing on the outcomes you are trying to achieve and how well you demonstrate you can achieve those.

1.12 We are keen to help applicants provide the right information. So, we strongly encourage you to contact us before you apply and talk to us about your plans. In this pre-application phase, we can provide a range of support and guidance, including workshops on key aspects of the application.

1.13 Once you have applied for your licence, we are likely to ask you additional questions about your proposals. We may want to examine documentation, visit sites, see installed equipment or get demonstrations of technology and systems you propose to use. Our rights to do this are set out in the SIA and Space Industry Regulations. We will treat all information you give us as commercially sensitive.

1.14 Once you get a licence, you are responsible for ensuring your range control services continue in line with your application. You can read more about what this means in chapter 4 of this guidance.

1.15 We will conduct regular monitoring and inspections to check everything is going as planned for your range control services. We do have enforcement powers, which we can use if we have reasons to be concerned about safety or non-compliance with the Regulations or conditions on your licence.

What you need to know

1.16 This document is intended for guidance only. You should read it alongside the SIA, the Space Industry Regulations and the Regulator's Licensing Rules.

1.17 For full definitions of some of the terms used in this guidance, see the SIA and the Space Industry Regulations, in particular regulation 2. However, there are some definitions elsewhere in the SIA and Space Industry Regulations.

1.18 This guidance focuses on what applicants and licensees are required to do under the SIA and Space Industry Regulations. Depending on what activities you are planning, you may also be required to meet requirements under other laws and regulatory regimes. We can highlight which other regulatory requirements may be relevant to your activities during the pre-application phase, though we can't advise you on how to meet other regulators' requirements.

1.19 If the launches you support might affect other airspace users, there may be a need to apply for an airspace change, temporary restriction or Temporary Danger Area (TDA). Some proposals will need to be consulted on, and there may be fixed dates that determine when a change can be formally notified. Other national authorities may also need to be involved. It could take longer to successfully apply for an airspace change or restriction than for the space licence itself. The process to apply for an airspace change is managed by the CAA's Airspace Regulation Team and is set out in more detail in The Process for Changing the Notified Airspace Design (CAP1616).

Chapter 2

Applying for a range control licence: overview

2.1 The process of obtaining a range control licence will typically take six to nine months from the date we receive your application, depending on the complexity of the planned operations. This could be longer if you do not provide sufficient detail at the application stage, or there is a delay in providing any further information we request.

What you will need to do

2.2 When applying for a range control licence, you will need to:

- complete the standard application form online, including providing details of your company's legal status and financial and technical resources. This is covered in more detail in the separate guidance document, Applying for a licence under the space industry act 2018 (CAP2209)
- describe in detail the range control services you intend to provide. These will be one or more of the services shown in **figure 1**
- provide us with the information required in the technical question set relevant to the range control services you intend to offer. The technical question set is explained further in chapter 3 of this guidance
- provide a summary of your safety and quality management systems
- submit a draft cyber security strategy and draft site security programme, plus the risk assessments on which these are based
- provide information about the individuals who will be in the following prescribed roles:
  - Accountable manager
  - Range safety manager
  - Range operations manager
  - Security manager

2.3 Before starting their licensed activities launch operator and range control licensees must apply for approval of their training managers. Requests for approval can be made alongside your application

