Department for Transport

Department for Business, Energy & Industrial Strategy

Civil Aviation Authority

UK SPACE AGENCY

UNLOCKING COMMERCIAL SPACEFLIGHT FOR THE UK

Space Industry Regulations Consultations: summary of views received and the Government's response

Date of issue: 5 March 2021

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Ministerial Foreword

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It was once said that space was the final frontier. On 12 April 1961, Yuri Gagarin became the first human to travel in space. The traditional space sector is changing, and today we move a step closer to making space accessible to all human beings – to making that final frontier a new region for growth and prosperity for the whole of the United Kingdom. We stand at the dawn of an exhilarating new era that will forever change our relationship with space to the benefit of all, as we enter a period of unparalleled opportunity for growth.

Space is fundamental to the UK; it enables the defence and security of our nation, and empowers our society. It can help us to improve our everyday lives; from monitoring traffic, to providing GPS guidance on our phones and helping us tackle some of the biggest issues facing us today, such as climate change.

The UK is a global leader in innovation and emerging technologies, and our space industry is already a success story – a story of invention and innovation, of enterprising spirit and global ambition. We already have a well-established and globally respected space sector, and this government is committed to continue growing this exciting industry and to set the direction for the future by creating highly skilled jobs and opportunities right across the UK, levelling up our economy and attracting new ideas and industry to keep the UK at the forefront of this incredible growth sector.

In the latter half of 2020, we sought views from the public and from industry on our new regulatory framework that will enable commercial space launches to operate from the UK. The publication of this response to those consultations sets out the next steps we are taking to bring this legislation into force, and how we will continue to forge the path of cementing our world-leading sector – building on the UK's leading small satellite industry, bringing new markets to the UK, and inspiring the next generation of British space scientists, engineers and entrepreneurs across all four corners of our nation.

The Government has a vision of enabling a thriving commercial spaceflight market within the UK. Our aspirations are not modest, and the Government and industry have set a bold target to grow the UK's share of the global market to 10 per cent by 2030. In order to support this, our spaceflight programme aims to establish commercial vertical and horizontal small satellite launch from spaceports around the UK. The cornerstone of this ambition is the legal and

regulatory framework we have created. As one of the most modern in the world, this regime has been designed from the outset to be flexible and to support commercial operations, driven by the exciting new opportunities and innovations which abound in the space sector.

The UK's space sector will strengthen our national capabilities, create high-skilled jobs and drive economic growth across the UK. This new regulatory framework will support safe and sustainable activities that will drive research, innovation and entrepreneurship, exploiting the unique environment of space, while ensuring that public safety is at the heart of our regulatory approach. With the inherent flexibility of the Regulations we will be putting in place, the sky will no longer be the limit when it comes to UK ambitions in this sector.

We would like to thank all of those who contributed views during this consultation and look forward to building this space-faring future together.

Executive summary

1.1 As set out above, in summer and autumn 2020, the Government ran two consultations on the draft regulations and guidance material that will provide a framework for commercial space launches to take place from the UK.

1.2 The feedback received was largely positive, with respondents supporting the overall regulatory approach and, in particular, the flexibility offered to applicants in how they meet the requirements.

1.3 Respondents also provided a number of constructive suggestions to clarify some regulatory requirements and aspects of terminology. These are detailed within this response document and the regulations and guidance will be updated in the majority of the instances identified.

1.4 Respondents identified areas where they wished for greater alignment between the requirements for different licence types, and between the new regulatory regime under the Space Industry Act 2018 (SIA) and the principles of the existing regulatory regime for orbital activities, under the Outer Space Act 1986 (OSA).

1.5 The OSA has a traffic light system to provide early advice to applicants about whether their applications would meet acceptable risk thresholds. The consultation sought views on whether a similar system would be beneficial to applicants for orbital operator licences under the SIA. The majority view was that this would be beneficial, so the Government will introduce an optional traffic light system for these applications. It should be underlined that a positive indication under the traffic light system does not guarantee that an application will be successful, and also that applicants for all licences under the SIA are encouraged to engage with the regulator from an early stage, whether they wish to use the traffic light system or not.

1.6 To assist prospective orbital operator licence applicants to understand how the OSA and the new regime under the SIA relate to one another, the Government will arrange an additional plenary session.

1.7 Another area where respondents identified a need for greater alignment was between the safety requirements for spaceport and launch operator licences. Reflecting this, the safety requirements for each licence type will be reviewed to ensure consistency of terminology. In the draft Space Industry Regulations (“the Regulations”), there were separate schedules (Schedule 4, for spaceflight operators, and Schedule 6, for spaceports) setting out the safety management system requirements for the different licence types. These will now be combined into a revised Schedule 4, which also includes new criteria relating to ‘human factors’.

1.8 Many respondents also felt that the spaceport and launch operator licensees should share relevant safety information. The Government supports this, and encourages co-operation between licensees; however, it will not make it mandatory for licensees to share their safety cases. The rationale for this decision is set out in section 4 of this response.

1.9 Another area for co-operation between licensees relates to conducting rehearsals of launches. In line with the feedback from respondents, requirements for rehearsals will be expanded.

1.10 Two other aspects of the Regulations relating to launches received significant feedback. Firstly, several respondents indicated they were uncertain whether the Regulations permitted launches from a ship. The Government has sought to clarify the position in section 3 of this response. In brief, the Government wants to enable the licensing of launch activities from a ship, subject to other conditions being met, and will provide further guidance on this.

1.11 Secondly, several respondents raised concerns about the requirements for launch operator licence applicants to provide details of payloads. The core of these concerns was that the payload may not be known at the time of application. In response to this, the Regulations will be adjusted to clarify that information on payloads is only required if the payload is known. If the specific payload is not known, applicants will be expected to provide information about the intended class of payload.

1.12 A range of feedback was received in relation to the training requirements set out in the draft Regulations. A common view was that the scope of training should be extended, with a particular emphasis on 'human factors'. Reflecting the feedback received, the Regulations will be amended to make it mandatory for all persons who participate in licensed activities to be provided with initial training. There should then be additional training for those who perform a specified role or act in a specified capacity; the Regulations and guidance will be updated to include further details around what this should cover.

1.13 The second consultation focused on the Government's proposals for liabilities, insurance, and charging requirements under the SIA. Around half of respondents agreed with the charging proposals put forward, but around a quarter disagreed. There was broad support for the proposal to not charge fees for spaceport, range control and launch licensing activities under the SIA until 2024, to support sector growth in the UK. Based on the feedback received, the Government does not intend to change its charging proposals at this stage.

1.14 On the proposal for a single approach to orbital licensing under both the OSA and the SIA, there was broad support for a one-off charge of £6,500. Some queried how this would apply to constellations of satellites. On the basis of the feedback received from the consultation the single approach to licensing orbital operators will be retained for both the OSA and the SIA. The Government recognises the concerns raised by constellation operators and will also look at ways to reduce the licence fees for these operators and provide further details in due course.

1.15 There was also broad support for using the Modelled Insurance Requirement (MIR) approach to setting insurance requirements for launch. However, respondents raised a range of queries in relation to liabilities and insurance. The Government has noted these comments and will carry out a wider review of insurance and liabilities requirements in 2021.

1.16 The Government is grateful for the engagement from industry, both in advance of the consultations, which assisted in the development of the draft Regulations and guidance, and in the detailed responses to the consultations. It intends to continue this collaborative approach, that will meet joint ambitions for industry growth.

1.17 In line with this, the Government will share the proposed licence application form and orbital operator questionnaire that the regulator will use over the coming months.

Next steps following Consultation

2.1 The Government is grateful to all those who responded to the consultations. As a result of the extensive feedback received, amendments will be made to the secondary legislation and the associated guidance documents, as detailed in the following sections.

2.2 As well as the adjustments that have been made as a result of responses received through the consultations, some additional amendments have been made to the draft Regulations to remove cases of duplication or replication of regulatory requirements, and to ensure consistency of terms within the regulations.

2.3 In response to the consultations the Government will also commit to carry out a review of the impact of the Government's proposed approach to insurance.

2.4 The Government has also committed to holding further engagements with the orbital community to ensure that the differences between the OSA and SIA licensing regimes are clarified, and to provide further information on which regulations apply to the orbital community.

2.5 To ensure that the Government's approach to commercial spaceflight remains current, relevant, and effective, a committee will be established involving industry and the spaceflight regulator to keep the regulations under review.

2.6 It is expected that the updated guidance material and the impact assessment will be published alongside the secondary legislation, when parliamentary time allows.

Introduction

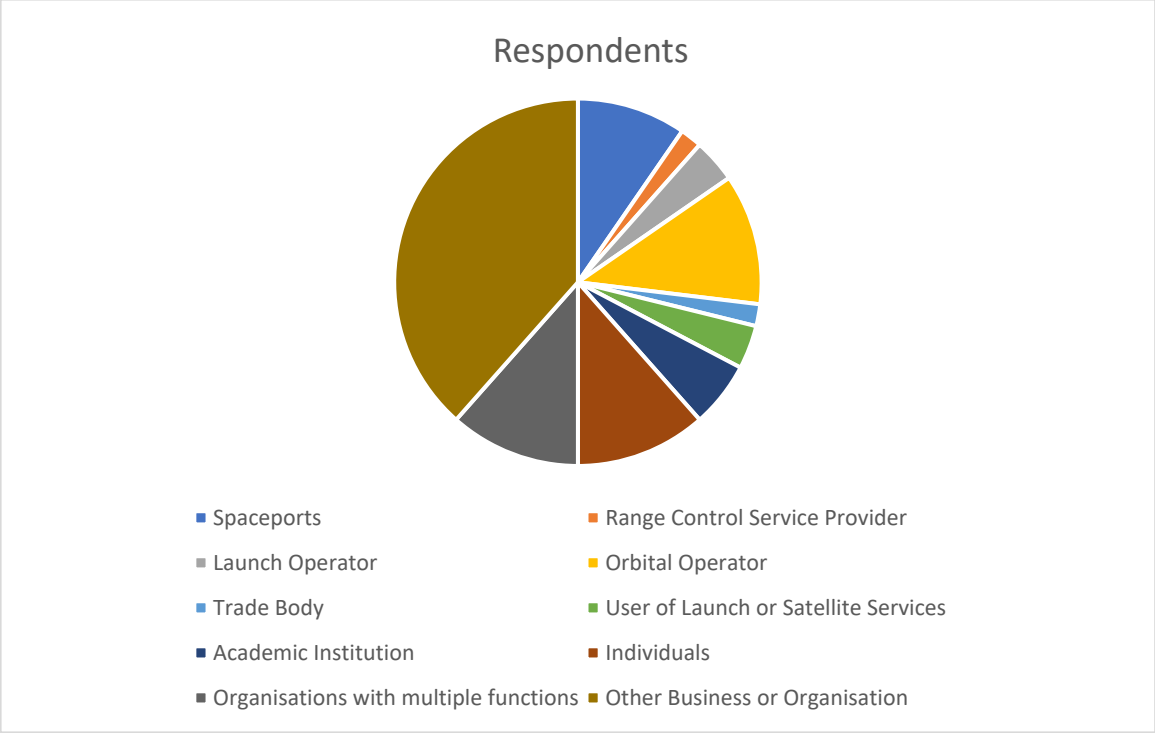
3.1 The Government ran two consultations on the draft regulations and guidance material that will provide a framework for commercial space launches to take place from the UK.

3.2 The first of these ran between 29 July 2020 and 21 October 2020. It sought views on the operability and effectiveness of the draft Space Industry Regulations ("the Regulations"), the Spaceflight Activities (Investigation of Accidents) Regulations, ("the Accident Investigation Regulations") the Space Industry (Appeals) Regulations, ("the Appeals Regulations") the associated guidance documents and Regulator's Licensing Rules. It also tested the assumptions in the consultation-stage impact assessment.

3.3 The second consultation ran between 13 October 2020 and 10 November 2020. It sought views on the operability and effectiveness of the proposed liabilities, insurance, and charging requirements, including the use of licence conditions to cover insurance requirements; the draft Space Industry (Liabilities) Regulations and the associated guidance documents. It also tested the assumptions in the consultation-stage impact assessment.

Consultation on the draft Space Industry Regulations, Accident Investigation Regulations, Appeals Regulations, associated guidance documents, and Regulator's Licensing Rules

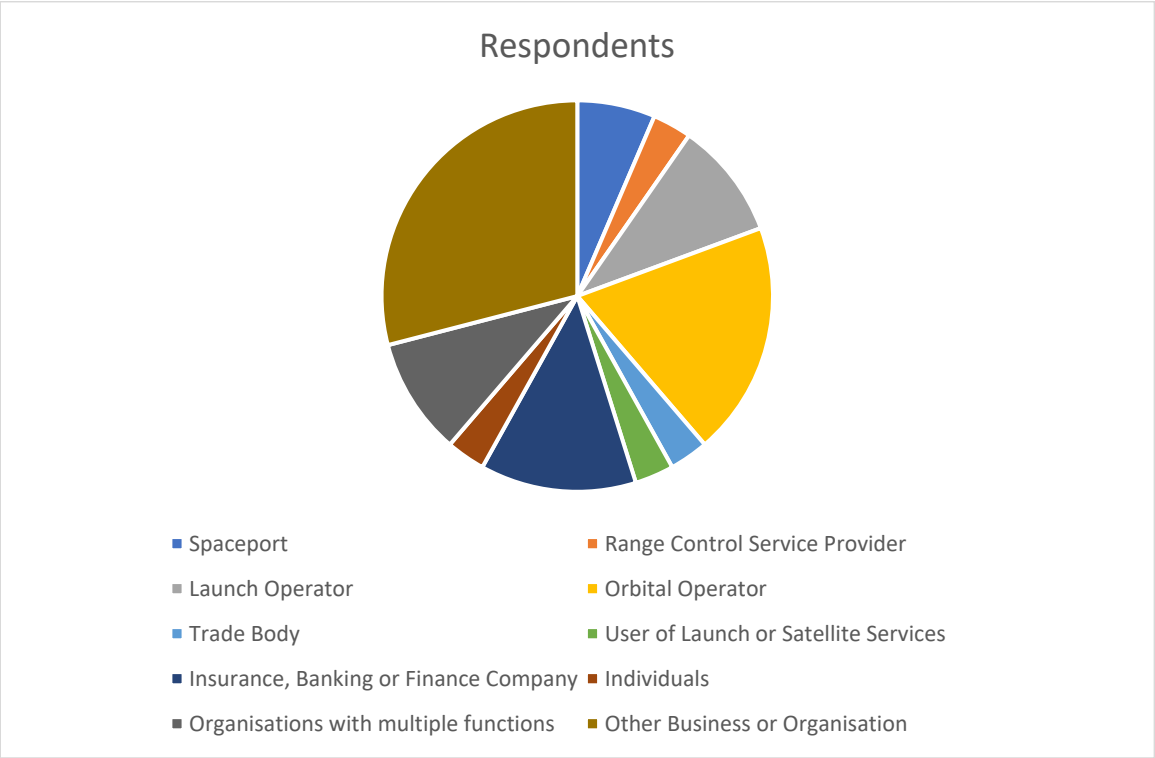
3.4 A total of 52 responses were received, 46 of which were from organisations and six were from individuals. The distribution of respondents was as follows:



3.5 Respondents in the "other business or organisation" category included: safety services, executive agencies, engineering and design companies, local councils, service suppliers, commercial and civil mediation, Royal and professional membership societies, devolved administrations, law firms, companies aspiring to work in commercial spaceflight, professional and representative bodies, and orbital debris removal companies.

Consultation on the proposed liabilities, insurance, and charging requirements

3.6 A total of 31 responses were received to the second consultation, 30 of which represented organisations and one was from an individual. The distribution of respondents was as follows:



3.7 Respondents in the “other business or organisation” category included: professional and representative bodies, satellite risk committees, service providers, law firms, and research and technology organisations.

3.8 All responses to both public consultations were recorded and analysed. As well as considering the full written response to questions, the Government has drawn out the common themes that emerged from these responses to obtain an indication of the most frequently expressed points of view. This document includes a summary of the responses received based on this analysis.

Government Response

4.1 The Government is grateful for the thoughtful responses received, and values all the evidence provided and views expressed. It welcomes the views provided by the wide range of respondents, including those provided by schoolchildren. The Government is also grateful for the engagement provided by the devolved administrations during the development of the draft Regulations.

4.2 The first part of this document provides a summary of the most commonly expressed views, and the Government's responses to those. The responses received to specific questions are then set out, with more detailed responses from the Government. This document concludes with information about the next steps the Government will take in response to the consultation.

4.3 Annex 1 contains a detailed analysis of the responses received to the questions which were raised on the impact of the Regulations.

4.4 Annex 2 contains a detailed analysis of the responses received to the questions raised on the Government's proposed approach to liabilities, insurance and charging.

4.5 As well as the adjustments that have been made as a result of responses received through the consultation, some amendments have also been made to the draft Regulations to remove cases of duplication or replication of regulatory requirements, and to ensure that regulations are aligned.

Consultation on the draft Space Industry Regulations

Cosmic Radiation requirements: crew of a launch vehicle and crew of a carrier aircraft

4.6 Since the consultation closed, a new section has been added to the draft Space Industry Regulations to include the provisions relating to space crew of the Air Navigation (Cosmic Radiation: Protection of Air Crew and Space Crew and Consequential Amendments) Order 2019 ("the 2019 ANO"). The 2019 ANO lays down basic standards for protection of aircraft and spacecraft crew against the dangers arising from exposure to ionising radiation. This includes some general provisions about exposure and monitoring, as well as how experts should be instructed in these matters.

4.7 The provisions in the 2019 ANO relate to space crew and the spaceflight operator's requirements with regards to cosmic radiation but are otherwise are concerned with provisions relating to aviation. As the Space Industry Regulations deal with matters related to space, it was always intended to incorporate provisions which already relate to the safety of space crew into the Regulations.

4.8 As these regulations are derived directly from the 2019 ANO with small adjustments only for them to fit into the space industry regulatory regime, they will not be subject to further consultation. However, guidance material will be provided to prospective applicants on the implementation of these provisions.

Launch from a ship

4.9 Throughout the consultation responses, concerns were raised about whether the Regulations accounted for launch of a space object from a ship. Respondents queried whether launch from a ship was akin to launch from a carrier aircraft, which is expressly provided for under the Space Industry Act 2018 (the SIA). Some respondents suggested that the Regulations should be amended to account for vertical launch services (i.e. launching a rocket) from a controlled location outside of UK territorial waters, proposing that 'UK territory' include all 14 British Overseas Territories, their airspace and waters and possible inclusion of British Forces Overseas.

4.10 The SIA does not recognise a ship as a spaceport so launch from a ship would not require a spaceport licence but can be regulated by a launch operator licence. The actual launch from a ship is within the scope of a 'spaceflight activity' as defined in the SIA, whereas a ship carrying a launch vehicle to sea to launch is not. In the case of a sea launch, the spaceflight activity is deemed to commence at the launch of the launch vehicle, rather than when the ship carrying the vehicle leaves the port[1].

4.11 In response to the feedback received from the consultation, a review of the terminology used in the Space Industry Regulations has been carried out to ensure that these Regulations apply in scenarios where sea launch and related activities are licensed under the SIA.

4.12 Potential licence applicants for launch from a ship should contact the regulator to discuss their proposal. The regulator will consider the facts of each case to determine whether the proposed activities can be regulated under the SIA or OSA. A general principle is that where launch is from a British flagged ship, the SIA will apply, however, this principle is subject to many variables which may also have to be considered in a particular launch situation.

4.13 The SIA does not currently extend to British Overseas Territories or military activities. There is power in the SIA for Her Majesty by Order in Council to direct that any provisions of the SIA extend with any modification specified in the Order to any of the Channel Islands, the Isle of Man or to any Overseas Territory. The relevant law applying to a proposed launch from waters adjoining such territories or islands would have to be considered on a case by case basis, taking into account the flag of the ship from which launch is proposed to take place. Applicants should consult with the regulator about their particular proposals in the first instance.

Assessment of Environmental Effects (AEE)

4.14 Many of the consultation responses welcomed the approach proposed in the guidance on conducting an AEE. The concerns raised were largely due to respondents needing clarification on what would constitute an equivalent assessment. Respondents were particularly concerned about duplication of effort and the associated costs of carrying out multiple assessments.

4.15 As a result of the feedback received, the Government will ensure that the guidance material is updated to provide clarification to address the concerns raised by respondents. However, no changes will be made to the overall approach proposed, nor the draft Regulations.

[1] A fixed platform at sea or a mobile installation at sea that can be moved from place to place which is used for launches is a spaceport within the meaning of the SIA but they too are not treated by the SIA in the same way as carrier aircraft.

4.16 In addition to amending the guidance, on 10 February 2021 the Government launched a consultation on the draft environmental objectives the Secretary of State for Transport intends to set for the spaceflight regulator to take account of when exercising its duties under the SIA.

4.17 These objectives, and the associated guidance on how the regulator should implement the objectives, supplement the AEE guidance. Although aimed at the regulator, this guidance may provide additional information about how the regulator will assess certain environmental topics that industry may find useful.

Orbital

4.18 The majority of the respondents to the consultation were in favour of the introduction of a traffic light system to provide early steers to potential applicants about whether their applications pose an apparently acceptable level of risk to safety, security and sustainability.

4.19 A few respondents also queried whether this system could be introduced into other application types and others asked that the system be voluntary.