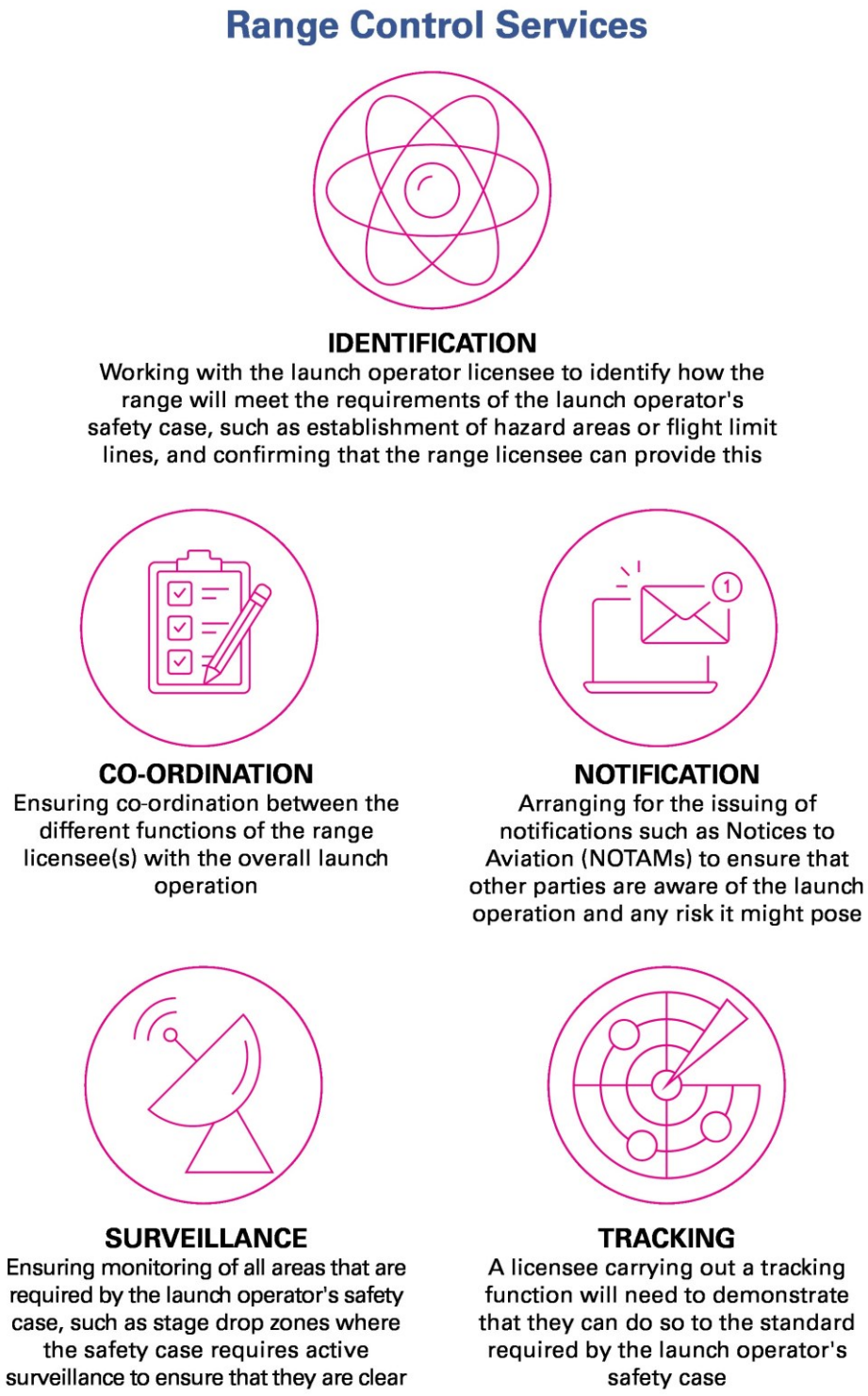

Figure 1: Overview of range control services

Choosing which services you wish to provide

2.4 When you apply for a range control licence, you need to state which of the six range control services that can be licensed under the SIA you want to apply for. These are set out at section 6(1) of the SIA and repeated here for ease:

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).

2.5 Monitoring (part (e) above) is more commonly referred to within the space industry as tracking and surveillance, as shown in figure 1. Tracking refers to tracking the path of a launch vehicle or carrier aircraft. Surveillance refers to surveillance of the areas covered by the range, such as ensuring there has been no unauthorised access to an exclusion zone.

2.6 The SIA and the Space Industry Regulations are flexible about whether you provide one or all of the services.

2.7 Since the SIA came into force, no further prescribed services have been identified. (See part (g) above).

2.8 In the application process, you need to show how you will provide the relevant services, by providing the information required in the technical question set. You don’t need to answer the questions about services you aren’t applying to provide.

2.9 If you have any queries about which services you should apply to provide, talk to us. We can explain further what is required from each service and what capabilities you would need to demonstrate. Contact us by emailing commercialspaceflight@caa.co.uk

Deciding on your operating model

2.10 Range control services are generally provided using fixed ground-based tracking and surveillance equipment stationed permanently at or near a launch site, or in other locations. However, other methods exist, such as mobile or transportable monitoring equipment, or satellite-based capability.

2.11 The Space Industry Regulations do not prescribe that range control services should take any particular form. Instead, the focus in on ensuring that a range control service provider has the necessary capabilities to support a launch.

2.12 This means that, though most applicants may specify the launch location they wish to provide range control services for, we can also grant a licence to provide range control services which are not tied to a particular launch location. If you propose to provide such services, we will need to carry out additional reviews and inspections, as part of an ongoing monitoring programme, to confirm that you have the capability to provide the services in the manner that you describe. For example, if you are licensed to provide tracking services using a transportable radar, once the site has been identified we may need to assess its capability in that location.

2.13 Similarly, it's possible for more than one range control licensee to operate from the same site at different times. For example, different launch operators might operate from the same spaceport but want to use different range control service providers. Or a launch operator may want to bring in equipment more suited to provide range control services for its launch vehicle, rather than using existing equipment located at a spaceport.

Working with other licensees

2.14 You do not need to provide a safety case when you are applying for a range control licence. However, because range control services are likely to be a key element of a launch operator's safety case (a fundamental part of the launch operator licence application), you will need to show that the services you propose to provide are of the quality and standard the launch operator needs.

2.15 It is possible to get a range control licence without identifying a specific launch or launch operator that you will provide services for.

2.16 It is also possible that more than one range control service provider could provide different range control services for a particular launch. Each must have its own licence. It's then the responsibility of each licensed provider to specify

which services they are providing and document how they will interact with the other range control service providers and the launch operator.

2.17 Where appropriate, you will also be asked to give an indication of how you would work with other licensees. However, we recognise that some of this will be dependent on the details of the launch operation, so is not necessarily available when you apply.

2.18 There is more information on how range control service providers should work with launch operators in chapter 5 of this guidance.

2.19 Launch operators can also apply to provide range control services for their own spaceflight activities. However, as range control services are a safety-critical activity, they will be required to demonstrate how the range control function retains independence from some other elements of the launch operation.

Providing additional services

2.20 Some range control service providers may also wish to provide other services which are not categorised specifically as range control services under the SIA, such as:

- providing meteorological data such as weather forecasts
- non-flight safety telemetry information
- flight termination

2.21 You won't need to submit information about any such additional services when you apply for a range control licence. However, you may be asked for details of your capability to provide these services if a launch operator's safety case relies on you performing them.

2.22 If you're considering providing additional services, we recommend you discuss this with us at the pre-application stage. We can give you an indication of what sort of information we would need from you. Contact us by emailing commercialspaceflight@caa.co.uk

Use of agents

2.23 If you are considering using an agent as a third party to carry out specific activities on your behalf, you must provide details of them in your application, including:

- a detailed description of the range control services that the agent will carry out and evidence that they are capable to carry out the activities, and
- any applicable agency contracts.

2.24 If you are using an agent, it is your responsibility to ensure the agent can provide the specified range control services or support services to the correct specification and service level agreed.

Duties after you get a licence

2.25 If you get a range control licence, there are additional things you have to do to remain compliant with that licence. These include:

- providing us with specific information relating to the launch operations you will be providing range control services for. This refers to information that was not available, or not confirmed, at the time you applied for a licence – such as how you will provide range control services specific to a particular launch, including details of notifications you are issuing in relation to that operation.
- putting in place management systems to ensure the safety, quality and reliability of the range control services you're providing.
- establishing a training programme and ensuring that all individuals involved in providing range control services have participated in it, to a level appropriate to their role, and have been assessed as being competent.

2.26 Your training manager must be approved before you can begin any of your licensed activities. We must also approve the sections of your training manual that describe the training that will be provided to the range safety manager and range operations manager.

2.27 These duties are covered in chapter 4 of this guidance.

Legislative background

2.28 Sections 5-7 of the SIA focus on range control services.

2.29 "Range" is defined in section 5 of the SIA as:

> "a zone which (or two or more zones each of which) is subject to restrictions, exclusions or warnings for keeping it clear, at the relevant times, of—
>
> (a) persons or things that might pose a hazard to spaceflight activities, and
>
> (b) persons or things to which spaceflight activities might pose a hazard."

2.30 As set out at paragraph 2.4 above, range control services are defined in section 6 of the SIA.

The Space Industry Regulations 2021

2.31 Part 6 of the Space Industry Regulations 2021 covers range control.

- Regulation 42 sets out requirements regarding the organisation, management and capability of a range control licensee
- Regulations 43 to 45 set out the agreements that a range control licensee must have with third parties, if the licensee is monitoring the range for spaceflight activities
- Regulations 46 to 48 set out the requirements relating to the identification of an appropriate range for spaceflight activities ("the designated range"), including the matters to be taken into account, who must be notified of the details relating to the designated range, the identification of hazard areas within the designated range and the surveillance of hazard areas
- Regulations 49 to 51 set out the requirement to notify certain persons and issue warning notices in connection with surveillance of the designated range
- Regulation 52 sets out a requirement for the range control licensee to establish and maintain a safety management system and a quality management system
- Regulations 54 and 55 set out some additional requirements for spaceflight operators who want to provide range control services for their own spaceflight activities, to ensure that the functions are appropriately independent.

Chapter 3

Applying for a range control licence: full requirements

Organisation and management

3.1 Regulation 42 sets out some requirements relating to a range control licensee's organisation and management. These are designed to be scalable and proportionate to the extent and complexity of the proposed range control activities.

3.2 When you apply for a range control licence, you will need to provide evidence that you have, or will have:

- the financial and technical resources to provide the services the licence would authorise
- a safety management system that identifies the hazards, risks and appropriate mitigation relevant to the services you will provide
- a quality management system that explains how you will maintain quality control and quality assurance during the operation of your range control services.

3.3 If you're applying for a range control licence in addition to a launch operator or spaceport licence, you can use a combined safety management system for more than one licence type. For example, an organisation that is both a spaceport operator and range control services provider can have a safety management system that covers both licences.

3.4 You will also need to show how you will ensure, by the time the licensed activities would take place, that you have:

- sufficient suitably qualified and experienced operating staff and a management structure proportionate to the type of services that are being provided
- facilities, infrastructure and equipment required to provide the services
- an organisation which is capable of complying with all relevant requirements imposed by regulations and gives due priority to safety in relation to the provision of its range control services
- defined operational control procedures for (among other things) maintenance of equipment, pre-operation checks and system failures i.e., loss of surveillance capability.

3.5 The types of evidence needed, and the level of detail, will depend on what services you are applying to provide. Talk to us at the pre-application stage to find out what information would be relevant to your application. Contact us by emailing commercialspaceflight@caa.co.uk

The technical question set

3.6 The technical question set is a core part of the application process for a range control licence. It's where you must explain how you will provide the range control services. Your answers may need to include:

- your overall operational approach
- details of the equipment you will use, including its heritage (where appropriate)
- the processes and procedures you will follow
- the personnel who would be responsible and their qualifications and experience
- diagrams, specification sheets and models to evidence and support your answers.

3.7 Our regulatory focus is on safety. When you are answering our technical questions, you should demonstrate your approach to managing safety-critical equipment and functions. In particular, you should identify:

- any elements of the range control system that sit on the safety-critical path and could lead to a mission failure
- their probability of failure, and what the effect of any failure would be on the mission
- what mitigation you will have in place, such as redundancy in systems for single points of failure.

3.8 You can provide the information required in the technical question set either as direct answers to the questions or by submitting the information in another documented form, such as a draft range control or operations manual. Either way, you should provide enough detail to demonstrate that you have or will have the capability to provide the range function. We may ask for more specific details depending on the information you provide.

3.9 To obtain the most up-to-date version of the technical question set, please contact us by emailing commercialspaceflight@caa.co.uk

3.10 The following sections each cover different range control services and what you are expected to show in your application, if you are applying to provide that service.

Identification of the designated range

3.11 Identifying the designated range for a particular launch activity is crucial to public safety for any spaceflight operation. It requires consideration of a number of matters, set out in regulations 46-48, to determine the extent of any zone or zones that need to be subject to restrictions, exclusions or warnings during a spaceflight operation.

3.12 Identifying the range may be solely the responsibility of the launch operator. In most cases, the launch operator's flight safety analysis will be key in identifying the range and the extent of the mitigation measures required to manage the range.

3.13 If you wish to provide services to identify the designated range for launch operations, you will need to demonstrate your capability through your answers to the relevant questions of the technical question set.

3.14 There are two ways this can be done:

- if the details of the launch operation(s) that you intend to provide services for already exist, then your answers should explain how you will identify the designated range for that operation, based on the launch operator's safety case and launch vehicle(s)
- if the launch operation has not yet been identified, you should base your answers on a hypothetical launch operation and vehicle that is representative of the type of operation you wish to provide services for.