4.20 As a result of the feedback received on this topic, the Government can now confirm that a voluntary traffic light system will be implemented for orbital operator licence applications under the SIA.

4.21 The consultation also asked for comments on the approach taken to licensing orbital activities more widely.

4.22 Many respondents were unclear about which regulations applied to them and why a new regime had been created to replace the current regime for licensing orbital activities, the OSA. The Government is conscious that, because there is an existing regime which governs orbital activities, there are unique challenges for that community in understanding how the OSA and the new regime under the SIA relate to one another. An additional plenary session will therefore be held for prospective orbital operator licence applicants and additional guidance will be provided to specifically address the new regime under the SIA and how it relates to the OSA. Stakeholders will be informed in due course of the details of this event.

Return operator licence

4.23 A number of respondents queried whether orbital operators would be able to apply for a return operator licence if they wish to return a satellite to the Earth for reuse or reclamation. In the current drafting of the Regulations, a return operator licence is only for the return of a launch vehicle, including any returning components of the launch vehicle. However, the SIA would still require operators of such a returning satellite to hold an operator licence, because this would be considered a 'spaceflight activity.' The regulator will consider requests for this unique licensing provision on a case-by-case basis and discuss with potential licensees how the safety and security of such an activity might be managed using licence conditions.

Regulator's Licensing Rules

4.24 Respondents raised queries throughout their feedback to the consultation about how long the regulator would take to assess an application. While the Government recognises the importance of providing certainty to potential licensees, the length of time needed to issue

a licence will be variable. There are a number of factors which will impact the speed at which a licence is issued, such as whether a mission is bespoke or novel, and the nature and completeness of information provided by applicants. This will make it challenging for the regulator to commit to a specific timescale for all applications. It should also be noted that the regulator expects to have ongoing engagement with applicants, both before and after an application is submitted.

4.25 Many respondents made it clear that they would like to have an opportunity to comment on the proposed licence application form and the orbital operator licence questionnaire which were not available at the time of the consultation. The regulator will publish these documents in due course. This can be expected before the Regulations come into force.

4.26 Queries were also raised by a number of respondents on being limited to 28 days when responding to information requests from the regulator. While the Government recognises that time limits can be constraining, applicants are encouraged to engage with the regulator to discuss any concerns that might arise in meeting these timelines to ensure that an application is not unduly delayed. The Regulator's Licensing Rules provide that the regulator may grant an extension for more time to respond if it appears reasonable to do so, but depending on the information being requested, could equally stipulate a shorter response window to applicants. This will be reflected in the next iteration of the Regulator's Licensing Rules.

4.27 Some respondents were also concerned that the information requirements specified in the Rules would apply to a very wide cross-section of their employees unless the term "every officer" was defined. The definition of an "officer" is taken from section 57(3) of the SIA. The SIA makes it clear that this applies only to directors, managers or company secretaries and anyone acting in a similar capacity. This will be clarified in the Rules.

General amendments

4.28 The majority of respondents welcomed the draft Regulations, and noted that they are a significant step forward for the UK launch industry, in that, once finalised, they have the potential to produce a regulatory framework that is not only attractive to business but also meets all of the regulator's duties.

4.29 The flexibility in the Regulations was also welcomed, and there was general consensus that they offer greater flexibility to applicants to meet the requirements for a licence compared to a prescriptive regime.

4.30 The Government is grateful for the engagement from industry which took place in advance of consultation, which assisted in the development of the draft regulations and guidance. It intends to continue this collaborative approach that will meet joint ambitions for industry growth.

4.31 The Government also recognises that, to ensure that the Regulations and associated documents continue to enable the growth of this sector, close collaboration with industry will be necessary to ensure that the Regulations and guidance material remain fit for purpose.

Part 1: Preliminary

4.32 A majority of respondents felt that there were terms used in the legislation that should be defined.

4.33 A list of definitions used in the Space Industry Regulations can be found in Part 1 of the draft Regulations. Some terms are not defined as they carry their plain English meaning, for example runway, taxiway, launch pad. Some terms are already defined in the SIA or in Schedule 1 to the Interpretation Act 1978, and are therefore not defined again in the draft Regulations. Examples of words used in the Regulations that have been defined in the Interpretation Act 1978 include "month", "person", "statutory maximum" and "indictable." For example, the SIA defines words such as "space activities", "sub-orbital activities" and "spaceflight activities". Some parts of the Regulations contain definitions specific to that part, and some regulations provide definitions specific to that regulation.

4.34 These are new Regulations and have been designed to allow for the regulation of a wide range of new commercial spaceflight technologies and activities. There will necessarily be some differences between these proposals and the space legislation which exists in different countries.

4.35 As a result of feedback received though the consultation, the Government will ensure that the guidance material is updated to address the suggestions raised by respondents.

4.36 Some respondents also drew attention to some inconsistencies in the terminology used. These inconsistencies have been noted and will be corrected.

4.37 The Government considers that no changes will be needed to the terms contained within the legislation.

Part 2: Appointment of the regulator

4.38 Although a specific question wasn't asked on the appointment of the regulator, the majority of respondents agreed that the Civil Aviation Authority (CAA) would be an appropriate regulator for spaceflight activities. There was overall agreement that its expertise, derived from regulating the aviation industry – in particular, its transferable skills in regulating launch-related activities – rendered it well-placed for such a role.

4.39 Some respondents also suggested that the knowledge, skills and experience of the UK Space Agency in its role as a regulator under the current OSA 1986 licensing regime should be utilised to augment extant expertise within the CAA, and that this experience should be transferred to the new regulator in appropriate ways.

4.40 It was also noted that it would be important for the CAA to be sufficiently resourced once it formally becomes the regulator, to cope with the increased levels of work and stakeholder engagement that commercial spaceflight will require.

4.41 As stated in the consultation document, it is the Government's intention that the CAA will undertake all SIA regulatory functions in addition to regulating orbital activities under the OSA. The Department for Business, Energy and Industrial Strategy, the Department for Transport, the UK Space Agency and the CAA have worked closely together, with the support of the Health and Safety Executive, to develop these Regulations. This multilateral cooperation will continue once the Regulations come into force and the CAA prepares to accept the first licence applications for spaceflight activities.

Part 3: Grant of a licence – general

4.42 Following feedback from respondents, the Regulations will be amended so that it is not a requirement to appoint a training manager who is responsible for the conduct and management of a spaceport licensee's training programme. The rationale for this is that,

because there are no spaceport personnel taking part in “specified roles or capacities”, spaceport licensees do not need a training manager to ‘qualify’ these people in terms of section 18(4) of the SIA. It is also intended to remove the training manager from the list of specified roles under draft regulation 59.

4.43 This will apply only to spaceport licensees. The training manager will remain a prescribed role for launch operator licensees and range control licensees. The training manager is retained for these licensees because they have personnel taking part in “specified roles or capacities” and therefore require a training manager who is responsible for the conduct and management of the respective licensees’ training programme.

4.44 A number of respondents considered that the application of eligibility criteria to a “body corporate” may prove burdensome in large organisations, and it was proposed that the scope be narrowed. This has been addressed in paragraph 4.27 where respondents raised similar issues with regards to the Regulator’s Licensing Rules. The eligibility criteria only apply to “officers” as defined in the SIA, e.g. a director or manager of the organisation.

4.45 A number of respondents proposed other considerations that the grant of licence regulations or guidance should address. These comments were predominantly focussed on the length of time to apply for a licence and administrative processes. The Government considers that no changes will be needed to the regulatory requirements here. However, as a result of the feedback received, the Government will ensure that the guidance material is updated to address the queries and suggestions raised by respondents.

Part 4: Grant of a spaceflight operator licence – risk

4.46 Respondents were largely content with the requirements set out in Schedule 1 to the Regulations on the information a safety case should contain.

4.47 To meet requests from respondents for further clarity on the requirements set out in Schedule 1, the use and purpose of the terms: “validation”, “verification” and “safety critical systems” will be refined and will be further explained in the guidance material.

4.48 An additional paragraph will be inserted into Schedule 1 requiring an applicant to present information about the geographical locations and inhabited areas that could be affected by a major accident during the proposed spaceflight activities.

4.49 Respondents also raised queries about the references to payloads made in the Regulations, highlighting that the payload may not always be known at the time of application or the spaceflight activity might not involve a payload. In response to this, the Regulations will be adjusted so that it is clear that information is only required on the payload if one is intended for launch. If the specific payload is known, this should be information about that to the payload. If the specific payload is not known, applicants will be expected to provide information about the class of payload intended to be carried. Additional requirements will be included in the Regulations for consideration of the hazards which could arise during the preparation or integration of the payload with the launch vehicle.

4.50 Respondents also queried the phrase “method of operation” and suggested that instead the phrase “concept of operations” for launch vehicles and carrier aircraft be used. This amendment will be made to the Regulations.

4.51 In response to comments received, amendments will also be made to the requirement in Schedule 1 for a schedule of preparatory events to link it more clearly with the Ground Safety Analysis and to require that the safety case should also set out the review process for checking progress and a schedule of the safety critical events that the range control and spaceport licensees will perform. The guidance will say that the schedule of preparatory events need only be preliminary or outline at the time of application, but that any updates or refinements ahead of the launch event must be communicated to the regulator.

4.52 Provisions have also been included in Schedule 1 address queries raised about whether launch operators would need to consider space debris mitigation, including post-mission disposal. The Government agrees that launch operators should consider this as part of their safety case and will add a requirement for an applicant to supply a description of the engineering practices and design and operational measures that will be used to prevent or mitigate the creation of space debris. In addition, as part of the safety case, an applicant will be asked to supply information about the company's heritage in designing, developing or operating launch vehicles, payloads or any other space-related hardware or software.

4.53 Respondents concurred that there should not be a mandatory requirement for licensees (e.g. launch operator licensee and spaceport licensee) to share their safety cases with each other, but asked that the regulator provide further clarity on how licensees are expected to coordinate, communicate and set up joint activities. Amendments will therefore be made to Schedule 5 to the Regulations to require applicants to include in the safety operations manual further information on the instructions and procedures which will support collaboration between licensees. This supports the change mentioned in paragraph 4.51 to require prospective launch operator licensees to provide a schedule of the safety critical events to be performed by the range control and spaceport licensees.

4.54 To ensure that the safety cases of spaceport and launch operator licensees contain a thorough investigation of the potential hazards which could impact on safety, the Government supports the inclusion of 'human factors' into the safety management systems of these licensees. All relevant staff will also be required to undergo training in 'human factors' as set out in paragraph 5.240 of this response.

Part 5: Grant of a spaceport licence

4.55 Although many respondents felt that there should be alignment between the safety requirements of spaceport and launch operator licensees, and that the two should share relevant safety information, in response to the feedback received, the Government will not be recommending a change to the Regulations to mandate the sharing of safety cases between these licensees.

4.56 As already discussed in paragraph 4.54, the spaceport safety management system requirements will be amended to account for 'human factors' and the safety management system implemented will be prescribed by the same Schedule which governs launch operator licensees.

4.57 Part 4 of the consultation raised similar queries about aligning the safety cases of spaceport and launch operator licensees. As a result of the feedback provided, the language used to describe hazards for spaceport operators will be amended to align more closely with the requirements for launch operators. In particular, the requirements

for the spaceport safety case will be changed to focus on ‘major accident hazards’ as defined in regulation 2 rather than ‘hazards’.

4.58 Because the UK has now left the EU and the transition period has ended, references in draft regulations to “EASA” certification (in relation to requirements imposed where a horizontal spaceport is to be co-located with an existing aerodrome) will be amended to reflect the relevant domestic legislation.

Part 6: Range control services

4.59 In general, respondents supported the approach proposed for the provision of range control services as licensed under the SIA. The Government recognises the importance of the range control function in supporting the safety case of the launch operator and of ensuring that range control licensees are monitored and scrutinised by the regulator. To facilitate this, and in response to the feedback received from the consultation, the draft Regulations on range control will now include a specific requirement for the range control service provider to have a safety management system in place.

Part 7: Training, qualifications, and medical fitness

4.60 The Government wishes to ensure that relevant individuals are appropriately trained and competent, and that all licensees clearly understand their responsibilities in this regard.

4.61 In response to feedback received through the consultation, the draft Regulations under part 7 will be amended to require that persons who participate in licensed activities, but do not perform a specified role or act in a specified capacity, must also be provided with the initial (induction) training. Regulations will also include requirements for training in human factors and security management, including the licensee’s security policy, space site or operator’s security programme, access controls, and security controls.

4.62 The draft Regulations require that the appointment of the training manager be approved by the regulator. In response to feedback received, the draft Regulations will be amended so that the regulator’s approval is no longer dependent on the training manager satisfying the condition in draft regulation 76(1).

4.63 In line with the feedback from respondents, requirements for rehearsals will be expanded. The new requirements will mean that before a launch, the launch operator licensee must conduct rehearsals of the mission as necessary to validate the operational procedures and to train staff in their operational duties. The rehearsals must as nearly as possible reproduce the intended spaceflight, spaceport and range control activities which would be carried out on the mission including:

- both normal and abnormal situations
- pre-launch, spaceflight and post-launch scenarios, and
- as suited to the spaceflight activity, the space weather events (“conditions in space”) that could affect the operator’s spaceflight activity.

4.64 Draft regulation 76(4)(a) sets out criteria an individual must meet for an approved aeromedical examiner to determine that a crew member or remote pilot is medically fit to fly. It does not specify any particular medical certificate for a remote pilot. This is because the medical fitness requirements for remote pilots will depend on the duties of the remote pilot and the complexity of the vehicle, so the actual medical certificate required will be decided on a case-by-case basis.

4.65 Because the UK has now left the EU and the transition period has ended, references in draft regulation 76(4)(a) will now refer only to Sub-Part B of Annex IV to the Aircrew Regulation.

4.66 As a result of feedback received though the consultation, the Government will also ensure that the guidance material is updated to address the suggestions raised by respondents.

Part 8: Safety of operator's spaceflight activities

4.67 Respondents provided detailed comments on the draft Regulations in Part 8. In response to the feedback received the Government will make the amendments detailed below in paragraphs 4.68 to 4.78.

4.68 In response to feedback received and the subsequent updates to the draft Regulations, some of the definitions for terminology used in Part 8 will be updated. These include the definitions for "flight envelope", "flight", "technical requirements" and a new additional definition describing a "stable orbit".

4.69 The list of events and matters that trigger a review of the safety case will be amended to require the operator to review the safety case whenever the safety management system has revealed that the operator's spaceflight activities may result in a major accident hazard which may affect the carrying out of those activities safely.

4.70 A requirement will be added for the spaceflight operator to ensure that flight termination personnel have access to the information necessary to determine whether any flight safety system is ready to be used.

4.71 An amendment will be included to specify that the spaceflight operator must retain the safety operations manual and keep it up to date. Whenever the manual is updated, the spaceflight operator should send the regulator a copy of the updated manual.

4.72 The previously separate Schedule 4 (spaceflight operator) and Schedule 6 (spaceport licensee) to the Regulations will be combined so that safety management system requirements are incorporated into a new common framework at Schedule 4.

4.73 Schedule 1 will now refer to "technical requirements" of the launch vehicle and ground support equipment rather than "technical requirements specification." There will be a duty for the spaceflight operator to identify appropriate requirements, and design, build, and test their vehicle against those requirements, and the spaceflight operator will need to present evidence to the regulator that it has done to.

4.74 The term "technical requirements" in Schedule 1 will now also refer directly to chapter 6 of ECSS-E-ST-10-06C[2], which covers "technical requirement types". Guidance will explain what this means in practice.

4.75 The term "simulation" will be changed to "rehearsal" in the conditions for commencing operator's spaceflight activities and additional clarification about the meaning of "rehearsal" will be inserted into the training regulations at draft regulation 70.

[2] ECSS – European Cooperation for space standardization. https://ecss.nl/standard/ecss-e-st-10-06c-technical-requirements-specification/

4.76 To help avoid collisions, an additional condition will be added to draft regulation 99 to provide that a launch of a launch vehicle authorised by a launch operator licence can take place at a time when the launch vehicle will not collide with any known space object during its flight or when it first reaches stable orbit.

4.77 A further condition will be added to draft regulation 99 that requires the spaceflight operator or launch director to be satisfied that any flight safety system is ready to be used. This would take the form of a confirmation from the flight termination personnel in the case of a non-autonomous system, or from some other member of the operating staff in the case of an autonomous flight safety system.

4.78 As a result of feedback received through the consultation, the Government will also ensure that the guidance material supporting the safety regulations is updated to address the concerns and suggestions raised by respondents.

Part 9: Spaceport safety

4.79 Most respondents agreed with the intervals proposed for reviewing a safety case and testing the emergency response plan. They were also largely content with the triggers which would result in a review of the safety case.

4.80 As noted above, to address points raised about aligning more closely the spaceflight and spaceport requirements and terminology, the previously separate Schedule 4 (spaceflight operator) and Schedule 6 (spaceport licensee) to the Regulations will be combined so that safety management system requirements are incorporated into a new common framework at Schedule 4. The wording of the spaceport licensee's safety duty will also be changed to align more closely with the spaceflight operator's safety duty, as well as terms in the safety case review provisions.

Part 10: Security

4.81 A number of respondents to the consultation expressed concerns about the draft security regulations that relate to the UK-US Technology Safeguards Agreement (TSA) which was published on 16 October 2020. While efforts have been made to address some of these concerns in the associated guidance documents, because the provisions stem from an international treaty, the specific requirements and definitions cannot be amended.

4.82 In response to feedback received, the time within which a licensee must notify the regulator of a security incident has been amended from 24 hours to 72 hours. This aligns with industry standards and the notification periods specified elsewhere in the Regulations.

4.83 The Government will ensure that the guidance material is updated to address the suggestions raised by respondents.

4.84 No other substantive changes are being made to the security regulations as a result of the feedback received from the consultation.

Part 11: Informed consent

4.85 Respondents supported the principle of securing informed consent from human occupants taking part in a spaceflight activity.

4.86 The consultation proposed that to enable occupants to give informed consent, information should be provided to the intended occupants a maximum of one month, and a minimum of 12 hours before a consent form is signed. Some respondents highlighted that whilst the maximum timing of one month was appropriate, the minimum time period should be extended, with the rationale that 12 hours would to be too short for a human occupant to be able to read and fully digest the information to be provided, given its likely volume and complexity.

4.87 As a result of feedback received though the consultation, the Government will require that information should be provided to human occupants a minimum of 24 hours before the consent form is signed. The maximum time limit of one month will remain unchanged.

Part 12: Liabilities and indemnities

4.88 As a result of feedback received, the Government has updated the list of individuals in draft regulation 206 – individuals to whom a strict liability right of claim does not apply – to include those who might not be agents of a licensee (e.g. a satellite manufacturer) but who may be present at a site, as well as those covered by any reciprocal waivers of liability (cross-waivers).[3]

4.89 A further reference has been included in the draft Regulations regarding the definition of "partners". The guidance material will also be updated to provide further clarification on the term "partner" and on the issue of trespassers.

4.90 The Government will clarify in guidance that where a person is exempt from making a strict liability claim, this does not prevent them making a claim under common law, nor does it remove any liability from any party included in the list referred to draft regulation 206 .There is no requirement for any person to sign a cross-waiver or informed consent form for the provisions in draft Regulation 206 to take effect, unless that is covered as part of the specific provision elsewhere in the regulations (for example, spaceflight participants and crew who are required to sign an informed consent form prior to taking part in spaceflight activities).

Part 13: Monitoring and enforcement

4.91 Concerns were raised by a number of respondents regarding the provision of confidential or commercially sensitive information to the regulator during the application process. Several respondents questioned the measures the regulator would take to protect this information once received.

4.92 It is the Government's intention to appoint the CAA as the spaceflight regulator. The CAA has robust security processes in place to ensure all the information sent in relation to applications is handled and protected appropriately. This includes:

- ensuring that all personal data is stored and processed in accordance with GDPR requirements, including the provision of appropriate technical and organisation security controls
- having systems and processes designed for protecting information, based on standard UK Government information classifications

[3] The use of cross-waivers means that each licensee may agree to waive their right to claim against the parties they are contracting with in connection with the spaceflight or associated activity. See guidance for further details on cross-waivers.

- employing a principle of Least Privilege, which means that only approved roles are granted access to information stored on its systems, insofar as they need that access to carry out their roles. Privileged access is carefully controlled and limited, and access is reviewed on a regular basis
- protection of all information at rest through encryption
- strict requirements for personnel vetting, and ensuring that only cleared staff have access through the use of strong access controls with multiple authentication factors.
- using a secure information exchange for the transfer of any information requiring protection.

4.93 A number of respondents queried the penalties proposed under Scottish law and whether some proposed penalties were appropriate under Scottish law. As part of its due diligence, the Government sought advice from Scotland and Northern Ireland on the proposed offences and penalties. In doing so, it was found that two of the penalties did not fall within the vires of section 54 of the SIA. Consequential amendments have therefore been made to draft regulations 210 and 244.

Part 16: Duty to inform the regulator

4.94 A number of respondents to the consultation, whether commenting on Part 16 or other Parts of the Regulations, were concerned about the use of the term “significant change” as being too subjective and vague.

4.95 Some respondents also felt that the wording of regulation 285, which explains the penalty associated with the offence of failing to inform the regulator, was worded in such a way as to bring “any person” in scope of this offence. By contrast, regulation 284 specifies that only the licensee or a person applying for a licence should be in scope of committing an offence under this regulation.