Example questions from the technical question set for Identification

- What is your concept of operations for identifying an appropriate range?
- What are the objectives and rationale of the identification function?
- Who will be involved in the identification process and what will their tasks be? Will any third parties be involved?
- What key processes will be involved?
- What methodology will be used to identify an appropriate range?
- Will hazard areas be identified for land, sea and air?
- What risk criteria will be used to define the boundaries for each zone?

- Will any non-spaceflight activity take place within an identified hazard area?
- What data sources (air traffic, shipping traffic, population data etc) will be used?

3.15 You also need to explain how you would identify any hazard areas within the range and describe how you will manage them. Hazard areas are classified into three categories:

- exclusion zones, where active measures must be taken to ensure that no-one enters the area during the spaceflight activity
- warning zones, where measures must be taken to clearly identify the area to people who might enter it and warn them of a hazard
- restriction zones, where some people may be permitted to enter, such as range control service provider personnel, but others must be excluded.

3.16 The Space Industry Regulations make clear that that it is the **range control licensee**'s responsibility to ensure that any such zones are protected.

3.17 In deciding whether to grant a licence, we will assess your capability to identify the designated range based on your answers to relevant questions.

3.18 However, identification of the range for any operation can only be defined once the details of the operation are confirmed.

3.19 Your answers should highlight which aspects of your identification service would be dependent on the confirmed details of the operation and which aspects would be the same throughout (e.g., personnel, equipment, etc.)

Notification

3.20 To minimise the risks associated with a spaceflight operation, it will be necessary to notify other users (and potential users) of the area covered by the range, to inform them when and where the operations are taking place and what restrictions are in place as a result.

3.21 This service can be provided by a range control licensee:

- issuing notifications itself, or
- providing information for a third party to issue them, such as an air navigation service provider.

3.22 Regulations 49-51 explain who must be notified, what information must be provided and by when. Depending on where the hazard areas are, you may need to notify users of airspace, the sea or areas of land.

3.23 If you want to provide notification services, you will need to demonstrate your capability through your answers to the relevant questions of the technical question set.

Example questions from the technical question set for Notification

- What is your concept of operations for identify and issuing notifications?
- What are the objectives and rationale of the notification function?
- Who will be involved in the notification function and what will their tasks be? Will any third parties be involved?
- What key processes will be involved?
- How will you identify key stakeholders (land, sea and air) that should be notified?
- How will the key information that needs to be notified be identified for each stakeholder?
- How will the method for notification be identified for each key stakeholder?
- How will the timeline for notification be identified for each key stakeholder?
- Will any stakeholder need to receive notifications in real time e.g., notification of a launch failure?
- Will there be a process in place to ensure notified stakeholders have received and acknowledged the notification where this is appropriate?

3.24 The launch operator licensee's safety case should determine where and when notifications need to be issued for each launch. So, if you're applying to provide this service, you need to show you have the capability to issue suitable notifications, on time. To do this, you should use your answers to the technical questions to explain how you will identify who needs to be notified, what systems and procedures you will use to issue notifications and how you will verify that notifications have been received.

- For local authorities and emergency services, the method and timing of notification, and the detail required, will differ from location to location. In your application, you should explain how you will identify the required bodies, contact them, and understand their requirements. If you already know what launch operations you are seeking to support, we expect to see evidence that you have already begun this process.

- For owners or occupiers of the land, notifications must be issued at least four weeks before an intended operation. We will look for evidence that you have determined how you will identify the appropriate people and what means of communication you will use.
- For people unconnected with the launch operation, we will want to see evidence that you have a plan for issuing appropriate notifications, such as using relevant websites, social media, local media etc.

3.25 It is recommended that, where possible, you use existing, established systems to notify people such as Notices to Aviation (NOTAMs) and Notices to Mariners (NOTMARs) and provide information in the appropriate format. However, there aren't established systems for all of those who need to be notified. You may be able to draw on best practice in other range control operations globally.

3.26 Appendix A gives examples of notifications.

Notifying foreign governments

3.27 If any part of the identified range falls in the territory or territorial waters of a foreign country, it is essential that the relevant authorities in that country are informed. In some cases, government-to-government agreements will be required and agreements at the operational level. Agreements between governments will be managed by the Department for Transport. If any part of the identified range of operations you intend to be responsible for will, or is likely to, fall in the territory or territorial waters of a foreign country, you should set this out in your application.

Surveillance

3.28 Surveillance refers to surveillance of the areas covered by the range, such as ensuring there has been no unauthorised access to an exclusion zone.

3.29 If you are also providing such surveillance, you must explain how you will do this through your answers to the relevant questions of the technical question set.

3.30 As set out at paragraphs 4.6 to 4.7 of this guidance, as part of the identification of the designated range for a spaceflight operation, range control licensees are required to identify which areas of the range will be identified as hazard areas, and how these hazard areas are to be managed. Typical measures might include:

- physical measures such as patrols, barriers, or road closures to protect areas where this is possible

- surveillance to protect other areas, such as areas of sea or airspace, so that if these areas are in danger of being breached before or during a spaceflight activity, you can alert the launch operator and other relevant parties immediately.

3.31 As well as explaining the measures you would use, you will also need to demonstrate how you would put those measures in place, conduct surveillance and address any potential breaches.

Example questions from the technical question set for Surveillance

- What is your concept of operations for surveillance?
- What are the objectives and rationale of the surveillance function?
- Who will be involved in the surveillance function and what will their tasks be? Will any third parties be involved?
- What key processes will be involved?
- What equipment and systems will be used, where will it be located, what will the suitability, capability and reliability of the equipment and systems be?
- What boundary control will be required for areas under surveillance?
- What will the thresholds of intrusion be that need to be communicated and acted upon?
- What will the process be for managing and reporting intrusions for areas under surveillance?

3.32 The level of surveillance and levels of restriction will depend on the details of the launch operation, which are unlikely to be confirmed at the time you're applying for a range control licence, we will want to understand how you would manage hazard areas on the ground, in the air and at sea.

3.33 IMPORTANT: Some areas may also require measures to be in place for security reasons, in addition to, or instead of, safety. For further guidance on this, see the Guidance on security matters for applicants and licensees (CAP2217).

Tracking

3.34 Tracking refers to tracking the path of a launch vehicle, carrier aircraft or space object during its flight.

3.35 If you want to provide tracking services, you will need to demonstrate your capability through your answers to the relevant questions of the technical question set.

Example questions from the technical question set for Tracking

- What is the concept of operation for the tracking function?
- What are the objectives and rationale of the tracking function?
- Who will be involved in the tracking function and what will their tasks be? Will any third parties be involved?
- What key processes will be involved?
- What equipment and systems will be used to track launch vehicles?
- Where will equipment be located, what will the suitability, capability and reliability of the equipment and systems be?
- What will the process to communicate any failure to adhere to planned trajectories be?

3.36 In terms of equipment, you should set out detailed technical information including:

- the overall operational concept, explaining what outcomes the system aims to achieve and why you have chosen this concept and the selected equipment
- details of the tracking equipment you plan to use and where it will be located
- the maximum and minimum capabilities of the equipment, including accuracy and latency
- any software that is used as part of the system, with details of where it has been used in similar situations in the past, and the experience that proposed range control personnel have in using this software
- any inputs or assumptions that the capability of the system is dependent on, and an analysis of external factors which may affect these capabilities, such as meteorological conditions or geographical features
- the compatibility the tracking equipment has with different types of launch vehicles, identifying the technique(s) to be used and any differences of interface.

3.37 For all major systems, you should provide details of verification and validation, including the test methods, approach to verification by analysis and the calibration plan. If you are proposing to use systems that are readily commercially available, you may wish to provide suitable evidence from the

supplier of any other relevant licences held (e.g., Ofcom for spectrum compatibility.)

3.38 Graphics to display coverage areas can be useful. However, if you're including graphics, you should also explain the analysis you have used to inform them – for example, link budget analysis or using the radar equation in some form of integrated model which considers vehicle aspects, and any relevant assumptions.

Co-ordination

3.39 The technical question set for co-ordination assesses how the different range control service functions and systems will be integrated to provide the overall range control service.

3.40 As set out in chapter 2, it is also possible that more than one range control service provider could provide range control services for a particular launch. If you envisage working in this way, you will also need to explain how you will interact with other licensed range control service providers and how the co-ordination range control service will function.

3.41 We recognise that some of this will be dependent on the details of the launch operation, so is not necessarily available when you apply. In your application, you should clearly indicate where matters are dependent on the launch operation.

Agreements with relevant authorities

3.42 If you are providing tracking and/or surveillance, you will be required to work with relevant authorities and have the appropriate agreements in place, depending on the location of the range (see regulations 43-45). The relevant authorities include:

- appropriate air navigation service providers (ANSPs) responsible for managing airspace within the range
- The Marine and Coastguard Agency, or other appropriate management organisation having responsibility for UK territorial waters within the range
- The UK Hydrographic Office.

3.43 In your application, you will need to explain how you propose to engage and co-operate with these relevant authorities, addressing:

- how you will ensure that they have sufficient time to put measures in place to fulfil their own responsibilities, for example the establishing of danger areas in the airspace

- how you will communicate with the relevant authorities during your operation, including details of the equipment you intend to use. For example, you may need to be in real-time contact with the ANSP responsible for the airspace, to ensure that up-to-date information about aircraft in the area is available.

Example

If you were intending to provide range control services for launches from the north of Scotland, you would need to contact the ANSP responsible for that region, well in advance of any launch. You would not be responsible for operational management of the airspace, but you would need to work closely with the ANSP to ensure that it is provided with the right information about the launch, at the right times, to allow the airspace to be managed safely.

You would be expected to meet with the ANSP to establish the procedures for their co-operation, and agree and document relevant steps such as:

- what measures will be in place to manage the airspace, such as the establishment of Temporary Danger Areas
- the timings and geographical boundaries of these areas.

Specific roles

3.44 Under section 18 of the SIA, licensees must have suitably qualified people in specified roles. For a range control licence, these roles include:

- range safety manager
- range operations manager, and
- accountable manager.

3.45 When you are applying for a range control licence, you must provide details of the individuals you have appointed, or are intending to appoint, to these roles. This includes information about their qualifications and experience, as well as confirming they meet the eligibility criteria set out in regulations 5 and 6.

3.46 To help you appoint the right people for these roles, we set out the core functions of each role below.

3.47 The **range safety manager** is responsible for:

- the day-to-day development, administration and maintenance of an effective safety management system
- examining all aspects of the range control licensee's activities, to ensure that they are carried out safely, and

- monitoring those involved in the range control licensee's activities to ensure compliance with the licensee's safety policies and procedures.

3.48 The **range operations manager** is responsible for ensuring that licensed activities are properly and safely undertaken in accordance with the range control licence.

3.49 The range **accountable manager** is responsible for establishing and maintaining an effective management system, and for ensuring that the range control licensee's licensed activities can be financed and carried out in accordance with the provisions of the SIA and the Space Industry Regulations.

3.50 In addition, range control licensees must appoint a **training manager** before you start your licensed activities (though not as part of your licence application). We have to approve this person as part of assessing your application. Regulations 61-65 cover the role and functions of the training manager and what information we consider when deciding whether to approve them. and what information we consider when deciding whether to approve them. When applying for approval of the training manager, you must submit a written statement setting out of the matters for which the training manager is to be responsible and their suitability for the role.

Security

3.51 When applying for a range control licence, you are required to submit:

- a draft security programme where applicable, based on a security risk assessment
- a cyber security strategy for the proposed operation, and
- details of a nominated security manager, responsible for the implementation of security measures.