4.96 As a result of the feedback provided from the consultation, the Regulations will be amended and “significant change” will be replaced with “material change,” which has more precedent in law. The offence associated with the failure to inform the regulator of changes will also be amended so that only the “relevant person” can commit the offence of failing to inform the regulator. “Material” in the context of “material change” carries its plain English meaning and will therefore not be further defined in the Regulations. The guidance material will be updated to provide some more information on what is meant by “material change.”

4.97 No other amendments are being made to the draft regulations in Part 16 as a result of the feedback received from the consultation.

The Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations

4.98 As a result of feedback received though the consultation, the Government will ensure that the guidance material is updated to address the suggestions raised by respondents.

4.99 There are no substantive amendments being made to the Accident Investigation Regulations as a result of the consultation.

The Space Industry (Appeals) Regulations

4.100 As a result of feedback received though the consultation, the Government will ensure that the guidance material is updated to address the suggestions raised by respondents.

4.101 There are no substantive amendments being made to the Appeals Regulations as a result of the consultation.

Consultation on liabilities, insurance and charging

Liabilities and insurance

4.102 Overall, there was broad support for using the Modelled Insurance Requirement (MIR) approach to setting insurance requirements for launch and for setting out insurance requirements in licence conditions. It is the Government's intention therefore to adopt the MIR approach for launch and to carry out a review of the approach after the first tranche of launches.

4.103 There were a number of key themes raised by respondents in response to the liabilities and insurance aspects of the consultation which suggested that the strategic implications of proposals outlined on the sector and on Government more widely should be considered. These included:

- development of an alternative model to traditional insurance to address issues around current insurance provision for small satellites
- lowering the limit of operator liability for in-orbit operations
- including a maximum limit of insurance for the launch MIR (referencing limits such as the maximum insurance available in the market or fixed limits such as in Australia or intended in Portugal – Aus$100m and €50m respectively), and
- use of alternatives to insurance as forms of security to meet an operator's liability obligations (e.g. decommissioning bonds, escrow accounts, performance and surety bonds).

4.104 The Government has noted these comments and will carry out a wider review of insurance and liabilities requirements in 2021. As part of this review, the Government will engage further with the sector.

4.105 This review will consider a holistic approach to insurance requirements for the whole of the mission, including end-of-life activities. It will explore further the use of the MIR approach and whether it could extend to in-orbit operations and use of alternative financial instruments. Although no question was raised in the consultation on the subject, respondents commented that they would be less supportive of an MIR approach being adopted for operations in orbit. There were also suggestions that for higher risk operations (e.g. in-orbit servicing) a higher limit might be appropriate and some suggestions were received on how this might be achieved. This will therefore also be considered as part of the review.

4.106 The review will also consider the competitiveness of the UK space sector and the Government's evolving approach to maintaining the sustainability of the orbital environment.

4.107 Many respondents also raised concerns that section 12(2) of the SIA states that a licence "may" contain a limit of liability with respect to claims made under section 36 of

the SIA, as compared with the word '"must" for section 34 liability included in the draft Space Industry (Liabilities) Regulations. This led to concerns that operators would be exposed to unlimited liability for operators for claims under section 36.

4.108 It is not possible, as suggested in a number of responses received, to be able to remedy this inconsistency through regulations, as there are no regulation-making powers to amend section 12(2). If another suitable piece of primary legislation is brought forward, the Government may seek to amend the wording in section 12(2) from "may" to "must".

4.109 The Government's policy intention is that **all licences issued under the SIA contain a limit of operator liability with respect to claims made under both section 34 and section 36 of the Act**. This will be set out in guidance.

4.110 A key concern raised by satellite operators was that the section 34 liability will be an additional burden. The Government's response in Annex 2 of this document sets out in further detail the reasons why the Government does not consider that the liability arising from section 34 poses an additional cost burden for satellite operators in general. In summary, this is because damage sustained during launch and uncontrolled re-entry would be covered by launch or in-orbit policies. Depending on the specifics of a particular mission however, there may be cases where an additional cost burden might arise for satellite operators. The Government will consider how to minimise the risk of an additional cost burden as part of the wider review.

4.111 Annex 2 also sets out further clarifications relating to insurance and liabilities by operator type, including for spaceport operators and range control service providers. The table in the Annex 2 sets out the liabilities and insurance requirements by operator type to assist with this clarification.

Updated financial values to be included in the MIR

4.112 The consultation document stated that updated MIR financial values would be provided. The Government Actuary's Department has therefore updated the proposed values to reflect the latest statistics / discount rates. These are presented in Annex 2.

4.113 Many respondents provided feedback on the guidance provided. This material will therefore be updated to reflect the suggestions and concerns raised by respondents.

4.114 The Government does not intend to make any further changes to the Regulations in addition to those outlined in paragraph 5.376 of this document.

4.115 Annex 2 provides a detailed overview of the responses received to the consultation on liabilities, insurance and charging.

Government's approach to charging

4.116 Around half of respondents agreed with the charging proposals put forward by the Government, whereas around a quarter of respondents disagreed with the proposals. The remaining respondents did not provide an answer to the question.

4.117 There was broad support for the proposal to not charge fees for spaceports, range control and launch licensing activities under the SIA until 2024, to support sector growth in the UK.

4.118 With regards to licensing orbital activities under the OSA and the SIA, there was broad support for implementing a one-off charge of £6,500 per licence across both regimes.

4.119 Some concerns were, however, raised with regards to the suitability of the charging model for constellation operators, particularly that the model might over-recover licensing costs, which could be detrimental to the UK's ability to create an attractive constellation market.

4.120 The Government acknowledges the concerns raised by constellation operators and will look at ways to reduce the licence fees for these operators and provide further details in due course.

Detailed Summary of Responses

Assessment of Environmental Effects (AEE)

Background

5.1 This section of the consultation set out the context of the AEE within the SIA and explained that the guidance would provide the detail required for applicants to be able to conduct an AEE. This section of the consultation asked a general question on the approach taken.

Question

1. Do you have any comments on our approach to assessment of environmental effects? Please provide details.

Consultation responses

5.2 The majority of those who responded to the consultation had comments on the approach being taken towards assessing the effects of spaceflight activities on the environment. Many found the guidance to be robust and well-structured.

5.3 Many respondents were unclear about what types of equivalent environmental assessments, such as an environmental impact assessment (EIA), would satisfy the requirements of an AEE and were concerned about duplication of effort. Some concerns were also raised on the parameters used in previous assessments and how long they would remain valid for. Some respondents suggested that a consultative scoping process be introduced to allow prospective applicants an opportunity to engage with the regulator on what equivalent assessments may be appropriate, or that specific guidance be provided on what is required as part of an AEE that is not already captured by other environmental consenting regimes.

5.4 The Government has not excluded optional pre-application engagement with the regulator to discuss any environmental assessments that have already taken place, and which may satisfy some of the requirements for an AEE. The Government cannot, however, provide detailed guidance on the conditions under which an assessment already carried out will meet the requirements of an AEE. This is because each case will be unique and will need to be assessed on its own merits. The fact that an equivalent assessment can be submitted under section 11(4) of the SIA should ensure that duplication of effort does not occur. Providing the equivalent assessment was based on the same parameters or worst-case parameters, and there have been no material changes since the previous assessment was conducted, there will be no expiry date to their use. With regards to the EIA specifically, while every effort has been made to align the requirements of an AEE with those of an EIA, this has not always been possible due to the unique nature of spaceflight activities. The two regimes are separate and have their own legal requirements which applicants may be required to meet, depending on the nature of their activities.

5.5 Some respondents were concerned about there being no specific regulations drafted for the AEE, and that because the SIA does not include the specific requirements for an

AEE, applicants had no legal obligation to follow the guidance provided on this topic. Some respondents also queried whether this meant that an application could be refused on the grounds of the AEE contents.

5.6 While it is true that no specific regulations have been drafted on the requirements for an AEE, section 11 of the SIA makes the submission of an AEE a legal requirement for those wishing to apply for a spaceport or launch operator licence. The SIA also specifies that the regulator must provide guidance on the form, content, level of detail and timings for submitting an AEE and that the regulator has discretion to specify the matters which must be dealt with in an AEE under Section 11(6). Where the guidance states that applicants 'must' do something, this is a requirement set by the regulator using the power under section 11(6) and applicants are legally required to fulfil that. The regulator will not issue a licence unless it is satisfied that the applicant has met all the criteria specified in the SIA and Regulations for the licence type in question.

5.7 Some respondents felt that more specific requirements should be included in an AEE, such as the Navigation Risk Assessment and the legislation which governs hazards to shipping. Some respondents also queried why neither the Airspace Change Proposal (ACP) environmental requirements under CAP1616 nor COMAH were referenced, and why more prescriptive requirements were not included in the AEE.

5.8 While it is true that the AEE guidance does not contain an exhaustive list of all the environmental consents or legislation which may be relevant to applicants, the onus is on applicants to ensure that they are aware of their own statutory requirements. With regards to including prescriptive requirements, the Government has elected to use a more flexible approach which will allow applicants more freedom in determining how they meet the requirements set out.

5.9 Concerns were also raised about the apparent lack of consultation with other environmental bodies during the AEE process, both during and prior to the submission of an application for a licence. Other respondents queried whether such a consultation would be necessary if one had already been carried out in support of an EIA application.

5.10 The AEE guidance states that both public and environmental authorities and public bodies may be consulted on an AEE, once it is received. Consultation with environmental authorities will enable the regulator to gain local environmental expert opinion and will help to avoid conflicting licence conditions such as monitoring. Furthermore, the Government has a duty under the Aarhus Convention to consult the public on environmental decision making. A consultation under one regime, whether in support of an EIA application, an AEE or any other regime, does not remove the requirement to consult under the another if both permissions are required by a potential licensee. With regards to the AEE, details have been provided on the requirements to consult in the guidance document.

5.11 Some respondents were also concerned about the lack of definition for the term "significant effects."

5.12 The guidance does provide a definition of "significance" to aid potential licensees. Significance, however, will be different for different environmental topics and activities. This makes it challenging to provide a narrower definition for this term.

5.13 A few respondents sought further guidance on how the spaceport and launch operator licence applicants should work together when compiling their AEEs. This is, however, not

for the Government to dictate, nor within the remit of the Regulations. Instead, it is up to the different parties to agree between them how they wish to work together.

5.14 Concerns were raised about the impact of satellite constellations on ground-based astronomy and why this was not included under the environmental topic of "landscape and visual impact."

5.15 While the Government recognises that respondents were concerned about this issue, and is currently reviewing its policy on mega-constellations, this is not a topic for the AEE. The AEE should consider only the matters stipulated in the guidance, such as the impact of spaceflight activities on biodiversity, habitats and those creatures in a community who could be susceptible to adverse effects.

Orbital activities

Background

5.16 This part of the consultation set out the rationale for not drafting additional legislation for orbital operations, to retain the flexibility required to address emerging technologies and practices in this field.

5.17 The purpose of the Traffic Light System (TLS) was explained as an optional pre-application questionnaire to gauge the applicant's readiness to apply for a licence on the basis of the risks associated with the proposed activity. The proposal would then be given a red/amber/green rating based on the apparent levels of risks to safety, security and the sustainability of the orbital environment.

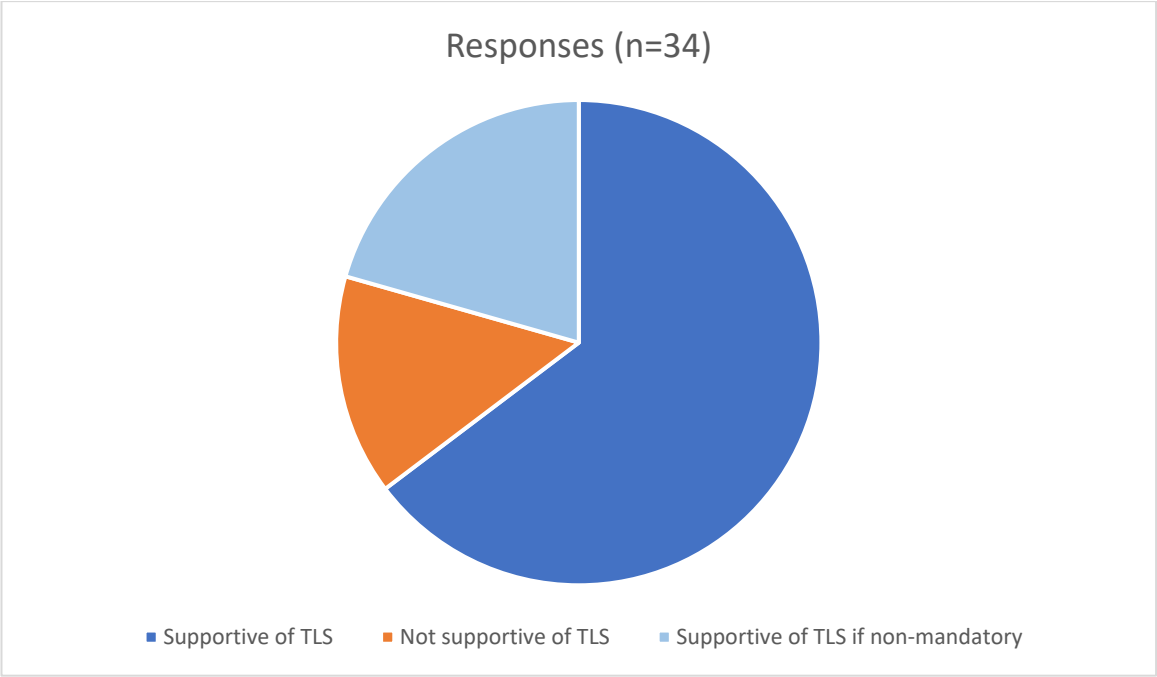
5.18 The Government sought responses on both the TLS and the general approach taken for orbital activities.

Question

2. Would you welcome a Traffic Light System for orbital operator licence applications under the Space Industry Act 2018?

Consultation responses

5.19 The majority of those who responded to the consultation were in favour of a non-mandatory TLS as being a useful and helpful approach to take, particularly for new entrants into the market who may have less experience of licensing regimes. The responses were distributed as follows:



5.20 A small number of respondents were concerned that the TLS would duplicate the work of assessing an application and were concerned about the potential impact on the regulator. However, the introduction of a TLS may actually result in less time being needed to assess an application, as the regulator has had an early view of an applicant's intentions.

3. Do you have any comments on the proposed Traffic Light System? Please provide details.

Consultation responses

5.21 A number of respondents proposed methods for ensuring that the questionnaire associated with the TLS would be user-friendly and made comments on the sorts of information that should be requested.

5.22 Some respondents also queried how transparent the assessment process would be and whether advice would be provided on how to improve the colour rating of a given application. Some also stressed that this system should be voluntary, while others were concerned that those who use the TLS might have an unfair advantage.

5.23 A few respondents were concerned that a green rating might mislead potential applicants into thinking that they had satisfied the requirements to hold a licence and asked that the guidance be very clear on this point.

5.24 A small number of respondents also suggested that the TLS be expanded to incorporate applications for other licence types.

5.25 Some respondents also wanted assurances that the TLS process would connect directly to the licence application process, in the same way that the TLS system used under the OSA regime does.

5.26 As a result of the feedback received from the consultation, the Government supports the introduction of a voluntary TLS for those who wish to apply for an orbital operator licence under the SIA.

5.27 The guidance for orbital operator licence applications will clearly set out the scope of the TLS to ensure that applicants understand that a green rating does not necessarily mean that a subsequent application will be successful. The Government also supports the TLS being voluntary and providing all potential orbital operator licence applicants with an equal opportunity to access the system.

4. Do you have any comments on our approach to orbital activities? Please provide details.

Consultation responses

5.28 Just over a third of consultees provided feedback on this question.

5.29 Many respondents were unclear about which of the regulations apply to potential orbital operator licensees and how the regime established under the SIA is different from the regime under the OSA.

5.30 Many respondents were concerned that the draft Regulations are too onerous and disproportionate for orbital operator licensees and should therefore be reconsidered. This also led some to raise concerns about the costs associated with satisfying these requirements.

5.31 Many felt that retaining the OSA regime would address their concerns, or that if the OSA regime were replicated under the SIA, their concerns would be mitigated.

5.32 The Government recognises that further clarity is needed on which regulations apply to orbital operators. As a result of the feedback received, the guidance will be updated to clarify these points. The guidance will also be amended to provide clear comparisons between the existing regime under the OSA and the new regime under the SIA, and how orbital activities will be regulated going forward.

5.33 Some respondents wanted further information on how the UK intends to interact with neighbouring countries with regards to launch activities. As was made clear in the consultation document, the Government is in discussion with neighbouring countries to ensure that they are content with UK spaceflight activities in which they may have an interest. This does not exempt potential licensees from making their own inquiries about what obligations they may need to meet to satisfy the requirements of those countries.

5.34 As was raised with regards to the AEE requirements, concerns were also raised in response to the Government's proposed approach to orbital activities about how the impact of mega-constellations on the night sky might be mitigated. This is currently being considered by the Government. Once the policy has been agreed, this will be communicated to stakeholders later in the year.

Regulator's Licensing Rules

Background

5.35 The consultation set out the purpose of the Regulator's Licensing Rules as covering matters related to the application for a licence under the SIA.

5.36 Views were sought on the information to be submitted with an application form and the specific time limits prescribed by the Rules.

Question

5. Do you have any comments on the Regulator's Licensing Rules?

Consultation responses

5.37 Less than half of those who provided feedback on the consultation provided comments on the Regulator's Licensing Rules.

5.38 Many respondents raised concerns about there being no time limit set for the regulator to review an application, with a number also raising concerns about how quickly an applicant would be expected to respond to a request from the regulator (28 days).

5.39 While the Government recognises that industry would like the certainty of time constraints, due to the complexities of the activities being licensed and the unique nature of each application, it is not possible to place absolute limits on how long an assessment will take to complete. The regulator will endeavour to assess all applications in the shortest time reasonably practicable.

5.40 With regards to the time within which an applicant is expected to respond to a request from the regulator, the Government feels that 28 days is appropriate and proportionate and that this is a necessary requirement which will ensure that the application process continues to run smoothly without undue delays. It is in line with other industries and regulatory regimes. It should not preclude applicants informing the regulator directly if the proposed deadline for a specific request seems untenable. The regulator can extend this timeframe if it appears reasonable to do so. By the same token, the Rules will be amended to allow the regulator to specify a shorter period of time within which an information request should be actioned on a case-by-case basis, for example, if a proposed launch date appears to be more imminent. This will be reflected in the next iteration of the Regulator's Licensing Rules.

5.41 Some respondents also queried the types of additional information which can be requested by the regulator during the determination of an application. There was concern that this might allow to regulator to expand the scope of application in a way that may be inconsistent with the Regulations. The Regulator's Rules and the draft Regulations are clear that the regulator will only ask for more information insofar as it is deemed necessary to determine an application in line with the matters that the regulator must satisfy itself of in order to grant a licence under the SIA and accompanying Regulations.

5.42 Queries were raised by some respondents on whether there would be a pre-application consultation process and whether the regulator would provide applicants with a document which sets out how they can comply with the Regulations in detail. The guidance material is clear that engagement with the regulator ahead of submitting an application is encouraged, though not compulsory. With regards to providing compliance documents, while the Government recognises that such documents would provide industry with clear steers on how to achieve compliance, this is contrary to the ethos behind the regulatory approach being adopted by the UK, which is outcomes-focussed, rather than prescriptive.

5.43 Some respondents also queried whether consent under regimes such as the FAA-AST[4] would be considered equivalent or sufficient to meet the requirements of a licence under the SIA.

5.44 Many respondents commented on the fact that the proposed licence application form was not made available during the consultation period for review, nor was the proposed orbital questionnaire for orbital operators. Some also queried whether electronically signed forms would be accepted. The Government and the regulator are content with the use of electronic signatures.

5.45 In the coming months, the regulator will l share the draft application form and the orbital operator licence questionnaire. Stakeholders will be updated in due course on how to access these forms.

5.46 Some respondents were also concerned at the scope of some of the detailed information requirements which appear to apply to “every officer” in the organisation. Several respondents felt this was disproportionate and onerous and should only apply to certain individuals. Respondents were also concerned about what should be covered when listing “assets” and what level of detail might be required when describing the relationships between parties and any inter-company relationships.

5.47 In response to the feedback received, the Government will update the Regulator’s Licensing Rules to make it clear which part of the SIA defines an “officer” and that the regulator will only expect detailed information on key members of an organisation. Clarity will also be provided on what assets the regulator may be interested in. With regards to the relationships between parties and any inter-company relationships, in the first instance applicants should use their discretion in providing information to the regulator which they believe to be sufficiently detailed. Where further information is required, the regulator will inform applicants of this.

Context and Background

Background

5.48 This section of the consultation set out the legislative background for the secondary legislation and associated guidance being consulted on.

5.49 The safety principle of ensuring that risks are managed to the standard of being as low as is reasonably practicable (ALARP) was also introduced, alongside an overview of the international context for commercial spaceflight from the UK, particularly with regard to the US.

Question

6. Are there any matters addressed in the Context and Background Information section of the consultation document on which you would like to comment? Please provide details.