3.52 The extent and detail of your risk assessment should be appropriate and proportionate to the risks identified with the activity taking place. We can provide more guidance on this at the pre-application stage.

3.53 We recognise that some of these details will depend on the launch operation. That is one reason why you are asked for a draft security programme, and proposals for security restricted areas, which can only be designated by Secretary of State.

3.54 Your proposed security restricted area or areas must include areas where mission management or range control services require restricted access. This could include the mission management control room, plus any facilities or equipment designated for range control services, including where tracking systems, surveillance systems, telemetry systems and meteorological equipment

is located. Your draft security programme should set out how you intend to keep these secure.

3.55 Regulation 174 sets out specific requirements around access control to both restricted and controlled areas. These include requirements to:

- ensure that these areas are clearly defined and signposted
- ensure that access controls are in place at all times, including for authorised persons to wear identification at all times in such areas
- prevent any prohibited articles (see regulation 176) from entering the area.

3.56 Your security programme should also consider the security arrangements for the use of mobile or transportable monitoring equipment that might be located outside the restricted areas and how security will be managed.

3.57 In your application, you must also provide information about the person you propose to appoint as security manager and provide details of their qualifications and experience. As well as meeting the basic eligibility criteria (see regulations 5-6), the security manager must have a level of security clearance regarded as appropriate by the UK Government for persons performing such a security function.

3.58 Regulation 169 sets out the responsibilities of the security manager. These include acting as the focal point for the security programme and managing the development, administration, and maintenance of an effective security operation for the licensee, with responsibility for physical, personnel and cyber security.

3.59 There is more information on security requirements in Guidance on security matters for applicants and licensees (CAP2217) and Guidance on Cyber Security Strategies for applicants and licensees (CAP2535).

Granting a licence

3.60 If your application satisfies all requirements, your case manager will present the conclusions to our space leadership team. Our Head of UK Space Regulation makes the final decision on any licence application and proposed conditions.

3.61 After we've completed our assessment, we check if the licence conditions are contrary to the interests of government departments and other agencies. This is a statutory consultation and it will take four weeks. You will also have the opportunity to comment on the proposed conditions at this stage.

3.62 If there are no objections from the statutory consultation, we then must get consent from the Secretary of State to grant the licence.

3.63 We will write to you to inform you of our decision.

3.64 If your licence has been granted, you will be sent the licence (electronic or paper format). The licence will set out any conditions we have placed on the licence. We will also provide written reasons for including those conditions.

3.65 We will also send you a reporting plan to support our ongoing monitoring of your licensed activities. The reporting plan will detail what information you are required to send us and when. This is in addition to general reporting requirements under the SIA and Space Industry Regulations. Further details of these general reporting requirements and the other duties you will have as a licensee are set out in our separate guidance document Working with the regulator as a licensee under The Space Industry Act 2018 (CAP2214).

3.66 If your application has been refused, we will write to you to confirm this and explain why. Under section 60 of the SIA and Schedule 10, you can appeal against:

- a decision to refuse an application for a licence
- a decision to grant a licence subject to conditions.

3.67 The Space Industry (Appeals) Regulations apply in such cases. For further details, see the separate document Guidance on appealing decisions made under the Space Industry Act 2018 (CAP2216).

Chapter 4

Duties of a range control licensee

4.1 As examined in chapter 3, in most cases, range control licence applicants will not know all the details of the launch operations they are providing services for when they apply for a licence. Therefore, once you have a licence, you are required to provide us with further information about those operations and evidence that you are acting in line with your licence and any conditions on it. When we grant you a licence, we'll send you a reporting plan that sets out the minimum information you are required to send us, and when.

4.2 In addition, there are some duties that only come into effect after you have a range control licence. These relate to:

- putting in place management systems to ensure the safety, quality and reliability of the range control services you're providing
- training.

4.3 In addition, there are some duties that apply to all licensees under the SIA and the Space Industry Regulations. These can be summarised as:

- providing information to us, so we can fulfil the UK's international obligations to supervise space activities under our jurisdiction
- keeping records of, and in relation to, licensed activities
- reporting occurrences.

4.4 These latter duties are covered in the document Working with the regulator as a licensee under The Space Industry Act 2018 (CAP2214).

4.5 If you don't fulfil any of these duties, we can take enforcement action, that could result in you being prevented from conducting the activities you are licensed to carry out. More details on the action we can take is included in our Spaceflight enforcement policy (CAP 2987)

Identification of the designated range

4.6 If you are providing this service, once you have the details of the launch operation you are identifying the designated range for, you must:

- identify the designated range, considering the matters set out in regulations 46-48

- identify all areas of land, sea and airspace within the designated range and locations of relevant facilities and equipment
- provide written details of the designated range to:
  - the launch operator
  - the spaceport
  - us.

4.7 In addition, you must identify hazard areas within the designated range and categorise them as:

- exclusion zones
- warning zones, or
- restriction zones.

4.8 You must determine how each of these zones will be managed, and provide full details to:

- the launch operator
- the spaceport
- the appropriate ANSP for the airspace within the designated range
- His Majesty's Coastguard, for any UK territorial waters within the designated range
- the UK Hydrographic Office, and
- us.

4.9 **IMPORTANT:** If part of your plan for managing an exclusion zone or warning zone is to prevent other airspace users from using it, you may to need to apply for an airspace change, temporary restriction or Temporary Danger Area (TDA). Some proposals will need to be consulted on, and there may be fixed dates that determine when a change can be formally notified. Other national authorities may also need to be involved. It could take longer to successfully apply for an airspace change or restriction than for the space licence itself. The process to apply for an airspace change is managed by the CAA's Airspace Regulation Team and is set out in more detail in CAP1616 Airspace Change.

Notifications

4.10 If you are providing a notification service, once you have the details of the launch operation, you must:

- **either** prepare and issue notifications, in line with regulations 49-51
- **or** provide the relevant information to the designated third party that is responsible for issuing the notifications.