[4] The Federal Aviation Administration Office of Commercial Space Transportation (FAA-AST) regulates the commercial space transportation in the US. www.faa.gov/about/office_org/headquarters_offices/ast/

Consultation responses

5.50 Some respondents raised concerns that the Regulations are either too detailed or insufficiently detailed in parts, and that specific terms and definitions required further elaboration. There was a belief among some that the Regulations and the guidance were not 'user-friendly' or accessible for small and medium-sized enterprises. It was suggested there could be a high-level review of the proposed secondary legislation and policy, with summary and flow diagrams that are specific to spaceports, launch operators, range control service providers and orbital operators, summarising the Regulations and the guidance.

5.51 The Government understands the need for clarification and has presented guidance to accompany the Regulations that is detailed and comprehensive, which specifies the regulatory requirements, and is supported by explanatory diagrams. Throughout this document the Government has indicated where updates to the guidance material can be expected.

5.52 Several respondents queried whether transitional provisions were to be put in place to govern applications made under the OSA when the Regulations come into force. Respondents noted that there was no reference to operations that fall under both the SIA and OSA, and clarity was needed about licence requirements for operations that fall under both.

5.53 Once in force, the SIA will work alongside the OSA to regulate the spaceflight and associated activities of UK entities. The OSA will continue to regulate:

- the procurement of the overseas launch of a space object, and
- the operation of a satellite in orbit from an overseas facility by a UK entity.

The SIA will regulate:

- launch from the UK (space or sub-orbital) and return
- the procurement of a UK launch (space or sub-orbital)
- the operation from the UK of a satellite in orbit
- the operation of a spaceport, and
- the provision of range control services.

The type of licence required will depend on the activities being carried out.

5.54 There are transitional provisions in commencement regulations relating to commencement of the provisions in the SIA which are due to come into force at the same time as the Space Industry Regulations. The draft commencement Regulations contain a transitional provision which enables applications for licences made under the OSA at the coming into force of the licensing provisions contained in the SIA and which fall to be determined under that SIA, to continue to be considered and determined under the OSA. The draft commencement Regulations also include a savings provision which has the effect of saving certain licences processed under the OSA but granted after the date of coming into force of the licensing provisions made under the SIA. Such licences would be treated as having been granted under the SIA.

Part 1: Preliminary

Background

5.55 Throughout the draft Regulations terms are defined to aid the reader in understanding the provisions set out. Balancing the complex and often highly technical requirements around spaceflight with regulations that are accessible and easy to understand is challenging. Views were sought on whether the right balance was struck or whether certain terms required more explanation.

Questions

7. Are there any terms used in the regulations that are not defined that you think should be defined? Please provide details.

Consultation responses

5.56 Part 1 of the draft Regulations, and section 1 of the guidance documents, explain most of the terms used in the Regulations.

5.57 Some terms suggested by respondents are already defined elsewhere, and do not need to be defined again. These terms included:

- “Spaceport” and “balloons” are defined in the SIA
- “carrier aircraft” is defined in the SIA and the Regulations
- “Safety critical system” and “hazardous material” are defined in the Regulations
- “Safety case” is defined in the Regulations for launch operator and return operator licence applicants, spaceport licence applicants and licensees.

5.58 Some terms suggested by respondents carry their plain English meaning. These were “prevention”, “mitigation”, and “possession”.

5.59 It was suggested that the term “space site” should not be used, and terms such as spaceport or launch site be used instead. The Government recognises that the term “space site” is unique but will not be removing this term from the Regulations as this term was introduced in the primary legislation, the SIA.

5.60 Some respondents suggested that what amounts to a “national security issue” needs to be outlined more clearly. There is no definition of national security; however, the Government will update the guidance for orbital operator licence applicants, and the guidance on security matters for applicants and licensees, to provide some examples for potential licensees.

5.61 It was suggested that the definition of “US technology” needed refinement to be more precise, especially given the additional restrictions and processes which may become applicable when US technology is deemed to be present in some way. The terminology used in the regulations mirrors that used in the TSA and therefore cannot be amended or removed.

5.62 It is not possible to provide a more precise definition for “US technology”. However, any US export licence approval and related technology transfer control plan relevant to the operation will set out the details of the US technology involved.

5.63 Other respondents raised points in relation to other parts of the consultation covering spaceports, orbital activities, spaceflight safety, risk, informed consent, environment, and appeals. The responses to these are dealt with in their respective sections of this Government response.

Part 3: Grant of a licence – general

Background

5.64 The Regulations set out clear requirements for holding a licence under the SIA. These range from meeting eligibility criteria to appointing individuals to specified or prescribed roles, depending on the licence being applied for.

5.65 Views were sought on whether these requirements were acceptable to prospective applicants and whether the purpose of the prescribed roles had been understood.

Questions

8. Are there any other considerations you think the eligibility criteria and prescribed roles regulations or guidance should address? Please provide details.

Consultation responses

5.66 A number of respondents were concerned about the application of the eligibility criteria under draft regulation 5 where a licensee is a body corporate and its application to “every officer of that body corporate”. Respondents suggested that this is disproportionate for larger, well-established companies and the application of the eligibility criteria should be limited to officers who will be performing specific key roles, e.g. managing and finance directors.

5.67 The Government will amend the guidance to clarify which officers of a body corporate would need to meet the eligibility criteria. This is set out in more detail in paragraphs 4.27 and 5.47.

5.68 Some respondents suggested that the eligibility criteria should preclude applicants and prescribed persons subject to UK undischarged bankruptcy measures or convicted of indictable offences in the UK, and that this should also include similar insolvency proceedings or dishonesty offences.

5.69 Draft regulation 6(e) covers any indictable offence and any offence involving fraud or dishonesty, whether indictable or not.

5.70 It was queried whether there would be a time limit on any or all of the eligibility criteria.

5.71 All the eligibility criteria have a measure of time constraint within them, e.g. criminal convictions become spent after a certain period of time. Spent convictions will not need to

be considered, and UK bankrupts will be eligible once that bankruptcy has been discharged.

5.72 A number of respondents sought further clarity on the function of security manager, and on what would constitute an issue of national security. Some respondents also asked if the security manager would require security clearance.

5.73 The point regarding national security, as discussed in paragraph 5.60, will be addressed in the guidance on security matters for applicants and licensees, and the guidance for orbital operator licence applicants and licensees. Draft regulation 175(1) requires that a licensee must ensure that the security manager has a level of security clearance which would be regarded as appropriate by the Government for persons performing such security functions.

Questions

9. Are there any other considerations you think the grant of licence regulations or guidance should address? Please provide details.

Consultation responses

5.74 The responses received to this question were predominantly themed around the timing for a licence application and the individual application stages, and the administrative requirements and potential burdens that could result.

Licence application timings

5.75 The main point raised by respondents was a request for clarity about how long it would take for a licence application to be processed. It was suggested that gateways or checkpoints could be set out somewhere, for example in the guidance material, that could act as milestones for both applicants and the regulator. This point was also raised in relation to the Regulator's Licensing Rules and has been addressed in paragraph 5.39.

5.76 There was also a request for clarity around how long a licence would be valid for once granted.

5.77 Some respondents were also concerned that the time needed for the Government to bring the draft Regulations into force, coupled with the time that may be needed to apply for a licence, could result in UK launches not being able to take place until much later in the 2020s.

5.78 Section 14 of the SIA provides that a licence may be granted by the regulator for a period specified in the licence. A licence granted for a specified period may be renewed by the regulator, on the application, of the licensee for a further specified period. The regulator cannot however renew the licence automatically (see rule 5.6 of the Regulator's Licensing Rules and section 14(4) of the SIA).

5.79 The Government remains on track to establishing a safe and supportive regulatory framework to enable launches to take place from the UK from the early 2020s.

5.80 There was general agreement with the proposed 28-day time period within which an applicant must respond to an information request from the regulator, and the process by which an applicant can submit a request for an extension to this time period. However,

some respondents also felt that the timing for certain processes by the regulator should also be specified, for example by setting a time limit for the regulator to review information provided by applicants, for the regulator to respond to applicants etc. These points were also raised in relation to the Regulator's Licensing Rules and have been addressed in paragraph 5.40. It was additionally suggested that the regulator should provide confirmation of the receipt of an application, or other material that may be provided as part of an application.

5.81 All licence applications must be submitted online and confirmation of receipt will be given at key stages. It is intended to share more details on how to submit an application, the key stages of the licensing process and methods to escalate issues, on the CAA website. Additionally, service level agreements on estimated minimum processing times and key performance indicators are currently being developed that will be used to track progress. These will be shared at a suitable point.

5.82 The powers to be conferred on the regulator provide the regulator with a wide discretion about the granting of a licence. There is no restriction on the number of licences which a regulator may grant to one applicant. In addition, it is possible for one licence to authorise a series of launches, with the regulator having powers to impose licence conditions regarding such a series of launches.

Administrative requirements and potential burdens

5.83 Multiple respondents felt that the use of electronic signatures should be allowed for documents which are required to be submitted as part of licence applications, particularly if certification is required for lots of documents. This point was also raised in relation to the Regulator's Licensing Rules and has been addressed in paragraph 5.44.

5.84 Many respondents were concerned that the draft Regulations could create significant administrative burdens, and that the requirements to provide all the information necessary could be time-consuming and labour-intensive. It was suggested this process could be eased by the regulator retaining applicant records for future applications, and thereby avoiding the need for applicants to resubmit information that is already held on file.

5.85 Some respondents also expressed a concern that the regulator may become overburdened as it works through all the applications it will receive and that sufficient resourcing in the regulator would be key.

5.86 The Government recognises the concerns that potential applicants may have about the administrative burden in applying for a licence. The draft Regulations have been crafted to allow for flexibility and balance. As set out in the guidance material (which was included in the consultation package), the regulator welcomes and encourages 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, and can help with understanding whether a licence is required for the proposed activities and what information the applicant will need to submit. Pre-application engagement can also enable the regulator to learn if there are any special circumstances related to the proposed activities. There is further information on pre-application engagement in the guidance documents relating to each of the licence types.

5.87 There is no obligation to engage with the regulator before submitting an application, and if an applicant decides not to engage, this will in no way affect the regulator's consideration

of a submitted application. Any engagement before submitting a licence application is not part of the regulator's decision-making process relating to granting or refusing the application for the licence. The aim of any informal engagement of this kind is to facilitate the preparation of the application and of information required in connection with the application. The process for obtaining a licence starts at the point when the regulator receives the application and the information in connection with it, and it is expected that engagement between the regulator and applicant will be ongoing, even once the application has been submitted.

Part 4: Grant of a spaceflight operator licence – risk

Background

5.88 The Regulations and associated guidance on the spaceflight operator licence detail the requirements and assessments which must be met with regards to safety, before a licence can be granted.

5.89 Schedule 1 to the Regulations provides an overview of the minimum information which must be included in a spaceflight operator's safety case. The consultation asked whether these requirements and the other provisions around the spaceflight safety case were appropriate and sufficient.

Question

10. Schedule 1 details the types of information required by the operator on the manifested payload(s) ahead of launch, and the use/presentation of this information within the safety case, as well as how this information will be used by the regulator. Do you have any comments on the proposed approach? Please provide details.

Consultation responses

5.90 Many respondents agreed that the information required from the spaceflight operator on any payload(s) listed in the launch manifest were reasonable.

5.91 Some respondents asked for clarity on which information requirements were applicable to orbital operators and which to spaceflight operators, raising concerns about duplicating the information provided on the application for orbital operator licensees. Respondents suggested that the regulator permit a launch operator licensee to make reference to an orbital operator licensee for the payload information, rather than having to provide it separately.

5.92 As discussed in paragraph 5.32, the guidance for orbital operators will be amended to provide further clarity on which regulations apply to this licence type. While the sharing of information between licensees is encouraged, launch operators must provide the regulator with the requisite information on manifested payloads ahead of a launch from the UK, as stipulated in Schedule 1.

5.93 Comments were also received regarding Schedule 1, with some respondents concerned that only 'descriptions and diagrams' were required, arguing that the information requested should be more substantial and relevant to the safety case. Schedule 1

however, clearly requires applicants to submit more than descriptions and diagrams in support of the safety case.

5.94 As a result of the feedback received from the consultation, an additional requirement will be added to Schedule 1 for an applicant to supply payload technical particulars relevant to the risk of a major accident including:

- descriptions of any systems on board the payload
- information about any hazardous material or any equipment or device carried on board the payload, and
- a description of any ground support equipment needed for the payload or its integration with the launch vehicle and information about any essential interface between the payload and specific equipment at the place of launch.

5.95 This information may be updated during the application process as specific information on actual payloads becomes known. Once a licence has been granted, conditions will be set on spaceflight operator licences that require payload information to be reported as it becomes known for a subsequent launch. The guidance material provides examples of what these information requirements are.

Question

11. Paragraph 5 of Schedule 1 requests a schedule of the preparatory events linked to the safety of a launch campaign. This includes grouping events into ‘days ahead of launch.’ Do you have any comments on the fidelity of the events? Please provide details.

Consultation responses

5.96 Respondents generally agreed that a schedule of preparatory events was necessary. However, respondents noted that any schedule submitted at the application stage would be preliminary and would be subject to change.

5.97 A number of respondents commented that although specifying days was useful, closer to the time of the launch events would need to be specified in hours.

5.98 Some respondents thought that the schedule should be referred to as an “outline plan of safety critical events” and also include the expected activities of other participants such as local authorities or the police.

5.99 A few respondents suggested that the schedule should clarify the period of time expected for the launch window and that the regulator should be provided with updates/alterations to the schedule/plan, particularly where these may affect the safety case.

5.100 In response to the feedback received, the requirements for launch operator licence applicants to provide information on the preparatory events in Schedule 1 has been broadened to link it more clearly with the Ground Safety Analysis and to cover the applicant’s proposed review process for checking progress and the safety critical events that the range control and spaceport licensees will perform. The schedule of preparatory events need only be preliminary or outline at the time of application, but any updates or refinements must be communicated to the regulator ahead of the launch event as required.

Question

12. The Regulations explain how the safety case can be used to demonstrate the safety of single or multiple missions. Do you have any comments about this approach? Please provide details.

Consultation responses

5.101 Many respondents agreed that spaceflight operators should not be required to duplicate the safety case for each mission if the missions were sufficiently similar. Respondents suggested that the regulator only need consider the possible effect of the changes proposed between the launch proposal already approved and any subsequent launches as appropriate.

5.102 Some respondents suggested that if mission types (launches) vary and a range of missions are to be allowed for one licence, the safety case must cover the 'worst-case' scenarios for a range of missions. Respondents recommended that this include meteorological variables, human factors, organisational design and variations in pattern of life and geography.

5.103 A few respondents asked for further clarity on how certain regulations would apply in the case of multiple missions, or where there are a range of missions permitted by the licence. There was some confusion over whether a licence application would be needed for each launch, and if so, whether the same level of (duplicate) information would need to be submitted for every licence application.

5.104 In line with the feedback received, the Government intends that a spaceflight operator licence will be flexible enough to cover a single mission or multiple missions, as required by applicants. The safety case should reflect the range of activities being considered under a licence. The guidance material will be updated to provide further clarity on how this should be set out.

Question

13. The Regulations set out the elements of the safety case for spaceflight operators, including the minimum requirements. Do you have any comments on the safety case or the minimum requirements? Please provide details.

Consultation responses

5.105 There were a number of different comments provided on the minimum requirements set out in Schedule 1 to the Regulations, although there was little consensus on how or why these requirements should be amended.

5.106 A few respondents made the case that the 'technical particulars' in Schedule 1 should be set out in guidance rather than in Regulations, and that this guidance should provide details about the types of documentation that the regulator will accept.

5.107 Some respondents were in favour of the regulator providing "pre-approved" methods for meeting the applicable requirements, such as an indicative list of technical data/technical annex.

5.108 The Government's approach to developing the Regulations has been to avoid prescriptive requirements and allow applicants flexibility to meet the requirements. Providing applicants with "pre-approved" methods of compliance would be contrary to this approach.

5.109 Respondents agreed that the safety case should include a safety argument, articulating what the top-level safety argument/claim is and how the safety case satisfies that argument/claim. Some respondents suggested that human factors and organisational design also be considered; as well as simulated adverse events and exercises to evidence stress-testing of "cases".

5.110 As a result of this and other feedback from the consultation, the consideration and mitigations around the impact of human factors on safety have been included in the Schedules to the Regulations.

5.111 Respondents were also concerned about the potential overlap between the requirement for the spaceflight operator to identify and assess major accident hazards associated with the ground segment, and the requirements for spaceport licensees to do the same, resulting in duplication.

5.112 Some respondents questioned the differences between the regulations setting out the minimum requirements for spaceflight operators and for spaceports.

5.113 Although the safety case requirements for spaceflight operators and spaceports compare well, the Government recognises that more could be done to align the two. This is addressed more specifically in response to question 22.

5.114 A few respondents asked that spaceflight operators should be required to adhere to similar space debris mitigation regulations and practices as orbital operators, including avoiding collision throughout their lifecycle, during deorbit or disposal phases of the mission as appropriate. Some respondents suggested that this should be included in the safety operations manual and should address the safety aspects for recovery of stages or fairings (planned and in failure cases).

5.115 As a result of the feedback received from the consultation, the requirements for the safety case for spaceflight operators will be amended to include the applicant providing a description of the engineering practices and design and operational measures that will be used to prevent or mitigate the creation of space debris. Further guidance will be provided to support applicants in meeting these requirements.

Question

14. The information the safety case must contain is set out in Schedule 1 – is there any further information you think it should be necessary for the safety case to contain or anything currently in the requirements that should not be in the safety case? Please provide details.

Consultation responses

5.116 The majority of respondents were content with the information about what a safety case should contain and did not propose any amendments.

5.117 A few respondents were concerned that too much detailed information is required, the requirements are overly prescriptive (particularly on defining hazards) and are not commercially workable.

5.118 The Government is not of the view that the requirements are overly prescriptive, and considers that they are proportionate and appropriate.

5.119 Some respondents commented that the definition of 'safety critical systems' used in Schedule 1 paragraph 11 is too wide.

5.120 The Government's response to this concern is set out in more detail at question 16, paragraph 5.131 below, in relation to question 16 which specifically addressed safety critical systems.

5.121 One respondent suggested that although the technical requirements specifications are currently left to operators to interpret, this should not be done without providing standards or acceptable means of compliance to applicants which include appropriate performance and risk-based requirements, noting that this approach is taken in the US. As discussed in paragraph 4.74, the term "technical requirements" in Schedule 1 will now also refer directly to chapter 6 of ECSS-E-ST-10-06C.

5.122 A respondent also suggested that the regulator should recommend or provide a population database to use for the flight safety analysis. Although the Government recognises the value of having access to such data, this would be a duplication of information already accessible online.

5.123 A number of respondents raised concerns about sharing commercial information and valuable intellectual property (IP) with the regulator, particularly in the case where US launch systems are being used.

5.124 The Government recognises that the protection of applicant information is of great importance and will work with the regulator to ensure this is conducted to the highest standards.

Question

15. What do you understand by the phrase (the launch vehicle or carrier aircraft's) "method of operation" in the safety case requirements set out in Schedule 1? Please provide details.

Consultation responses

5.125 Many respondents equated the term "method of operation" with the term "concept of operations," expressing a preference for the latter.

5.126 The majority of respondents correctly assumed that the term "method of operation" indicated a high-level descriptive overview of the entire sequence/phases of the launch activity, from ground preparation through to launch and disposal of stages / completion of mission. They also assumed that key technical information about the launch vehicle architecture would need to be provided (type of propulsion system, orbits to be achieved, flight safety system, normal and abort flight profiles etc.).

5.127 In response to the feedback received, references to the “method of operation” will be changed to read “concept of operations” in Schedule 1.

Question

16. Do you agree with the list of safety critical systems in paragraph 11 of Schedule 1? Please provide details.

Consultation responses

5.128 Most of those who responded to this question agreed with the list of safety critical systems listed in paragraph 11 of Schedule 1 to the Regulations.

5.129 Some respondents suggested adding mechanical, pyrotechnics devices, telemetry and communications systems on board the vehicle to the list. Others suggested adding meteorological monitoring systems and human factors such as training, experience, and fatigue to the list. This has been addressed in paragraph 5.110.

5.130 Comments were made by some respondents that the definition of a “safety critical system” in Schedule 1 was robust enough not to require a detailed list and that the regulator should consider setting out an acceptable methodology to allow applicants to identify such systems.

5.131 In response to the comments received, the definition of a “safety critical system” will be amended to not specify individual sub-systems (e.g. electrical) but instead redefine as meaning any system, including hardware and software, the performance of which is essential to preventing a major accident as a result of the proposed spaceflight activities.

5.132 The information to be supplied for each safety critical system will be changed to make it more relevant from an engineering and analysis perspective, by requiring applicants to describe how the use of a system is justified, accepted for use and is expected to perform throughout its lifecycle.

Question

17. Do you think licensees should share their safety cases with other users/potential users of the spaceport or those other users who have prepared a safety case? Please provide details.

Consultation responses

5.133 The majority of respondents indicated that they supported the sharing of safety information with other licensees but did not want this to be a mandatory requirement due to the commercially sensitive, proprietary information a safety case will inevitably contain.

5.134 Some respondents suggested that the regulator could encourage licensees to collaborate through joint hazard workshops to identify overlaps and agree working arrangements, particularly those that result in a transfer of risks or where responsibilities need to be allocated. Respondents also suggested that spaceflight operator licensees should be encouraged to carry out joint analysis with the range control and spaceport licensees, to enable safe integration of all operations and a joint understanding of safety matters.

5.135 Respondents also commented that licensees should be encouraged to share best practice in the mutual interests of the combined operation. Some respondents suggested that potential licensees should be required, in their safety case, to describe how they propose to manage safety interfaces with other licensees/users. It was also suggested that the regulator sets out in guidance how licensees/users should collaborate and engage in constructive dialogue.

5.136 In response to the feedback received, additional requirements have been included in the schedule of preparatory events in Schedule 1 to the Regulations to cover the review process for checking progress towards launch and the safety critical events that the range control and spaceport licensees will also perform. In addition, a new provision will be added to the safety operations manual in Schedule 5 to require applicants to describe how they intend to coordinate and communicate with other licensees and key parties as part of preparations for spaceflight activities.

Question

18. If you intend to apply for a spaceflight operator licence, would you share your safety case with other users/potential users of the spaceport or other users who have prepared a safety case? Please provide details.

Consultation responses

5.137 The responses to this question were similar to those already provided for question 17. Respondents largely confirmed that they would share safety information but would avoid sharing sensitive information.

5.138 Respondents agreed that it was both sensible and necessary for launch operators to share parts of their safety cases with proposed spaceport and range control service providers, but that it should be up to the licensee to decide what information to share.

5.139 As a result of the feedback received from the consultation, the Government is not proposing to mandate the sharing of safety cases between licensees or prospective licensees. Similar queries and responses were received for questions 20 and 21. These are discussed in Part 5.

Question

19. Are there any other considerations you think the spaceflight regulations or associated guidance should address with regards to safety? Please provide details.

Consultation responses

5.140 The majority of respondents provided comments in response to this question, but there was little consensus on the changes that should be made to either the Regulations or the guidance material.

5.141 A few respondents suggested that an assessment of the underlying safety record of the technology being used should be considered as part of a safety case, as well as the heritage of the spaceflight operator.

5.142 Some respondents proposed that the safety management approach be aligned with other key entities, and that human factors be considered in both the Regulations and guidance material. Others were concerned that the CAP 1616 or the Air Navigation Order 2016 to protect air traffic had not been considered.

5.143 One respondent also asked for clarity to be provided in the guidance on how the Regulations might apply to unmanned or autonomous vehicles where there is no "pilot in command." Clarity was also sought on what carrier aircraft were permitted under the Regulations.

5.144 Some respondents also queried why the Regulations did not follow the HSE good practice approach (Plan, Do, Check, Act) nor align with COMAH requirements and also whether the regulator would be providing details on 'acceptable means of compliance' in future iterations of the guidance material.

5.145 As a result of the feedback received from the consultation, more guidance will be provided on the subjects identified, such as use of airspace, different types of carrier aircraft including autonomous kinds etc. Schedule 1 to the Regulations will include a requirement for applicants to include in their application information about any relevant experience (heritage) they may have in developing space-related hardware or software. In terms of coordinating safety performance, a single new common safety management system approach will be required for spaceflight operators and spaceports in a revised Schedule 4. The Regulations have been devised to align, where possible, with similar provisions and approaches used in other spaceflight licensing regimes worldwide. This approach includes the treatment within the Regulations of major accident hazards, flight safety analysis, ground safety analysis, operator safety regulations and the flexibility to apply conditions on a licence which are specific to each type of licensed activity.

Part 5: Grant of a spaceport licence

Background

5.146 For a spaceport licence to be granted, a number of safety requirements must be met, including the preparation of a safety case. There are likely to be overlaps between the safety activities carried out by spaceport and launch operator licensees under the SIA.

5.147 The consultation asked whether spaceport licensees would be likely to share their safety cases with other licensees and whether this should be a formal requirement. Views were also sought on whether there was sufficient alignment between the requirements for launch operator and spaceport safety cases to facilitate sharing of information.

Question

20. If you intend to apply for a spaceport licence, would you share your safety case with other users/potential users of the spaceport or those other users who have prepared a safety case? Please provide details.

Consultation responses

5.148 In answering whether they would share their safety case with another potential spaceport user, respondents were almost evenly split although slightly more were opposed to the idea than in support of it.

5.149 Respondents generally recognised that spaceport and launch operator licensees will need to collaborate when preparing their safety cases and share information to address interdependencies and ensure that there is a complete safety picture. However, they expressed a preference for this not to be an explicit requirement in legislation or guidance.

5.150 A number of respondents were concerned about sharing their safety case in its entirety because of the commercially sensitive and proprietary information which may be contained in it.

5.151 One respondent also noted a liability risk, if a third party obtained a copy of their safety case and suffered a loss as a result of an issue arising from or in relation to that safety case. The respondent suggested that there could be potential for that party to make a negligence claim against the organisation that produced the safety case for that loss.

5.152 This question is closely linked to the next question posed on whether the sharing of safety cases should be specified in the Regulations.

Question

21. Regulation 39(3)(a) requires the spaceport licence applicant to take into account any operator licence applicant in developing its safety case. Similarly, regulation 31(4)(b) requires an operator licence applicant to consult any proposed spaceport licensee on its operating manual. Do you see a need for a specific requirement for spaceport and operator licensees to share their respective safety cases and ground safety analysis? Please provide details.

Consultation responses

5.153 As with the previous question, there was a roughly even split between those who answered ‘yes’ and ‘no’ to this question.

5.154 One respondent thought that, in practice, it would not be possible to conduct a launch safely if both the spaceport and launch operator licensees were unaware of the other party’s risks and mitigations, so this would end up being a de facto requirement regardless of whether this was set in the Regulations.

5.155 A small number thought that, within the bounds of commercial confidentiality, the spaceport operator should be able to see safety cases for all the spaceflight operators it wishes to host, to identify any potential overlaps or conflicts or to verify common assumptions.

5.156 For the most part, the comments received in response to this question mirrored those already provided for question 20, with respondents urging against any mandatory requirement to share safety cases.

5.157 Respondents recommended that the guidance material be used to encourage collaboration and best practice between spaceport and launch operator licensees and that clear steers be provided on how these two should interface with regards to safety. The guidance will be updated to reflect the suggestions made.

5.158 As a result of the feedback received, the Regulations will remain unchanged and no provision will be added which mandates the sharing of safety cases between spaceport and launch operator licensees.

Question

22. It is foreseeable that there will be an overlap between the ground safety analysis conducted by a launch operator and the spaceport's safety case. Regulations are drafted to meet the specific requirements for each type of licence. Do you see any aspects of the spaceport safety case regulations that should more closely align with regulations 30 and 31? Please provide details.

Consultation responses

5.159 The majority of those who responded to this question answered 'yes.' However, there were no consistent areas of alignment identified by respondents.

5.160 One respondent suggested that in practice this alignment would already be happening because licensees would be interacting to align their activities as part of developing their safety cases.

5.161 A number of respondents did not agree with aligning the requirements between spaceport and launch operator safety cases, due to concerns about the prescriptive nature of the launch operator requirements in regulation 31.

5.162 A few respondents suggested amending regulation 30 to take into account 'human factors' and the interactions between hazards as part of the safety case.

5.163 The Government recognises the need to take account of 'human factors' in any hazard identification which could impact activities being carried out safety. The draft Regulations will therefore be amended to ensure that 'human factors' are considered as part of the safety management system. Staff will also be required to undergo training in 'human factors' as set out in paragraph 5.240.

5.164 One respondent suggested that alignment of the safety cases could be best achieved through unifying the safety management systems for both licensees. As a result of this feedback, the two licence types will now share a single set of requirements for the safety management system, through a single Schedule to the Regulations.

5.165 One respondent envisaged that it would be the spaceport licensee's responsibility to provide meteorological data and to arrange for weather forecasts for the launch window, while the responsibility for using this information appropriately would lie with the launch operator licensee. This is contrary to the intentions set out in the Regulations and the guidance material which require the launch operator licensee to determine the meteorological conditions under which it is safe to launch and obtain appropriate forecasts and data. This does not preclude the spaceport licensee from supplying the required information, only that they are not mandated to do so.

5.166 Similar questions were asked in Part 4 of the consultation, which is focussed on the risks to spaceflight operators, about whether there was a need to further align the safety cases for spaceport and launch operator licensees. Respondents suggested that the scope of the spaceport safety case be narrowed from 'accident hazards' to 'major accident hazards' to align the requirements between the two licensees.

5.167 As a result of this feedback, the language used to describe hazards for spaceport operators will be amended to also focus on 'major accident hazards.'

Question

23. Are there any other considerations you think the grant of a spaceport licence regulations and associated guidance should address? Please provide details.

Consultation responses

5.168 The majority of those who responded to the consultation addressed this question, with about two-thirds providing further suggestions for how the Regulations and guidance might be amended, and a third asserting that no changes were required.

5.169 One respondent queried whether the definition of the safety clear zone set out for spaceports in draft regulation 37 was accurate because it did not reference launch activities specifically, while the guidance material does.

5.170 The purpose of spaceport safety clear zones is to identify the areas which should be kept clear of people during the carrying out of hazardous pre-flight and post-flight operations (as defined). The launch operator safety case will identify the areas that need to be kept clear during a launch.

5.171 Those who provided comments largely reiterated points already made in response to previous consultation questions, seeking guidance on how the different licensees would work together on safety, or asking for the regulator to commit to a timescale for reviewing a licence application.

5.172 The Government recognises the importance of this coordination. In addition to aligning the safety management systems of the two licensees and changing the scope of a spaceport safety case to align with the 'major accident hazards' of a launch operator licensee, the Government will also ensure that potential licensees are provided with more detailed guidance on building a safety case and working with other licensees. This will encourage collaboration and constructive dialogue between licensees and ultimately contribute to ensuring that licensed activities are carried out safely.

Part 6: Range control services

Background

5.173 Range control services under the SIA are targeted at operations established in a given location which are capable of providing services for multiple launches. It is envisaged that the provision of temporary range control services will be managed through licence conditions.

5.174 The consultation set out scenarios for how the range control licence might work in practice, including more than one range control service provider operating at a designated site but a single licensee providing services for a launch operation.

5.175 The consultation also sought views on whether it would be appropriate to grant a licence without the designated site being identified and whether respondents found it appropriate that a spaceflight operator could also hold a range control licence.

Question

24. Do you think there are any drawbacks to the overall approach to sites for range control licensees? Please provide details.

Consultation responses

5.176 About a fifth of those who responded to the consultation provided feedback on the overall approach of having multiple range control licensees at a single site.

5.177 A number welcomed the flexibility of the proposed approach but concerns were raised about the potential for conflict if two licensees share facilities at the same site. One respondent commented that having a single licensee at a site would be preferable, to provide consistency and help to standardise practices.

5.178 Some respondents raised concerns about how coordination would be maintained between range control service providers and how hierarchies might be identified between the licensees at a single site.

5.179 On the basis of feedback received from the consultation with regards to multiple range control licensees operating at the same site, the Government will ensure that the guidance material is updated to explain how licence conditions will be used to ensure that licensees deconflict their operations when sharing a site.

5.180 The Government maintains that the approach of allowing multiple range control licensees to operate at single site will encourage competition, flexibility and resilience in commercial spaceflight market. No changes are therefore being made to this approach.

Question

25. Do you agree that there should be a single licensee providing the range control service for a launch operation? Please provide details.

Consultation responses

5.181 Approximately half of those who responded to the consultation also addressed the question of whether a single licensed range control service provider should provide services during a launch operation.

5.182 The majority of respondents agreed that this should be the case, with a small number disagreeing.

5.183 Those who disagreed with this approach were concerned about losing flexibility and competitiveness through this approach. They also questioned whether this approach

would allow for future scenarios where range control service providers may be more able to integrate their services, thereby allowing for more than one licensee to provide services. One respondent also questioned how this might work in the future if operators chose to use a bespoke range control or launch solution which relies on a third party, rather than the range control or tracking solutions currently envisaged by the draft Regulations.

5.184 The draft Regulations do not preclude the use of third parties or sub-contractors in the provision of services, but the Government's approach will be to require a single licensee to be the point of clear accountability for the range control services in a given launch operation. This approach will allow for the future scenarios described and will provide more flexibility to range control service providers.

5.185 Respondents who were in favour of this approach commented that it ensures accountability and provides a single point of authority to declare the range safe for launch. These respondents made the case that multiple licensees would result in confusion and increase the risk of errors, whereas a single licensee taking responsibility would simplify operations from a logistical perspective.

5.186 Some respondents highlighted that the successful implementation of this approach would require robust management systems to be in place, particularly for sub-contractors who may be providing services. Some were also in favour of specific regulations being written to clarify this approach.

5.187 As a result of the overwhelmingly positive feedback received from the consultation, no changes are proposed to the draft Regulations for range control service provision.

Question

26. Do you think that the system should allow a range control licence to be awarded without the designated site being identified? Please provide details.

Consultation responses

5.188 Almost half of those who responded to the consultation were in favour of it being possible to award a range control licence without the designated site being identified, with a small number disagreeing with this approach.

5.189 Respondents who disagreed with the approach were concerned about the ambiguity this may introduce, while others suggested that this approach could work only if managed through licence conditions which prevent the range control service provider from carrying out their licensed functions until the designated site is identified. Some respondents felt that allowing a range control licence to be awarded without the designated site being identified would prevent the site-specific attributes being fully considered when granting a licence.

5.190 In almost all instances, those who were in favour of this approach provided similar comments, that an incremental approach to licensing would be necessary, where a licence is granted only on the basis that services will not be provided by the licensee until the designated site has been identified.

5.191 This is the approach intended by the Government, that licence conditions will be used to ensure that a range control service provider will not be authorised by the regulator to

support launch activities until the site-specific requirements are known and the licensee is able to show that they can meet these requirements.

5.192 Some respondents questioned whether this approach would be practical and queried whether such an approach would result in delays in the licensing process.

5.193 Respondents who were supportive of this approach commented on the positive impacts this could have on reducing competitive barriers by allowing licensees to enter the market early and welcomed the flexibility that this approach will provide.

5.194 On the basis of the feedback received, the proposed approach of allowing the issuing of a licence without the designated site being identified will be retained. The Government is confident that this approach will ensure that the licensing system for range control service provision remains flexible and does not unduly constrain prospective licensees.

Question

27. Do you think that the requirements to ensure the independence of the range function are proportionate? Please provide details.

Consultation responses

5.195 The vast majority of those who responded to this question agreed that the requirements to ensure the independence of the range function were proportionate and appropriate.

5.196 There were a small number who disagreed that the range control service provider needed to be independent from the other licensees, stating that launch operators were likely to have their own equipment capable of performing range control functions, or that they may seek third party solutions. They put forward that, as long as a safe solution could be provided to facilitate a launch or flight termination, the Regulations should support this.

5.197 As a result of the feedback received from the consultation, the guidance material will be amended to provide further clarity on how licensees can carry out their own functions such as flight terminations.

5.198 Some found the drafting of the Regulations unnecessarily prescriptive in this regard, and were concerned that they could result in barriers being created between licensees. Other respondents were concerned about conflicts of interest arising from the approach, particularly where one company holds licences for different activities.

5.199 Concerns were also raised about whether independence could be maintained between spaceport and range control licensees. It was suggested that a requirement for a range control licensee to have a safety management system could help to mitigate these concerns, by ensuring that safety management is implemented correctly and responsibilities between the two parties are understood.

5.200 The Government recognises that including a provision in the Regulations which requires a range control service provider to have a safety management system will help to ensure that safety is at the heart of the range control licensee’s activities. The draft Regulations will therefore be amended to include this provision.

5.201 Those who provided feedback agreed that the independence requirements for the range control function were sensible and proportionate and a few also provided further suggestions on how this independence could be ensured.

5.202 As a result of the feedback received from the consultation, no further changes will be made to the regulations on ensuring the independence of the range control service provider.

Question

28. Are there any other ways of ensuring this independence? Please provide details.

Consultation responses

5.203 Just under half of those who responded to the consultation provided suggestions of how independence of the range control service provider could be maintained.

5.204 Some respondents reiterated points already made, that independence could be ensured by: implementing a safety management system for range control licensees; ensuring corporate separation between different licensees; avoiding or mitigating conflicts of interest; or ensuring that there is a single accountable person.

5.205 Some respondents suggested using autonomous guidance and flight termination systems to mitigate concerns around the independence of the range control service provider.

5.206 A small number of respondents also suggested that announced and unannounced audits may also help to ensure the independence of the range control function.

5.207 The Government welcomes these helpful suggestions. As a result of the feedback received from the consultation, the guidance material will be amended to account for the comments received from respondents.

Question

29. Are there any other considerations you think the range control regulations and associated guidance should address? Please provide details.

Consultation responses

5.208 Approximately half of those who responded to the consultation had further comments to make on the Regulations and guidance associated with range control service provision.

5.209 One respondent suggested that there should be a specific requirement for range control services to be demonstrably secure from external interference. However, these provisions are already included in the security requirements which must be met by all licensees.

5.210 Some respondents provided specific suggestions on how the guidance material could be amended to clarify certain points, such as how the licensees should interact, how the quality management system will support the availability of safety critical systems, as well as some examples about what is meant by the terms “appropriate,” “proportionate” and

"apportion." Clarity was also sought on some of the timescales mentioned in the guidance material.

5.211 The Government will ensure that the guidance material is amended to address these issues and explain the terminology used.

5.212 A query was also raised on whether consideration had been given to the provision of in-orbit surveillance and tracking. The draft Regulations currently only include the option to licence range control services provided for launch activities. The draft Regulations do not make provision for licensing of commercial in-orbit surveillance and tracking.

5.213 A small number of respondents were also concerned about how an appropriate range would be defined, and how many range control licensees would be required to deliver range control services. As a result of this feedback, the guidance will be amended to clarify these issues.

5.214 A few respondents were also keen that any agreements between licensees be shared with all parties concerned for scrutiny, and urged the Government to reconsider whether spaceflight operators should have the discretion to terminate an agreement with a range control service provider without the need for prior written approval from the regulator. Some were also concerned about instances where these services were provided by an agent, whether agreements with minimum terms would be required and again, whether these could be scrutinised by spaceport licensees.

5.215 The Government does not intend to regulate the agreements which exist between private entities engaged in spaceflight activities. The regulator, however, has a duty to exercise its functions with a view to securing public safety. As such, the regulator must ensure that any decision which impacts the safety case of the spaceflight operator, such as the termination of an agreement with a range control service provider, is given due consideration and scrutiny.

Part 7: Training, qualifications and medical fitness

Background

5.216 This section of the consultation set out the rationale for the requirements to set regulations in these areas, drawing from established regimes in commercial civil aviation and the Regulations administered by the Federal Aviation Administration (FAA) in the US, as well as discussions with industry and other potential stakeholders.

5.217 The consultation sought views on whether the Regulations allocated responsibilities to individuals appropriately.

Question

30. Do you have any comments on regulation 61 "responsibilities of licensees" (and dependant training regulations)? We are particularly interested in whether you think the training requirements should concentrate solely upon the listed relevant individuals (i.e. those who must be qualified). Please provide details.

Consultation responses

5.218 Of those respondents that supplied detailed comments, there was a preference that draft regulation 61 should continue to include relevant individuals (those who are required to hold qualifications) and also that the other persons who participate in the licensed activities are appropriately trained.

5.219 Respondents proposed that all of a licensee's staff should be required to receive formal induction training in safety, human factors and security management.

5.220 In response to feedback received through the consultation, the draft Regulations under part 7 will continue to include relevant individuals but be amended to require that persons who participate in licensed activities, but do not perform a specified role or act in a specified capacity, must also be provided with initial (induction) training. The scope of the initial training will be widened to include "human factors" and all personnel will need to receive general security awareness training.

Question

31. Do you think the requirement for licensees to keep their training, qualifications and medical fitness records for at least two years, beginning on the first day of the calendar year after they were created, is appropriate? Please provide details.

Consultation responses

5.221 The majority of respondents agreed that two years was an appropriate length of time. Respondents also highlighted that these records should be kept in line with the requirements of the General Data Protection Regulation (GDPR). It was also noted that two years is a good starting point, but should be kept under review as the commercial space industry develops and the frequency of launches and training or testing refresh rates change.

5.222 Those who disagreed felt that a longer period would be advisable. Reasoning here included that legal action could go back over a period of many years, and that the lifespan of a satellite or launch vehicle, or the length of a space vehicle mission, should also be factored in.

5.223 Draft regulation 63 sets the responsibility of licensees to keep specified records, and that these must be kept for a period of at least two years beginning on the first day of the calendar year following the year in which the records were created. Many of those records would not include personal data, and the limit is the minimum time a licensee must keep the records. A licensee could keep them for longer if it felt that there were valid legal reasons for doing so, and that doing so was not in breach of GPDR.

Question

32. The Regulations (see regulation 73(5)) currently only mention the need for the operator to perform simulations prior to launch to demonstrate safety. Do you think this should include rehearsals? Please provide details.

Consultation responses

5.224 There was a broad consensus among respondents that rehearsals are valuable and needed. It was also noted that it may be necessary to clarify the difference between “simulations” and “rehearsals”.

5.225 Some respondents felt that multi-agency (i.e. multi-licensee) cooperation would be required for rehearsals.

5.226 The Regulations will be amended to specify “rehearsals” rather than “simulations” and introduce a requirement for the launch operator licensee, before a launch, to conduct one or more rehearsals of the mission to test its operational procedures and train staff in their operational duties.