4.11 The notifications must be issued to the relevant local authorities, emergency services and to us, in the format each specifies, giving the advance notice each party requests.

4.12 Notifications to landowners and occupiers must be issued at least four weeks before the planned launch.

4.13 If you are responsible for surveillance of any area of the range designated as a warning zone, you must also issue warning notices.

Surveillance

4.14 If you are using surveillance to monitor an exclusion or restricted zone and providing real time information regarding unauthorised entry into that zone, you must put in place processes and procedures to:

- identify any unauthorised access to such a zone
- take appropriate action, such as to stop the incursion into the zone, or delay launch activity.

Agreements with relevant authorities

4.15 As set out at paragraph 3.42, anyone providing tracking and/or surveillance, will be required to put in place agreements with relevant authorities – such as an air navigation service provider – before and during a spaceflight, and to provide those relevant authorities with key information. (See regulations 43-45).

4.16 Once you have a licence, you will be required to work with these organisations, so that:

- they are fully informed about the services you will be providing and the operations you will be supporting.
- they are confident that you have an effective and reliable means of communicating with them during the operations, if required.

4.17 We can ask you for information about how you have engaged with relevant authorities. We can also ask them if they are satisfied with the way you have engaged with them.

Management systems

4.18 As set out in paragraphs 3.1-3.4, when you apply for a range control licence you need to provide information about how you will ensure you have the staff, facilities and organisational structure to deliver the range control services.

4.19 Once you have a licence, before you provide any of the licensed services, you must demonstrate that you now have:

- sufficient suitably qualified and experienced operating staff and a management structure proportionate to the type of services that are being provided
- facilities, infrastructure and equipment required to provide the services
- an organisation which is capable of complying with all relevant requirements imposed by regulations and gives due priority to safety in relation to the provision of its range control services.

4.20 You must also be able to demonstrate that you are operating in line with your safety management system and quality management system. Please ask us for further details of the safety management system and quality management system requirements for range control licensees.

Appointment of relevant individuals

4.21 Once you have a licence, you must notify us of any proposed changes to people appointed in the specific roles detailed in chapter 3 (range safety manager, range operations manager, accountable manager, training manager and security manager).

4.22 These should be the people we approved as part of your application. If for any reason you can no longer appoint any of them to the roles, you will need to inform us. Once people are appointed to these roles, you are responsible for ensuring that they:

- have the required qualifications, skills, experience, and competencies for the role (regulation 58(2)(a))
- have received training which satisfies the criteria specified in regulation 56(2) and otherwise complies with Part 7 (regulation 58(2)(b))
- are medically fit to perform their assigned duties. (regulation 58(2)(c))

Training

4.23 Before you can start licensed activities, we must approve your training manager and relevant sections of your training manual.

Training programme and training manual

4.24 Once the training manager is appointed, they are responsible for establishing and maintaining a training programme that provides appropriate training for individuals carrying out licensed activities. The minimum requirements for the training programme are specified in regulation 69.

4.25 Once this is established, you must:

- ensure that all employees have participated in the training programme, including receiving instructions on safety appropriate to their role, and have been assessed as being competent.
- compile and keep up to date a training manual, which complies with the relevant elements of Schedule 3 Part 2 of the Regulations.
- put in place a training management system and keep records related to training.

Training manual

4.26 The training manual will document the training programme. Schedule 3 Part 2 of the Regulations sets out the information that must be in the training manual.

4.27 Before you start your licensed activities, you must provide us with the sections of the training manual that describe the training that will be provided to the range safety manager and range operations manager. These sections must address the specified training criteria set out in Part 1 of Schedule 3 of the Regulations (paragraphs 22 to 29).

4.28 We must approve the relevant sections of the training manual, before you can start the licensed activities. This is in addition to the requirement to seek approval of the training manager.

4.29 You can apply for these approvals when you apply for a licence, or once you have a licence.

4.30 You don’t have to send the complete training manual for approval. If you send us the complete manual, you must list or clearly mark the relevant sections. However, we can ask to see the training manual, as part of assessing your application.

4.31 You must also ensure that ensure individuals are medically fit to perform assigned duties. However, there is no requirement for range control service provider staff to hold a medical certificate.

Security and cyber security

4.32 Once the security manager is appointed, they must keep your security programme maintained and up to date in response to any material changes of operations, or incidents that occur that require changes to be made to the programme.

4.33 'Material changes' include getting details of the specific launch operation you are providing range control services for and confirming the location from which you will be providing range control services. At this point, if you were not able to do so in your application, you will need to:

- conduct a further security risk assessment, or review the original one
- supply us with a site plan, showing proposed restricted areas.

4.34 The security manager should review the security programme and the security risk assessment on which it was based on an annual basis, from the date the licence has been granted, to ensure that any changes during the year have been captured. They should then provide us with a copy of the most up-to-date version.

4.35 Similarly, once you have a licence, you must put in place the cyber security strategy that you proposed as part of your application, including providing staff with cyber security training.

4.36 You must also review the cyber security strategy and cyber security risk assessment on which it is based on an annual basis and provide us with a copy of the most up-to-date version.

Chapter 5

The range control licensee's role in the launch operation

5.1 Range control services are a pivotal part of delivering safe space launches. They also help to mitigate the risks posed by the launch. They are therefore a key element of a launch operator's safety case.

5.2 This means that as a licensed, or prospective, range control service provider, you are likely to need to engage closely with licensed, or prospective, launch operators to give them information about the services you can provide and agree relevant procedures and processes.

Information that you may need to provide in support of an application for a launch operator licence

5.3 When they apply for a licence, prospective launch operators must provide details of the range control services that will be needed for the proposed spaceflight activities. These will be based on their underlying flight safety analysis. As well as describing what range control services they will need, applicants for a launch operator licence will also have to define appropriate performance standards for those services.

5.4 The range control licensee is responsible for ensuring that the services it provides are provided safely, and to the standard required by the launch operator licensee's safety case.

5.5 A range control licensee (or prospective range control service provider) is also likely to need to provide information to the applicant for a launch operator licence, at the application stage. For example, in carrying out the flight safety analysis, the applicant for a launch operator licence must take into account their, and any proposed range control service provider's, capabilities in tracking, telemetry and communications. They must also consider how any flight safety system will be activated if its activation is necessary and how they will coordinate and communicate with air traffic control service providers, meteorological information providers and emergency services.

Information that you may need to provide after a launch operator licence has been granted

5.6 Once a launch operator has been granted a licence, they must produce a safety operations manual, which contains the information, procedures and instructions necessary for staff involved in the spaceflight activity to carry out their duties.

Some of these duties will include co-ordination and communication with range control facilities and range control licensee personnel.

5.7 For example, the safety operations manual will include details of procedures involving the range control licensee when:

- deciding to commence a launch, and
- during each phase of the flight of a launch vehicle (e.g., tasks where range control licensee personnel will play a key role such as range clearance or range monitoring).

5.8 The safety operations manual must also record any tasks the range control service provider will undertake in relation to engaging with other organisations, such as liaising with the ANSP during the operation to ensure that airspace restrictions are being complied with.

Determining which licensee is responsible for which aspects of an operation

5.9 It is up to you and the launch operator to agree which of you is responsible for different aspects of an operation. The Space Industry Regulations do not set out a specific point at which the range control licensee's responsibility ends (e.g., once the launch vehicle has reached a certain altitude or a certain phase of the mission). This is because this will vary between missions and be dependent on the characteristics of the launch and launch vehicle.

5.10 It is particularly important to determine which organisation is responsible for flight termination. Under regulation 89, if a launch operator intends to use a launch vehicle with a non-autonomous flight safety system, it must appoint flight termination personnel. Regulation 100 sets out that the launch operator must monitor the flight of a launch vehicle in real time, so that it is aware immediately if that vehicle malfunctions. The same regulation also sets out parameters in which the appointed flight termination personnel must make a decision to terminate the flight.

5.11 However, in practice, the range control licensee may employ the flight termination personnel rather than the launch operator. For example, if the range control licensee's equipment is being used to track the launch vehicle and transmit the termination signal, their personnel may be most qualified to fill this role.

5.12 Whoever is responsible:

- the flight termination personnel must receive the required training described in Schedule 3 of the Space Industry Regulations, and

- the launch operator must set out instructions and procedures for flight termination in its safety operations manual.

Changing range control services providers after a launch operator licence is granted

5.13 Applicants for a launch operator licence are required to provide details of how range control services will be provided as part of their safety case. This will typically include details of the range control service provider they intend to work with.

5.14 If a launch operator licensee decides to change to a different range control service provider after the launch operator licence has been granted (for example, because their proposed provider's licence application was unsuccessful), the launch operator licensee must review and revise its safety case.

5.15 To support this, the new range control service provider will be required to provide any such information we deem necessary so we can assess whether the services it provides will meet the requirements of the safety case.

Ensuring compatibility of equipment and procedures

5.16 Range control licensees should consider any elements of another licensee's operation which could affect its ability to provide its services, including:

- technical issues, such as use of radio frequencies or locations of key equipment
- procedural issues, such as ensuring external organisations are aware who is operating the range and who the points of contact are
- relationships with other licensees involved in the launch or return operation, such as ensuring alignment of safety management systems.

APPENDIX A: Example notifications

These example notifications are provided to indicate the kind of information a range control service provider will be expected to include.

Example 1: Notice to Aviation (NOTAM)

The following is a generic example of the expected types of information to be included in the NOTAM which should be communicated through the appropriate and identified channels. This includes both through the national NOTAM channels and through other communication channels as identified in the notification planning.

The expected format and content of a NOTAM is dependent upon the proposed activity. However, as a minimum, it should include a description of the activities to be conducted, the identified hazard areas, the expected timings of activation of these areas and contact details for the range control service provider. An example of this may be as follows:

A. Launch Site Name

B. Launch Site Location. Lat/Long (degrees & decimal minutes).

C. Activated Co-ordinates Lat/Long (degrees & decimal minutes) From *time/date local

D. Activated Co-ordinates Lat/Long (degrees & decimal minutes) To *time/date local

E. Description of launch vehicle expected trajectory. Generic Activity Description. Range Contact Details xyz@email.com / Phone Number / Radio Frequency on Day

It is anticipated that any NOTAM will be issued as far in advance of launch as possible.

We can provide more details on what should be included in a NOTAM.

Example 2: Radio Navigational Warning and Notice to Mariners

The following is a generic example of the expected types of information which will need to be included in the Radio Navigational Warnings and Notice to Mariners.

The expected format and content are dependent upon the proposed activity. However, as a minimum, it should include a description of the activities to be conducted, the identified hazard areas, the expected timings of activation of these areas and contact details for the range control service provider. An example of this may be as follows:

A. Launch Site Name

B. Launch Site Location. Lat/Long (degrees & decimal minutes)

C. Activated Coordinates Lat/Long (degrees & decimal minutes) From *time/date local

D. Activated Coordinates Lat/Long (degrees & decimal minutes) To *time/date local

E. Description of launch vehicle expected trajectory. Generic Activity Description (with an image on a nautical chart). Expected impact on shipping. Range Contact Details xyz@email.com / Phone Number / Radio Frequency on Day

Radio Navigational Warnings and Notices to Mariners should be communicated through the appropriate and identified channels at least two months in advance of any restrictions coming into effect.

For more details of what is required in Radio Navigational Warnings and Notices to Mariners, contact the Maritime and Coastguard Agency.