5.227 A rehearsal must as nearly as possible reproduce the intended spaceflight, spaceport and range control activities which would be carried out on the mission. Guidance will clarify what a rehearsal should cover as a minimum.

Question

33. Do you have any comments on the type of rehearsals or simulations that are/could be required? Please provide details.

Consultation responses

5.228 Respondents to this question commented that rehearsals should cover:

- both normal and abnormal situations
- pre-launch, launch, and post-launch scenarios
- possible space weather events (e.g. solar energetic particle event)

5.229 Respondents also suggested the rehearsals and simulations should be informed by the safety case and risk assessment.

5.230 Some respondents felt that the aims of a rehearsal should be both to validate the operational procedures and to train staff in their operational duties, so with this in mind a full end-to-end rehearsal would be a particularly useful exercise, as it would involve the whole team. There was recognition that this would not always be practical however, so as a minimum there should be rehearsals that can be used to train the team within the mission operations centre.

5.231 It was also suggested that iterative dress rehearsals should culminate in real-time dress rehearsals with the appropriate stakeholders.

5.232 These points have been mostly accepted and the draft Regulations will be amended accordingly.

Question

34. Are there any other considerations you think the training, qualifications and medical fitness regulations or associated guidance should address? Please provide details.

Consultation responses

Training

5.233 Some respondents felt that the draft Regulations were unclear as to how the regulator will decide whether it is 'satisfied' to approve the appointment of the training manager.

5.234 This point is already addressed at draft regulation 67, which sets out the criteria by which the regulator may approve the appointment of a training manager.

5.235 Some respondents felt that the term "the engineer" should be defined.

5.236 Training criteria and qualifications for sub-orbital aircraft engineers are set out at paragraph 21 of Part 1 of draft Schedule 3 to the Regulations. The term engineer in this case only applies to engineers working on sub-orbital aircraft, which are narrowly defined in draft regulation 55 as meaning a craft to which section 1(5) applies and which can derive support in the atmosphere from the reactions of the air, other than reactions of the air against the earth's surface. This training requirement for engineers does not therefore apply to pure rockets but rather to aircraft that can operate above the stratosphere and are powered by rockets.

5.237 Some respondents felt that a requirement of approval for any changes to a training manual would be a significant burden for licensees, and that no timelines seem to be established for the review period.

5.238 The Government would like to clarify that the only changes to a training manual which would need approval are those for the "relevant individuals", which are a small number of specified key roles. The Government believes therefore this should not be unduly burdensome for licensees, particularly if the licensee does not need flight termination personnel or have crew or spaceflight participants on board the launch vehicle.

5.239 A concern was raised that training in human factors/ performance/ error had not been included.

5.240 Paragraph 51 of Part 3 of draft Schedule 3 already requires all crew and remote pilots to receive training in crew co-ordination, and covers the extent to which human error may affect the safety and efficiency of spaceflight activities, and how this may be mitigated. In addition, a new requirement will be added in draft regulation 72 for all staff to receive training in human factors.

Medical Requirements

5.241 Some respondents suggested that the Regulations or guidance should set out certain medical criteria that would automatically exclude someone from participating in spaceflight. These would include having had severe heart failure, having a pacemaker, receiving anticoagulant treatment, having had an acute spinal injury, having epilepsies and having any psychotic disorder.

5.242 These requirements are already stipulated as part of an unrestricted Class 1 medical certificate for flight crew and pilots, as in aircraft flight operations they would normally need be restricted by a multi-pilot or other limitation to certain higher risk operations.

5.243 It was felt that commercial spaceflight, and/or spaceport use should not place disadvantages on potential human participants that may have disabilities that can be

managed by individual assessment by the operator, informed by aero-medical best practice and guidance from the CAA.

5.244 Draft regulation 78 sets out criteria with regards to disability. If a spaceflight participant with a disability or reduced mobility has been certified as being fit to fly under draft regulation 76(1), the spaceflight operator may make arrangements for that participant to take part in a spaceflight if doing so would not compromise the safety of the flight, and the presence of an individual with that disability or reduced mobility would not impede or obstruct any member of the crew or spaceflight participant in carrying out their functions during the course of the flight, including executing emergency procedures or leaving the launch vehicle.

5.245 Some respondents raised concerns surrounding the need for medical tests to be conducted for specific conditions that may be impacted by the training, suggesting that specific medical advice should be sought for medical certificates that address an individual's fitness for space operations, and that medical fitness should take account of certain nuances such as age, previous medical history, current fitness level etc.

5.246 The Government will address these issues in the updated guidance material. The CAA will maintain medical guidance on fitness for crew and participants based on existing medical literature and ongoing aeromedical research. For flight crew, applicants with significant medical conditions will be referred to the aerospace medicine experts of the CAA for the fitness assessment decision.

Part 8: Safety of operator's spaceflight activities

Background

5.247 The consultation set out the Government's approach to safety and the use of an objective-based approach to spaceflight activities. This is enshrined in the principle of ALARP, whereby risks are managed to be as low as reasonably practicable to ensure safe operations.

Question

35. Is it clear to whom these safety regulations will apply? Please provide details.

Consultation responses

5.248 The majority of respondents indicated that it was clear to whom the safety regulations will apply.

5.249 In a few cases, there was some confusion over whether the safety regulations applied to satellite operations as well as launch vehicle operations. This was particularly the case for any satellite 'payload' which an orbital operator may want to return to the UK, with queries as to whether such an operation would need a return operator licence.

5.250 A payload carried by a launch vehicle does not come within the definition of "launch vehicle" in the regulations and neither a launch operator licence nor a return operator licence is the type of operator licence needed to operate such a payload which is a satellite. An orbital operator licence is the appropriate licence to authorise the operation

of the satellite in orbit. The safety regulations at Part 8 do not apply to an orbital operator licensee (i.e. the operator of a satellite that is not a launch vehicle). A return operator licence is only required in the case of a launch vehicle, launched from a location outside of the UK, that is intended to return from orbit to land in the UK.

5.251 The Government's position on the return operator licence is set out in paragraph 4.23 above.

5.252 Responses to this question and some others in the consultation have revealed a need to provide clarity about the scope of the operations covered in the Regulations.

5.253 The Government intends to update parts of the guidance for orbital operator licence applicants and licensees to clearly show which parts of the Regulations apply to orbital operators and which parts do not.

5.254 A few respondents expressed concern about whether regulations for flight crew and remote pilots applied to carrier aircraft crew (in the case of an air-launched autonomous launch vehicle rocket that did not have any persons on board the launch vehicle itself).

5.255 Draft regulation 2 defines flight crew and cabin crew as individuals that take part in spaceflight activities on board a launch vehicle. A remote pilot is not on board a launch vehicle but is able to control, in real time, the flight path of the launch vehicle. In both cases, the flight crew or remote pilot is concerned with piloting or controlling the launch vehicle, as distinct from piloting or controlling a carrier aircraft. Persons acting as crew members of a carrier aircraft primarily remain under aviation legislation. It is proposed to clarify in the spaceflight operator guidance which crew is being referred to when considering non-inhabited launch vehicles launched from a carrier aircraft.

Question

36. Is it clear where a spaceflight activity will begin and end to which these safety regulations will apply? Please provide details.

Consultation responses

5.256 There was a nearly even split between respondents, with a slight majority agreeing that they understood where a spaceflight activity begins and ends. Despite this, it is apparent that it would be beneficial for greater clarity to be given as to the beginning and end of the regulated spaceflight activity with regard to the practical implications of complying with the spaceflight safety regulations.

5.257 Several respondents pointed out that definitions in the Regulations for various aspects of spaceflight are fragmented because they appear in different places i.e. the SIA Part 1, draft regulation 2 "definitions" and at various places in Part 8 of the Regulations (only applying in the context of specific regulations).

5.258 "Spaceflight activities" are defined in section 1(4) of the SIA and so do not appear in the Regulations. "Operator's spaceflight activities" are defined in draft regulation 2 as any of the activities listed that can be authorised by a launch operator licence or a return operator licence. The listed activities include launch of a launch vehicle and operating a launch vehicle in so far as necessary to, for example, carrying a payload until its release or separation from the launch vehicle. The definition has been designed to be inclusive of various uses ("assignments") that a launch vehicle might be put to, including the launch

vehicle returning to earth and completing its flight and orbital activities (e.g. transfers between one orbit and another) only in so far as necessary to complete an assignment such as releasing a payload.

5.259 In response to the feedback received through the consultation, the Government intends to provide further guidance clarifying the scope of what can be authorised under a spaceflight operator licence, including examples and flow diagrams where appropriate.

5.260 Some respondents requested further clarity on when responsibilities are shared and when they are transferred between licensees (e.g. launch operator and orbital operator) and also on how the respective regulations are intended to work together.

5.261 In terms of the specific risk and safety activities each licensee is responsible for, these are laid down in the draft Regulations under Parts 4 and 8 (spaceflight operators), Parts 5 and 10 (spaceports) and Part 6 (range control services). Each of these Parts that apply to granting a licence contain provisions for the applicant to consider information about the other prospective licensees that will take part in the activity as a whole; this is particularly true of the spaceflight operator who has a number of responsibilities in relation to the associated activities of the spaceport and range control service provider.

Question

37. Do you have any comments with regards to the definition of flight or the flight envelope for the purposes of regulations 92, 103, 104, or paragraph 19 of Schedule 5? Please provide details.

Consultation responses

5.262 Most respondents thought that the definitions of ‘flight’ and ‘flight envelope’ were reasonable and usable in practice.

5.263 Some respondents had concerns about whether a flight termination decision might be needed if a launch vehicle leaves orbit and returns to earth e.g. during some part of the orbital mission, possibly hours or days later, the launch vehicle might need to be returned, including returning it for landing, disposing of it in a remote ocean area or causing it to be burned-up in the atmosphere. In the case of a controlled return to earth from orbit to land in the UK, there is a strong possibility that the return may require the vehicle to have a flight safety system. This system (and any associated flight termination decision) would be used if, for example, the launch vehicle deviates from its flight-envelope[5] and this malfunction presents a risk to persons on the ground. Because of these concerns, the Government intends to make clarifying amendments to the definitions of “flight”, “flight envelope”, “malfunction” and introduce the concept of a “stable orbit”. These amendments will help in demarcating between monitoring and flight termination that may be needed during a launch and flight termination that may be necessary during any planned return from orbit.

[5] Regulation 2: “flight envelope” will mean the expected set of trajectories of the launch vehicle taking account of variations to those trajectories and any deviation from those trajectories within which the operator’s spaceflight activities can be carried out safely

Question

38. With regard to the events and matters set out in regulation 83, are there any other instances or occurrences that you think should necessitate a review and/or revision of the safety case and risk assessment? Please provide details.

Consultation responses

5.264 A clear majority of respondents thought that there were other instances or occurrences that should necessitate a review and/or revision of the safety case and risk assessment.

5.265 Some respondents expressed concern about the thresholds for reviewing a safety case, e.g. those concerning an incident or accident occurring elsewhere in the industry, or an update on technology.

5.266 Several respondents believed strongly that the output of the spaceflight operator's safety management system should be directly referred to as a trigger for review and/or revision, rather than indirectly via an "operational change".

5.267 In response to the consultation, the Government intends to amend regulation 80 "Safety case and risk assessment review and revision requirements" to explicitly state that if a concern arises from the application of the safety management system that the operator's spaceflight activities may result in a major accident hazard, the safety case must be reviewed and if necessary revised. The revised common safety management system requirements at Schedule 4 to the Regulations include the licensee using the safety management system to address concerns in relation to the identification and evaluation of major accident hazards and establish how these can best be eliminated or mitigated through risk controls.

Questions

39. Are there any other considerations you think should be accounted for regarding the roles of the safety manager, accountable manager, launch director or the flight termination personnel, or that guidance should address? Please provide details.

Consultation responses

5.268 Some respondents were concerned that the Regulations set out too prescriptive an approach for the responsibilities of the various roles, and proposed that a more flexible approach would be preferable. This would allow organisations to allocate and integrate the functions of various individuals as they see fit and that suits their particular type of operation.

5.269 The Government does not agree that the prescribed roles set out in the Regulations will hinder the flexibility of organisations to allocate staff as they see fit. The Government considers these requirements proportionate and necessary to ensure that spaceflight activities are carried out safely.

5.270 For an organisation intending to hold a launch operator licence, there would clearly be many other important roles throughout the organisation, both in preparing for a launch and when carrying out the mission. The Regulations have deliberately not listed these

sorts of other important roles, to allow a launch operator flexibility in assigning individuals to functions and proportionately scaling their personnel requirements.

5.271 The possibility of having a formal role of compliance manager was also raised by respondents. In line with limiting the specific roles that must be appointed, the Regulations do not identify this as an individual responsibility but instead place the onus on the licence holder, who may choose to assign one or more persons for this task.

Questions

40. Is a technical requirements specification a suitable basis for the spaceflight operator to present the essential requirements of the launch vehicle and ground support equipment? Please provide details.

41. If you answered no, please say which document(s) should be referred to or might be used instead of a technical requirements specification.

Consultation responses

5.272 The majority of respondents thought that a technical requirements specification was a suitable basis for the spaceflight operator to present the essential requirements of the launch vehicle and ground support equipment. Respondents were also of the view that a technical requirements specification should be high-level, to allow for multiple solutions and in a format suitable for industry. The European Cooperation for Space Standardisation (ECSS) Space Engineering System Engineering general requirements were mentioned as a suitable basis.

5.273 These concerns have already been addressed in paragraphs 4.73 and 4.74.

5.274 Publishing acceptable means of compliance (AMC) is not envisaged since an applicant must use the safety case (including Schedule 1 items) to show that it has reduced the level of risk to ALARP.

Question

42. Do you agree that regulation 97 allows for an appropriate verification and validation approach to be taken in relation to a spaceflight activity? Please provide details.

Consultation responses

5.275 The majority of respondents agreed that draft regulation 97 allows for an appropriate verification and validation approach to be taken in relation to a spaceflight activity, although it was noted that only verification is specified, not validation. Respondents generally agreed that the ‘verification and validation’ approach is a standard assurance approach in UK/EU for reliability, safety and performance demonstration requirements.

5.276 In response to the feedback received, the Government will slightly amend the “verification and validation by testing etc of the launch vehicle and the ground support equipment” regulation to:

- specifically include “validation”;

- include integrated testing
- make it clear that the applicant may meet the requirements by one or more of testing, analysing, reviewing or inspecting the launch vehicle and the ground support equipment, and
- ensure compatibility with paragraph 13 of Schedule 1, which also includes verification and validation.

Question

43. Pre-launch preparation of the launch vehicle and spaceport involves a number of activities, from maintenance of the infrastructure to loading of propellant onto the launch vehicle and/or satellite. How do you foresee these responsibilities being split between the launch operator and spaceport licensees? Please provide details

44. How do you foresee the safety responsibilities for pre-launch activities being reflected in the respective safety cases for launch operator and spaceport licensees? Please provide details.

Consultation responses

5.277 Most respondents thought that the spaceport infrastructure should be maintained by spaceport licensees. However, payload/ launch vehicle specific activities, such as integration, fuelling, final readiness preparation of the launch vehicle and its ground support equipment should be undertaken by the launch operator. As the launch operator will hold the majority of responsibilities and liabilities for the pre-launch preparation, the safety case, risk assessments and contractual relationships between the licensees will inform the actual assignment of tasks.

5.278 Respondents also expressed views that since managing safety (e.g. hazard analysis and mitigation for all activities in which the licensee is involved) was essential for the safety of joint operations, coordination between the spaceport and spaceflight operator(s) would undoubtedly be beneficial. It was also felt that the division of work would depend on the nature of the operation and the capabilities of each licensee, and the regulator should not mandate exactly who takes on a particular role in a joint task, but instead take a flexible approach allowing licensees to make appropriate decisions based on their skills and expertise.

5.279 In accordance with this, respondents believed that the responsibility for interfaces must be clearly defined and mutually agreed between launch operator and spaceport licensee.

5.280 The Schedules to the Regulations already require licensees/applicant to describe how they will coordinate with other licensees during the preparation of the safety case.

5.281 In response to the consultation, the Government intends to make minor amendments to the Regulations as set out below. However, since the safety cases of both the spaceport and spaceflight operator cover the risks and mitigations for ground operations as they relate to vehicle preparation, the majority of the requirements are still valid and necessary. Amending the draft Regulations to specify what things must be done at a spaceport by either only the launch operator, or only the spaceport licensee, would be a less flexible approach which may disadvantage some types of operation.

5.282 As a result of the views expressed, the Government will:

- insert an additional paragraph into Schedule 1 to the Regulations requiring an applicant to provide a schedule of any safety critical actions the proposed range control service provider and the proposed spaceport licensee will carry out in preparation for the launch from the time when the launch vehicle or its components arrive at the spaceport or other place from which the launch is to take place
- amend the contents of the safety operations manual to require an applicant to:
    - provide instructions and procedures for carrying out safety, technical and organisational reviews, including joint procedures for carrying out such reviews;
    - check the progress of launch preparations, the fitness of the launch vehicle for the operator's spaceflight activities, the fitness of the ground support equipment and the readiness for use of any flight safety system or any necessary equipment for providing range control services.
    - The safety operations manual must also be kept up to date and a copy sent to the regulator.
- combine the previously separate Schedule 4 (spaceflight operator) and Schedule 6 (spaceport licensee) safety management system requirements into a new common framework at Schedule 4.

Question

45. Regulation 102 details the conditions for commencing the spaceflight activities ranging from the need to confirm that the launch vehicle is fit for operator's activities to the procedures for launch authorisation. Do you have any comments on the conditions for commencing the operator's spaceflight activities? Please provide details.

Consultation responses

5.283 Approximately half of respondents commented on draft regulation 102 (commencing the spaceflight activities). Of these, most thought draft regulation 102 was reasonable, although some thought it too prescriptive. Others requested further clarity on such things as NOTAMs etc. or the meaning of "simulations". It was also recommended that flight termination personnel should not be constrained to being at posts at the spaceport.

5.284 In response to the various points raised in this question the Government will amend draft regulation 102 as follows:

- "simulation" will be changed to "rehearsal" and additional clarification about the meaning of "rehearsal" inserted into the training regulations at draft regulation 70
- where the launch vehicle has a flight safety system, the launch director must receive confirmation that that system is ready to be used and
- the launch of the launch vehicle will only be permitted to take place at a time when the launch vehicle will not collide with any known space object during its flight or when it first reaches a stable orbit.

5.285 Flight termination personnel are not constrained to being on a spaceport but can also be at a “mission management facility” (defined in the SIA as a site other than a spaceport from which spaceflight activities are controlled or (as the case may be) are to be controlled) or other place during the flight. “Other place” has been added so that these personnel could be on a ship.

Question

46. Concerning regulation 103 (during flight: monitoring and termination) do you think it is reasonable to require a launch operator to monitor the launch and flight of their vehicle in real-time so as to be aware of a vehicle malfunction? Please provide details.

47. Should the requirement be for the monitoring to be done only if necessary to carry out the spaceflight activity safely (e.g. the operator sets out in the safety case why such monitoring might not be necessary)? Please provide details.

Consultation responses

5.286 A clear majority of respondents thought it was necessary to monitor the launch and flight of a launch vehicle in real time, so as to be aware of a vehicle malfunction. Despite this, there was also a strongly-held view that the extent of the monitoring should be determined by the safety case, as it might not be necessary in all situations. Draft regulation 103 should also be flexible enough to allow variations in the coverage of the monitoring depending on what is needed to ensure safety.

5.287 The Government accepts the logic of the responses and will amend this regulation so that the spaceflight operator need only monitor in real time if it is necessary to ensure that the activity is carried out safely.

5.288 The Government will also amend the draft Regulations to specify that flights may also need to be terminated in the event of a failure in any system used to monitor whether the launch vehicle is still fit for operator’s spaceflight activities or used to detect a malfunction itself fails (and the result threatens the carrying out the activity safely).

Question

48. Do you envisage any additional duties/responsibilities of the flight termination personnel? Please provide details.

Consultation responses

5.289 Most respondents did not think that the flight termination personnel should have any additional duties or responsibilities. Some respondents thought that if there were any additional duties or responsibilities, these should not be put in regulations but instead left to the discretion of the licence applicant to define those in accordance with their safety case.

5.290 It was also suggested that flight termination personnel should confirm (independently of the operator) that the minimum necessary equipment they require to make a termination decision, such as telemetry systems, is available and working. This would be particularly necessary just before a launch.

5.291 In response to feedback received, the Government intends to amend the draft Regulations to specify that where the launch vehicle has a flight safety system, the launch director must receive confirmation that the system is ready to be used before commencing a launch.

5.292 The regulation for verification and validation by integrated testing etc. of the launch vehicle will continue to apply for the parts of any flight safety system that are onboard the launch vehicle or ground support equipment. Similarly, under draft regulation 102 (conditions for commencing etc.), the launch director must receive confirmation from the spaceport licensee and the range control service provider that, in so far as their responsibilities are concerned, these activities can be carried out safely.

Question

49. Do you think it is likely that a launch vehicle returning from orbit will need a flight safety system and therefore might also need monitoring for the purpose of detecting malfunctions so that flight termination personnel may take action to safely terminate the flight (assuming there is no automatic flight safety system installed in the launch vehicle)? Please provide details.

Consultation responses

5.293 The majority of respondents thought that it could be likely that a launch vehicle returning from orbit would need a flight safety system and therefore might also need monitoring for the purpose of detecting malfunctions, so that flight termination personnel can take action to safely terminate the flight (assuming there is no automatic flight safety system installed in the launch vehicle).

5.294 Many responses related either to returning stages (not having reached orbital velocity) or a final stage that had reached orbital velocity but was later planned to be returned to earth. A flight safety system might be needed for a vehicle returning from orbit to land in the UK, but would not normally be required if the launch vehicle was returning to earth for disposal at some remote sea location.

5.295 The Government will make suitable amendments to draft regulations 103 (During flight monitoring and termination) and104 (additional requirement relating to the launch vehicle during operator's spaceflight activities) as follows:

- the concept of a "stable orbit" will be established to demarcate when the period of "flight" (draft regulation 103) has ended and when draft regulation 104 applies
- in concert with the amendment to draft regulation 103, amendments will be made to regulation 104 to clarify that orbital monitoring of the launch vehicle needs only to be done if necessary to ensure the spaceflight activity is carried out safely or to secure compliance with the international obligations of the United Kingdom, and
- clarify the reasonable steps the spaceflight operator must take to:
  - avoid the launch vehicle interfering with the space activities of other persons in the peaceful exploration and use of outer space
  - limit or prevent major accident hazards to the health, safety and property of persons arising from the launch vehicle in orbit, and

- prevent contamination of outer space arising from the launch vehicle in orbit or adverse changes in the environment of the earth from that vehicle in orbit

- the reasonable steps will include avoiding the release of space debris; avoiding a collision between the launch vehicle and its payload after its release or separation from that vehicle; manoeuvring the vehicle; deactivating a component part of a vehicle, or passivating that vehicle by dissipating the hazardous materials carried on board or preventing their accumulation.

Question

50. Referring to the sequential mission phases covered by regulations 102, 103 and 104 and the guidance provided, is the intent and purpose of these regulations clear? Please provide details.

Consultation responses

5.296 All but one of the respondents felt that the intent and purpose of draft regulations 102, 103 and 104, covering the sequential mission phases, and the guidance, were clear.

5.297 As set out previously, draft regulations 102, 103 and 104 will be slightly amended to aid clarity and in response to feedback from consultation questions 45, 46, 47, 48 and 49.

Question

51. Regulation 104 and Schedule 1 identify a number of requirements for parts of the launch vehicle that reach orbit or for any sub-orbital launches that interfere with the space environment. These seek to minimise the interference of the spaceflight activity with other space objects and ensure the operator considers aspects such as space debris mitigation in their mission. Do you have any comments about the requirements relating to the launch vehicle during operator's spaceflight activities? Please provide details.

Consultation responses

5.298 Half of the respondents to this question provided comments about requirements relating to the launch vehicle during the operator's spaceflight activities.

5.299 Some respondents requested greater clarity on time limits/ bounds related to a spaceflight operator's responsibilities for its launch vehicle in orbit.

5.300 The Government's view is that the operator remains responsible for the launch vehicle in orbit until such time as it is disposed of either through natural demise via re-entry, planned disposal via re-entry, being moved to a graveyard orbit, or being returned to land in the UK. Regulation 104 (additional requirement relating to the launch vehicle during operator's spaceflight activities) will be amended to set out the reasonable steps that can be taken to accomplish the requirements at 104(c).

5.301 One respondent requested further definition of the requirements to mitigate/avoid space debris and also sought clarification on whether the Government intends to oblige spaceflight operators to follow the Inter-Agency Space Debris Coordination Committee (IADC)'s Space Debris Mitigation Guidelines for the launch vehicle.

5.302 The Government intends to provide further guidance on space debris mitigation for launch vehicles. At present, applications for operations of a space object under the OSA are assessed using the following guidelines for debris mitigation:

- IADC-02-01, “IADC Space Debris Mitigations Guidelines”, IADC,15th October 2002
- IADC-04-06, “Support to the IADC Space Debris Mitigation Guidelines”, 5th October 2004
- ISO 24113, “Space debris mitigation”

5.303 It was requested that the Government explicitly include requirements in draft regulation 104 for mitigating interference to observations from ground and space-based astronomical facilities from UK licensed orbital objects (including launch vehicles and constellations of satellites). Further amendments made to draft regulation 104 were discussed in paragraph 5.295.

5.304 As discussed in paragraph 5.15, the Government’s policy on constellations will be communicated in due course.

Question

52. Do you understand the link between these regulations and the spaceflight operator’s safety duty set out at regulation 82, in as far as the regulations refer to the operator’s spaceflight activities being carried out safely? Please provide details.

Consultation responses

5.305 A clear majority of respondents understood the purpose of the link between these Regulations and the spaceflight operator’s safety duty set out at draft regulation 82, insofar as the Regulations refer to the operator’s spaceflight activities being carried out safely.

5.306 Although the purpose of draft regulation 82 seemed clear to most respondents, the Government intends to amend this slightly to use terms that are closer to those used in Part 4 of the Regulations that apply to the safety case.

Question

53. In the Regulations the scope of activities considered under the return operator licence are outlined. Do you have any comments about the type of activities envisaged under the return operator licence? Please provide details

Consultation responses

5.307 Most respondents did not have any comments about the type of activities envisaged under the return operator licence.

5.308 Those that provided comment thought that including satellite payloads ‘returning’ to the UK under this type of licence would be useful as this is more likely in the future. There was also a general wish for more guidance on return operator licensees, e.g. clarity on what sort of licence is needed for any retrieval of launch vehicle stages that have been launched from the UK.

5.309 This Government has addressed this in paragraph 4.23.

Question

54. Are there any other considerations associated with the safety of the operator's spaceflight activities that the launch operator licence or the return operator licence regulations or associated guidance should address? Please provide details.

Consultation responses

5.310 Most respondents did not think that there were other considerations associated with the safety of the operator's spaceflight activities that the launch operator licence or the return operator licence regulations or associated guidance should address.

5.311 Amongst the comments on the general topic of the Regulations was one asking for further clarity on what is meant by "financial and technical resources" in draft regulation 84 (spaceflight operator's organisation). The Government's view is that financial and technical resources will vary from operator to operator and are expected to be scalable to the size and ambition of the spaceflight activity. This is why there are no absolute parameters and why the Regulator's Licensing Rules require an applicant to submit financial information, plans and forecasts. The regulator will then take a view on the financial information provided and the technical resources that the applicant describes itself as having or as being necessary, and carry out on-site checks of facilities if necessary during the application stage.

5.312 Clarification was also requested on acceptable operations of the carrier aircraft (horizontal launch operators) during an abort scenario (e.g. can it return to the spaceport or diversion airfield?). The Government's view is that it is for an applicant to propose how it intends to deal with the hazards created by any identified abort scenarios in its safety case. The regulator can then come to a conclusion about any such proposal, its effect on the level of risk and whether it has been reduced to ALARP.

5.313 One respondent queried draft regulation 118 in terms of how a pilot-in-command will be able to perform a pre-flight inspection when in many cases it may not be realistic to do so. Draft Regulation 118 contains the caveat "to the extent that it is practicable to do so" – which acknowledges that in certain cases, such as vertically-stacked rockets, this might not be easily achievable or very limited. This does not preclude the pilot-in-command from carrying out other types of inspection such as internal checks in the cabin etc.

Part 9: Spaceport safety

Background

5.314 The consultation explained the safety responsibilities of spaceport licensees under the Regulations, as well as when and why a safety case may need to be revised. The consultation included the details of the regulations which apply specifically to horizontal spaceports and what the requirements are in emergency situations.

Question

55. Do you think the maximum period of five years in paragraph 1 of regulation 143 is a suitable interval between reviews (and, where necessary, revision) of the safety case? If you answered no, what do you think would be a suitable interval? Please provide details.

Consultation responses

5.315 Of those who responded to this question, the majority agreed that a maximum period of five years was a suitable interval between reviews of the safety case.

5.316 Respondents who disagreed with this interval were concerned that the safety case would not be reviewed frequently enough and suggested either annual reviews, or a review every three years, in line with the testing of the emergency response plan.

5.317 Many of the respondents were confident that there were enough additional triggers within the Regulations to ensure that a safety case would be reviewed should there be any material changes which could impact safety.

5.318 It should be noted that the five-year period for review and, where necessary, revision of safety cases is a backstop provision. Respondents generally agreed with the list of triggers for earlier review of the safety case in draft regulation 143. Also, the Regulations do not preclude licensees from carrying out more frequent revisions at their own discretion. As most respondents were content with this provision, no changes to the Regulations are proposed.

Question

56. Are there any circumstances not already covered in paragraph 2 of regulation 143 that you think would result in a review of the safety case? Please provide details.

Consultation responses

5.319 The majority of those who responded to this question were content that paragraph 2 of regulation 143 contained sufficient triggers for a review of the safety case and had no further comment.

5.320 A small number of respondents suggested that changes to the environment around the spaceport, changes to the licensee's organisational structure, or a change in the activities carried out at the spaceport should all be considered as triggers to review the spaceport's safety case.

5.321 The Government's view is that these additional suggested triggers should only be considered if they have material consequences for risk or introduced new risks or hazards or change the nature of existing hazards. As drafted, these triggers are already captured in paragraph 2 of draft regulation 143. Although the Government will not be revising these triggers, in response to other consultation questions, changes will be made to some of the terminology used, such as making reference to "major accident hazards" and defining this in regulation for the purposes of a spaceport licensee.

Question

57. Is three years a suitable interval between emergency response plan testing? If you answered no, what do you think would be a suitable interval? Please provide details.

Consultation responses

5.322 The majority of respondents agreed that an emergency response plan was necessary and should be tested every three years.

5.323 There was little consensus amongst those who disagreed with the testing interval about how long the interval should be, or whether the Regulations should specify testing triggers.

5.324 Some respondents suggested that changes which would trigger a review of the safety case should also trigger testing of the emergency response plan, while others considered annual or biennial testing more appropriate.

5.325 As drafted, the Regulations do not prevent more frequent testing of the emergency response plan, nor constrain the nature and scope of these tests. This allows licensees the flexibility to review and test the emergency response plan at intervals commensurate with the activities and associated risks being undertaken at the spaceport.

5.326 As a result of the feedback received, the provision for an emergency response plan to be tested at least every three years will be retained.

Question

58. Are there any other considerations you think the spaceport safety regulations or associated guidance should address? Please provide details.

Consultation responses

5.327 Less than half of those who responded to the consultation answered this question, with fewer than 10 providing specific suggestions for amendments.

5.328 There was little consensus about the changes which should be made. Where possible, the guidance material will be amended to address specific concerns.

Part 10: Security

Background

5.329 The security regulations are described in the consultation as following the principles of being appropriate to the activity being undertaken, and proportionate to the risks involved, based on a security risk assessment. The requirements for the different licence types are explained in the context of physical, personnel and cyber security and the Regulations also set out any clearances and vetting which may be required.

5.330 While specific regulations have been written for the protection of US technology at a space site, respondents were asked to provide a view on the general approach taken to security in the Regulations rather than any specific aspects.

Question

59. Do you have any comments on the draft security regulations? Please provide details.

Consultation responses

5.331 Approximately half of those who responded to the consultation had comments regarding the draft security regulations. Many welcomed the use of a security risk assessment to guide appropriate and proportionate security requirements and the general approach taken towards security.

5.332 A number of respondents however, asked for the terms “appropriate” and “proportionate” be defined in the Regulations. This is contrary to the approach taken throughout the draft Regulations, under terms are only defined if they do not carry their plain English meaning. The guidance document on security matters will, however, be updated to provide further clarity on these terms as they relate to specific provisions.

5.333 A small number of respondents were critical about the use of the term “space site” as not being commonly understood or used elsewhere. This has been addressed in paragraph 5.59 above.

5.334 The regulations which cover prohibited articles were thought to be too broad by one respondent because of the inclusion of “any object capable of causing injury.” This phrase, however, was taken out of context. In context, those articles which could cause injury are limited to those “not commonly used on the site.” The Government maintains that this is an appropriate and proportionate regulation.

5.335 Draft regulation 166 (3) provides a list of potential groups who can nominate an individual to be informed of the security controls being imposed on a payload. One respondent suggested removing manufacturers of payloads as being able to nominate a responsible person to be informed about the security controls being imposed on a payload. This suggestion was due to concerns that there may be numerous payload manufacturers for a single mission. The regulation as drafted provides sufficient flexibility to ensure that where it may not be appropriate to ask a specific payload manufacturer, there are others who can nominate a responsible individual.

5.336 While some respondents welcomed the regulations on cyber security, one respondent was concerned that the Regulations implied that licensees would be required to prevent any and all incidents from occurring, while another respondent was concerned about the short time within which a cyber incident should be reported.

5.337 With regards to the licensee having to prevent all incidents from occurring, the Government recognises that this will not be possible. However, licensees should aspire to prevent all incidents. In terms of the suggestion to extend the period within which a cyber incident should be reported, this regulation has been amended in line with reporting requirements in other regulations to 72 hours.

5.338 A number of respondents were unclear about what security regulations would be applicable to those holding an orbital operator licence. In particular, there were questions about the circumstance which might give rise to the requirement for an orbital operator to appoint a security manager.

5.339 Additional guidance will be provided for potential orbital operator licensees which will clarify which regulations apply to every orbital mission, and those which apply only when they are required to appoint a security manager. With regards to the appointment of a security manager, the regulator will inform an applicant or licensee about whether national security concerns were raised during the assessment of the application. This will not be the responsibility of the applicant/licensee to determine.

5.340 A few respondents also queried the requirement to review the security risk assessment, space site security programme and cyber security strategy annually rather than when there is a material change of operations. These respondents felt annual reviews were too frequent. They also queried whether more detailed training or guidance would be made available by the Centre for the Protection of National Infrastructure (CPNI) and the regulator on how to compile these documents.

5.341 The Regulations are clear that the required security documents should be kept up-to-date. If this is adhered to, the Government does not agree that an annual review would cause unnecessary administrative burdens on licensees. With regards to the provision of more detailed guidance or training material on security matters, this is something the Government is considering.

5.342 A query was also raised about whether first responders would be allowed to access segregated areas in the event of an emergency.

5.343 Access to segregated areas for emergency services is already addressed in the Regulations, and while this does not necessarily include first responders, a licensee could include them in any access authorisation requests to the US Government as necessary to address this.

5.344 There were concerns raised about the regulations which apply to supply chains and in particular how to determine which suppliers should be considered when addressing the security risks associated with suppliers. To address this concern, additional information will be provided in guidance to clarify the scope of what is required.

5.345 Queries were also raised about what steps applicants or licensees can take to ensure that they do not impair the UK's national security or impact the UK's international obligations.

5.346 Licensees and applicants should ensure that they familiarise themselves with the international treaties on space that the UK has signed up to, and that they contact the regulator for further advice if they are unclear about how to meet their obligations.

5.347 Some respondents were concerned about the implementation of regulation 179 which relates to the designation of a site or asset as critical national infrastructure (CNI). Respondents felt that any retrospective implementation of controls relating to CNI would be very challenging.

5.348 The guidance material on security matters promotes the concept of 'secure by design[6],' and, coupled with the Regulations, should provide licensees with the tools to embed security considerations into all of their operations. Where a site or asset is designated as CNI, licensees will be provided with the information necessary to meet this designation.

[6] This is the concept of embedding security features into operations/facilities at the earliest possible stage, i.e. during the design stage.

5.349 A number of concerns were also raised about the regulations which relate specifically to the use of US spacecraft or technology in the UK under the TSA. The Government recognises that there is work to do to clarify the practical implementation of the regulations which stem from the TSA. Additional guidance will therefore be compiled which addresses the specific concerns raised in the consultation on this issue. It should be noted however, that the terminology used in the Regulations mirrors that used in the TSA and therefore cannot be amended or removed.

5.350 In response to the feedback received from this consultation, the guidance provided on security matters will be updated and a minor amendment will be made to the Regulations to address the time within which a cyber security incident must be reported to the regulator. The regulations in Part 10 will otherwise remain unchanged as a result of the consultation feedback received.

Part 11: Informed consent

Background

5.351 The consultation set out the rationale for why regulations have been written on informed consent. As set out in the consultation, these regulations are about ensuring that any human occupants taking part in spaceflight understand the inherent risks associated with these activities, and have agreed to take part in full knowledge of these risks.

5.352 The Government sought views on when information should be provided to the human occupants taking part in spaceflight. The Regulations require information to be provided at least 12 hours, but no more than one month, before the consent form has been signed. The amount of time given should reflect the time needed to assess the information. These requirements, and the Government's overall approach to informed consent were tested with respondents.

Question

60. Regarding regulation 197, the maximum time limit of one-month has been established since information provided before that time is more likely to be out of date. The minimum period to examine the information and ask questions has been established as 12 hours. Do you agree with this approach or should some other time limits be established? Please provide details.

61. If you do not agree, what balance, in regard to these time-limits, do you see as adequate between the needs of the licensee versus the needs of the participants? Please provide details.

Consultation responses

5.353 The majority of respondents agreed that it was appropriate that information be given to the human occupant at least 12 hours, but not more than one month, before that occupant, as a prospective member of the crew or a prospective spaceflight participant, is required to sign the consent form. It was highlighted however that any material or significant changes to any information must also be communicated to the participants, regardless of the maximum or minimum timings specified. The operator should be mindful

that no confidentiality arrangements or agreements are breached in the provision of this information.

5.354 It was also suggested that the pre-flight training which is required may potentially cause injury or health impacts, and that the operator may wish to consider securing informed consent prior to undertaking this training.

5.355 Of those respondents that disagreed, responses highlighted that whilst the maximum timing of one month was appropriate, the minimum time period should be extended. The reasoning here was that 12 hours would to be too short a time period for a human occupant to be able to read and fully digest, and seek any advice needed, on the information to be provided, especially given the volume and complexity of the information that will need to be provided. Additionally, the Regulations require tha human occupants have the opportunity to ask questions about the information they are provided with and it was again felt that 12 hours would be too short a timeframe for this to take place.

5.356 Training activities are separate from commercial spaceflight itself, and training providers are responsible for their own consent systems that relate to their non-spaceflight-related activities. None of the training activities to be undertaken by a human occupant are 'spaceflight activities', so do not fall under the scope of the Space Industry Regulations, and do not require specific consent under these Regulations.

5.357 As a result of feedback received, the Government will require that information should be provided to human occupants a minimum of 24 hours before the consent form is signed. The maximum time limit of one month will remain unchanged.

Question

62. Do you think the requirement for the human occupant to sign the consent form not more than 24 hours before taking part in spaceflight activities is suitable? Please provide details.

Consultation responses

5.358 The majority of respondents agreed that the requirement for the human occupant to sign the consent form not more than 24 hours before taking part in spaceflight activities is suitable, as long as all relevant information had been provided to the signatory. Some respondents also noted that human occupants should be informed about all risks, accidents, incidents etc.

5.359 A small minority of respondents disagreed with this proposed timing for the reason that more time should be provided to a human occupant to consider the information given.

5.360 As a result of feedback received through the consultation, the Government will retain the requirement for a human occupant to sign the consent form not more than 24 hours before taking part in spaceflight activities.

Question

63. The draft Regulations do not require a witness to the signing of the consent form. Do you agree with this approach? Please provide details.

Consultation responses

5.361 The consultation proposed that there would be no requirement for the signing of the consent form to be witnessed. There was an approximate even split between those who agreed and those who disagreed with this approach.

5.362 Some respondents agreed that this was the right approach, and should, for example, be at the discretion of the regulator. Other respondents felt that a witnessed form would be important in the event of an accident to ensure that a human occupant's consent had been genuine, and suggested that the witness could be a professional involved in the spaceflight activity.

5.363 A witness to a form is typically required to ensure that a person who signs a form is the person they claim to be (i.e. the person signing the document is the same person who will take part in that activity). That isn't relevant for commercial spaceflight as there will be other checks in place to ensure this. Normally where a signature must be witnessed, the witness must be a neutral party, cannot have any conflicts of interest, and cannot be completed remotely. Finding such a person at the remote locations where spaceports in the UK are likely to be located could be difficult, and could risk delaying the scheduled spaceflight if one or more persons are awaiting a witness.

5.364 Based on the balance of feedback received through the consultation, the Government will not change the approach that there is no requirement for a witness to the signing of the consent form. Although a witness is not formally required, a prospective participant could still ask for one to be supplied or possibly arrange for their own.

Question

64. Do you think the regulations and associated guidance capture everything that is needed to properly provide informed consent for spaceflight activities? Please provide details.

Consultation responses

5.365 Responses were evenly split between agreeing and disagreeing that the Regulations and guidance capture everything that is needed to properly provide informed consent for spaceflight activities.

5.366 Of those who disagreed the concerns raised included:

- that participants cannot give genuine consent if overloaded with too much information
- it may not be useful to share information on number of accidents that occurred during testing and development of the launch vehicle, especially if such accidents did not present material harm to a (potential) human occupant, and
- participants with disabilities should be properly accommodated, and should be able to give consent to participate in spaceflights on the same basis as others.

5.367 The point about the level of information to be provided has been addressed in paragraph 5.369.

5.368 It is important that human occupants are fully informed of the risks associated with human spaceflight. Risks need to be stated in full and be accompanied by statistical information, which will include statistical information about accidents that have occurred for the type of craft they will be travelling on, even if such accidents did not present material harm to an occupant or potential occupant.

5.369 The Regulations include requirements for human occupants to meet certain medical fitness and mental capacity requirements to participate in a spaceflight. Persons with disabilities have been specifically considered draft regulation 78 of Part 7 (training, qualifications and medical fitness) encompasses these persons and requires a spaceflight operator to make arrangements for a disabled participant to take part in a spaceflight, subject to certain safeguards. In addition, there are also prescribed criteria relating to age and capacity for signing the consent form (regulation 205). For example, if a launch vehicle is to be launched in England or Wales, a human occupant must have capacity within the meaning of the Mental Capacity Act 2005 to understand the risks involved in the operator's spaceflight activities and the meaning of signifying consent to those activities.

5.370 As a result of feedback received through the consultation no further changes will be made to the informed consent regulations.

Part 12: Liabilities and indemnities

Background

5.371 An important element of the SIA concerns operators' liabilities arising from their spaceflight activity.

5.372 The SIA places a liability on a person carrying out spaceflight activities to indemnify the Government or listed person or body for any claims brought against it for loss or damage caused by those activities. Section 34 of the SIA places a strict liability on an operator carrying out spaceflight activities in the UK, meaning that any member of the uninvolved general public in the UK suffering injury or damage can bring a claim against an operator without having to prove fault.

5.373 The consultation set out the list of individuals who are able to make a strict liability claim under section 34(2), and prescribed cases or circumstances under which a limit on the operator's liability to the Government under section 12(2) of the SIA would not apply.

Question

65. Are there any other persons you think should be included in the scope of regulation 206? Please provide details

Consultation responses

5.374 A number of comments were received about persons who were suggested to be included on the list of those who do not have a strict liability right of claim. This included trespassers, sub-contractors, payload providers and in-house mediators. Clarity was also requested on the definition of a 'partner'. There was a wider question as to whether it

would be simpler to include a definition of the uninvolved general public, and comments that the list should be broadened to include those covered by cross-waivers.

5.375 Some wider comments were also received about:

- who can make a claim, and the distinction between fault and liability where the licensee may not be at fault
- whether the list meant that people were exempt from liability or unable to make a claim if they are on the list, and
- the practicalities of getting certain persons described in regulation 206 to sign waivers of a strict liability right of claim.

5.376 Draft regulation 206 sets out those persons who would not be able to make a strict liability right of claim. Such persons are included as they:

- will have agreed to accept the risks to themselves voluntarily, such as those who have signed an informed consent form
- would be required to engage in such activities as part of their job, or
- would be involved in the operation in some way (e.g. through being a customer of an operator but not necessarily being on site).

5.377 The list of individuals who do not have a strict liability right of claim is comprehensive. The Government believes that the majority of the additional persons suggested through the consultation responses are already covered within the scope of the current definitions (such as comments made in relation to agents / appointee, employee, contractors and sub-contractors). It is therefore not intended to amend the current draft definitions in regulation 206 to cover these persons.

5.378 Draft regulation 206 will however be updated in response to suggestions received about those who should not be able to make a strict liability right of claim by:

- broadening the scope to include persons who may not be appointed etc. by the licensee, but who may be at a space site for work purposes (e.g. the satellite manufacturer)
- including a provision covering any individual who has entered into a reciprocal waiver of liability with a licensee, and
- clarifying the term ‘partner’.

5.379 Trespassers although not excluded from making a strict liability claim under section 34 of the SIA, will need to demonstrate that negligence on their part was not a contributing factor. The guidance material will be updated to cover this point, as well as the other concerns raised by respondents.

Part 13: Monitoring and enforcement

Background

5.380 The consultation set out the approach taken by the Government to monitoring those licensed under the SIA, and the enforcement actions that the regulator can take when licensees have breached, or are at risk of, breaching, the SIA or the Regulations. As with

the aviation sector, the Regulations set out the requirements. This is different to the approach taken under the OSA, where the enforcement regime is implemented through licence conditions alone.

Questions

66. Are there any other considerations you think the monitoring and enforcement regulations should address? Please provide details.

Consultation responses

5.381 About a third of those who responded to the consultation had specific comments about the Government's approach to monitoring and enforcement.

5.382 Concerns were raised on the scope of the information requirements and inspection powers and how these might relate to the sites where there is US technology or equipment.

5.383 The only type of relevant information an inspector has no right to require a person to produce is that which attracts legal professional privilege. There is no right for anyone to withhold any information on the grounds that it is confidential or sensitive, or is covered by International Traffic in Arms Regulations (ITAR) or export controls.

5.384 The Regulations allow the regulator to share information with "any other public authority or international organisation responsible for regulating any aspect of spaceflight activities." Although some respondents found this provision to be unnecessarily broad, the Government believes that the scope afforded by this regulation is appropriate and proportionate when considering the complexity of activities captured by the secondary legislation.

5.385 The Regulations make provisions for inspectors to be on board a vehicle during testing, training, demonstration and commercial flights as deemed necessary to fulfil their duties under the SIA. There was concern that this might pose an undue risk to operators. While the Government understands this concern, in this instance the inspector would be a "spaceflight participant" and would therefore need to have undergone all the requisite training and medical fitness requirements set out in Part 7 of the Regulations prior to these sorts of inspections. In addition, any activities being considered by the inspector would be subject to the safety processes and procedures of the operator, including any risk assessments, to reduce the risks to ALARP for that activity. Together these will minimise any risks associated with an inspector taking part in activities on board a vehicle.

5.386 There was a request from a respondent for the regulations to provide examples of the individuals whom the regulator intend to appoint as inspectors. This is neither a practical nor reasonable request considering the variety of individuals who may be considered in this capacity.

5.387 A small number of respondents were also concerned about how a record would be kept of the items an inspector removes and whether the inspector should be required to consult with the licensee before any samples are taken or testing done. The inspector retaining equipment for an unspecified period of time was also a concern.

5.388 The secondary legislation is very clear that, where possible, the inspector will ensure that records are provided to the licensee of any goods removed from the site and that efforts will be made to engage with the licensee before equipment is tested or destroyed during the course of the inspector carrying out their duties.

5.389 One or two respondents also wanted mechanisms to be in place for objecting to a request by an inspector.

5.390 The Appeals Regulations make clear provisions for appealing a decision made by the regulator. An inspector acts on behalf of the regulator, therefore an aggrieved person can appeal an inspector's decision in the same way as other decisions by the regulator, where those decisions are prescribed in the Appeals Regulations. If there is cause to object to a specific request by an inspector, this is not an appealable decision. The regulator will ensure that there are internal mechanisms in place to facilitate this type of challenge.

5.391 As a representative of a public body, the inspector's decisions could be appealed or (for those where there is no right of appeal) subject to judicial review on the grounds of reasonableness.

5.392 Although some objections were raised, the Government does not feel that these warranted changes to the provisions set out in Part 13 of the Regulations.

Part 16: Duty to inform the regulator

Background

5.393 The consultation explained that there are provisions throughout the Regulations which place a duty on either the licence applicant or the licensee, to inform the regulator of any significant changes to the information they have provided to the regulator. In addition to the more specific requirements, there is also a general requirement to inform the regulator of any changes.

5.394 The consultation tested this approach with respondents to see whether the specific requirements could be replaced by a single more general requirement, or whether both the specific and the general requirements should be retained.

Question

67. Part 16 outlines provisions that apply to any information provided by a relevant person. There are also specific obligations in other regulations that create a duty for licensees to inform the regulator of changes. Do you agree that the general provision in regulation 270 should exist in addition to the specific obligation in other regulations? Please provide details.

Consultation responses

5.395 Approximately a quarter of those who responded to the consultation provided comments on draft regulation 270. Their concerns were largely focussed on the scope of the regulation, but also included concerns about the penalties associated with the offence of failing to inform the regulator of a significant change.

5.396 A number of respondents were of the view that the term “significant change” was too broad in its scope, vague and subjective. There were concerns that, without further clarity, a *de minimis* threshold of concern could not be established and this might put licensees or applicants at risk of committing an offence inadvertently.

5.397 As a result of this feedback, the Government will replace “significant change” with “material change” throughout the Regulations. Where possible, examples will also be provided in the guidance material which accompanies the Regulations.

5.398 With regard to the penalty associated with failing to comply with this duty, although no question was asked about this topic, many respondents were concerned that the penalty could apply to a much broader range of people than those captured by the duty specified in draft regulation 270.

5.399 Although it is implicit that the penalty associated with the offence should refer only to the people specified in the offence –in this case, licensees or applicants for a licence – the Government recognises that this is not immediately clear in the current drafting. The Regulations will therefore be amended so that only the “relevant person” mentioned in draft regulation 270 can commit an offence under draft regulation 271.

The Spaceflight Activities (Investigation of Spaceflight Accidents) Regulations

Background

5.400 The consultation outlined the rationale for developing regulations around the investigation of spaceflight accidents, and the need for an independent body to oversee this. This body, the Spaceflight Accident Investigation Authority (SAIA), would not only hold responsibility for the investigation of accidents, but also work to prevent them recurring.

5.401 The Government’s approach, drawn largely from the aviation sector, was tested with respondents during the consultation.

Question

68. Are there any other considerations you think the accident investigation regulations or guidance should address? Please provide details.

Consultation responses

5.402 The majority of consultees had no comments on the approach proposed for spaceflight accident investigations, although there were some recurring themes for those who did respond.

5.403 The few queries that were raised focussed on what was permissible at the site of an accident, i.e. what actions could licensees take to protect against potential harm to the environment, or to make the site safe to e.g. facilitate assisting victims or prevent further harm. There are clear provisions in the Accident Regulations which allow for this, but the investigator-in-charge should always be consulted in the first instance before action is

taken. More widely, if an environmental incident does occur, while the SAIA would not be responsible for any clean-up, would liaise with the responsible local government agencies to help ensure that contamination is kept to a minimum alongside preserving evidence.

5.404 Respondents also suggested amending the regulations to set a limit on the expenses recoverable by the SAIA during the course of an investigation and also to clarify that the costs to the licensee of implementing any safety recommendations as a result of an investigation should be considered before a recommendation is made.

5.405 The purpose of recovering "reasonable" expenses is to ensure that spaceflight activities in the UK do not place an unnecessary burden on the UK taxpayer, and safeguard the operator. What is "reasonable" will vary depending on the investigation and therefore cannot be limited by regulation. While an investigation can be costly, it is the operator's responsibility to ensure they have adequate financial capital and/or insurance to cover any potential costs. The same is true for implementing any recommendations made by the SAIA to improve safety as a result of an investigation. The role of the SAIA is not to calculate the costs associated with the implementation of a recommendation, but to prevent the recurrence of spaceflight accidents and improve safety.

5.406 Some respondents also raised concerns about how investigations would be carried out, the types of information which would have to be shared with SAIA and how that information would be reported.

5.407 In carrying out any investigations, the SAIA will always be sensitive to others' needs and will minimise any disruption to the site of an accident where possible. When publishing safety reports, the Accident Regulations prohibit the SAIA from disclosing the identity of individuals who have given evidence to the investigation and will seek to protect any confidential and/or sensitive information shared. The focus of these investigations will be to improve safety and prevent further accidents occurring, therefore only the information deemed absolutely necessary to include in the safety investigation report will be published. Prior to the publication of any report, there will also be a consultation process which will provide an opportunity for certain affected parties to make representations. Safety recommendations and safety bulletins will be included in these reports and safety bulletins published to avoid recurrence of the event and thus improve safety.

5.408 There were also those who found the distinction between a "spaceflight accident" and a "major accident" unclear. The latter, however, is used in the separate draft Space Industry Regulations and is part of what a potential licensee should consider when developing the safety case. Should a "major accident" occur, this would also be a "spaceflight accident" and require investigation by the SAIA. This will be clarified in guidance.

5.409 Some respondents felt that the definition of a "spaceflight accident" should be amended because it was too broad. The definition of "spaceflight accident" combines existing definitions from the SIA for "spaceflight activities" and "accident." The Government considers this definition to be both clear and appropriate.

5.410 Concerns were raised about how the "site" of an accident would be defined. As with aircraft accidents, the site of a spaceflight accident is bounded only to the extent necessary to conduct the investigation. Due to the unique nature of each accident, it would not be reasonable to set a formal definition of a spaceflight accident site in legislation.

5.411 As a result of feedback received though the consultation, the Government is not proposing to amend any of the regulations which relate to the investigation of spaceflight accidents.

The Space Industry (Appeals) Regulations

Background

5.412 The consultation set out the background and the process of appealing certain decisions made under both the SIA and OSA. This approach was tested with consultees.

Question

69. Are there any other considerations you think the appeals regulations or guidance should address? Please provide details.

Consultation responses

5.413 Approximately one third of consultees provided comments on the Government's proposed approach to appealing decisions made under the draft Space Industry Regulations.

5.414 A small number of respondents queried whether mediation would be available during the appeals process. The Government has made no specific provisions for mediation but, following a decision by the regulator which an affected person is unsatisfied with, expects dialogue to take place between the affected party and the regulator ahead of any formal appeals process. The regulator will also ensure that there is ongoing dialogue with applicants and licensees, to reduce the likelihood of an unexpected decision being taken by the regulator. Those who wish to pursue mediation should discuss this with the regulator at the appropriate time.

5.415 Queries were also raised in relation to who is permitted to intervene in an appeal. Respondents asked that further guidance be provided on what constitutes "sufficient interest," the requirement for an intervention. The guidance on the appeals process will therefore be updated to meet this request.

5.416 Concerns were also raised about the absence of time limits on when an appellant will be notified about whether they can appeal or about the outcome of an appeal. While the Government is not proposing to set time limits within the Appeals Regulations, the panel taking a decision will always seek to do so as soon as is reasonably practicable, taking into account the circumstances of those affected. More information on this will be available in the associated guidance material on appeals. Some respondents were also concerned about the time within which an appeal could be launched, which is currently set at 14 days. The Government believes that this is an appropriate timescale for requesting permission to appeal, considering that the appellant will not be required to provide a detailed presentation of the appeal at this stage. With regards to concerns raised about the fees being charged for an appeal, these are in line with those set in the Civil Procedure Rules and aim to cover the running of the service.

5.417 The composition of the panel was also called into question, with one respondent concerned that there would not be any representatives with technical, policy or regulatory

subject matter expertise. This is not the case: the UK Space Agency will provide technical and policy expertise as required. Additional information on this topic will be included in the guidance material.

5.418 A few respondents also queried whether licensed activities would need to cease while an appeal was being decided. The Regulations are clear on this point: unless a specific enforcement notice has been issued which prohibits activities, the appeals process itself will not stop a licensee from carrying out any activities for which they are licensed.

Annex 1: Additional questions for the consultation-stage impact assessments

Background

6.1 In addition to asking questions about certain policy aspects of the Government's proposed approach to commercial spaceflight, care was taken to also address the economic and social impact of the proposed secondary legislation on industry.

6.2 The consultations raised questions to address this impact, and a second consultation in the autumn of 2020 addressed the implications of the Government's proposed approach to insurance and liabilities.

6.3 Responses from both consultations will assist in producing the final-stage impact assessments.

Space Industry Regulations consultation responses

6.4 Out of the 52 consultation responses, only a few (n≤5) didn't provide any information or only provided organisational information for these questions. The analysis below is low confidence and should be treated as indicative, as it has required judgements about how to code the data in some instances.

Question

70. What is your organisation?

a) a spaceport
b) a range control service provider
c) a launch operator
d) an orbital operator
e) a trade body
f) a union
g) a user of launch or satellite services e.g. imagery
h) an academic institution
i) an international body or group
j) an environmental group or organisation
k) an insurance, banking or finance company
l) a foreign government
m) an individual

n) another type of business or organisation

Consultation responses

6.5 A wide range of responses were received (N=52), covering all segments of the space industry supply-chain, as defined in the 'UK space industry: Size and health 2018' report[7]. 44% of respondents were in the "*space operations*" segment of the supply chain and 35% in the "*ancillary services*" segment of the supply chain. This latter group included trade associations, legal and financial services, academic institutions, and policy, regulation and oversight bodies.

6.6 While many respondents (40%, N=52) answered on behalf of single businesses within the supply chain, there was also evidence of vertical integration up and down, and horizontal integration across the supply chain, with 11 respondents indicating their organisation was a consortium of different space market activities. In addition, there were a few (n≤5) responses from trade associations. This could indicate there are potential efficiencies that were not captured in the consultation-stage impact assessment. This will be considered in the final-stage impact assessment.

6.7 Finally, there were a number of responses (23%, N=52) from individuals, academic institutions and the public sector. Only a few (n≤5) responses couldn't be matched to any part of the space industry supply chain.

Question

71. Is your organisation considering applying for a licence under the Space Industry Act 2018?

Consultation responses

6.8 40% (N=52) of respondents are considering applying for a licence under the Space Industry Act 2018 (the SIA). 27% are not considering applying for a licence. The remaining 33% of respondents did not respond to this question. This supports the inclusion of "*familiarisation costs*"[8] and "*growth effects*"[9] in the consultation-stage impact assessment for other parts of the UK space industry supply-chain in addition to the 'space operations' licensed under the SIA. However, the high percentage of respondents not considering applying for a licence suggests that the number of organisations incurring familiarisation costs and benefiting from growth effects across the supply-chain should be increased in the final-stage impact assessment.

6.9 Of the respondents that are considering applying for a licence under the SIA (n=21), there was a fairly even distribution between the different licence types (spaceports, range control service providers, launch and orbital operators), except for return operator

[7] London Economics on behalf of UK Space Agency, January 2019 - https://www.gov.uk/government/publications/uk-space-industry-size-and-health-report-2018

[8] Familiarisation costs are the direct and indirect costs to businesses of familiarising themselves with the legislation, guidance and Regulator's Licensing Rules.

[9] Growth effects are the benefits associated with higher growth in the downstream space sector segments as a result of UK launch activity, such as satellite operators that may be able to enhance their growth by taking advantage of domestic launch capability.

licences. This reflects an assumption in the consultation-stage impact assessment that spaceflight operations from the UK will largely be centred around single spaceport locations and require all of the licence types under the SIA to permit spaceflight activities from these sites, although the volume and complexity spaceflight operations will probably vary significantly between sites. However, it could also imply that there currently are few plans to have multiple launch operators from individual spaceports.

Question

72. Which of the UK launch forecast scenarios in Annex 3 of the accompanying Impact Assessment do you think is most realistic? Please choose one option.
    a) Low
    b) Central
    c) High
    d) None of the above
    e) Not sure

Consultation responses

6.10 31% (N=52) of respondents thought the central scenario is most realistic, with a few (n≤5) responses suggesting it was somewhere between the central and low/high scenarios. This supports the use of the central UK launch market forecast scenario in the consultation-stage impact assessment. The majority of respondents were either not sure which scenario is most realistic (19%) or did not respond to this question (37%), perhaps because it was too technical or because of uncertainty around the UK launch market outlook. This indicates supports the use of a wide range of scenarios to reflect any uncertainties.

Question

73. If you answered 'none of the above' to question 72 please explain why including evidence if possible.

Consultation responses

6.11 A few (n≤5) respondents answered "*none of the above*" UK launch forecast scenarios were realistic, with some adding further justifications that the scenarios did not align with industry forecasts and that the wide range between the low ("*complete market failure*") and high ("*extremely optimistic*") scenarios were unhelpful for individual business planning purposes.

6.12 The aim of the consultation-stage impact assessment is to consider the impact of the proposed regulations for the whole UK launch market, which may explain some of the discrepancy with these responses as the perspective is different. This will be considered and the UK launch market forecast scenarios updated for the final-stage impact assessment.

Question

74. Have any stakeholders affected by the proposed secondary legislation not been captured in the accompanying Impact Assessment? Please provide details, including

the details of these stakeholders and how they may be affected, and costs and/or benefits in £ if possible or qualitative costs and/or benefits if not monetisable.

Consultation responses

6.13 The majority (92%, N=52) of respondents either did not respond to this question or did not think there were any stakeholders that had not been captured in the consultation-stage impact assessment. However, some respondents mentioned the lack of information on devolved administrations, local businesses and local communities, as well as possible impacts for people with protected characteristics under the Equalities Act 2010 and spaceflight participants.

6.14 The impact for other public bodies was considered in the consultation-stage impact assessment: "*In addition to direct costs to the UK spaceflight regulator, there are likely to be some indirect costs that fall to other public bodies from the information sharing and other monitoring and enforcement activities agencies*". This was intended to include devolved administrations and will be made clearer in the final-stage impact assessment.

6.15 The impact for local businesses was considered in the "*benefits*" section of the consultation-stage impact assessment, through both: a) "*the value of additional economic outputs (GVA) associated with launch service providers and their supply chain*" i.e. leveraged effects; and, b) "*the benefits associated with higher growth in the downstream space sector segments as a result of UK launch activity, such as satellite operators that may be able to enhance their growth by taking advantage of domestic launch capability*" i.e. growth effects. However, it is acknowledged that there may also be disruption to local business from spaceflight activities, and this will be reflected in the final-stage impact assessment.

6.16 The impact for local communities and the wider public was implicitly covered in the "*accident investigation*", "*liabilities and insurance*" and "*environment*" sections of the consultation-stage impact assessment. However, it is acknowledged that the impact on local communities could be more explicit, particularly with respect to local engagement and consultations that may take place. Whether these are attributable to the draft Regulations or other legislation is questionable, as many of these consultations are required to take place under existing planning and related laws. This will be reflected in the final-stage impact assessment.

6.17 An equalities impact assessment was completed for the consultation-stage impact assessment, summarised as follows: "*These measures apply irrespective of age/gender/race etc. We do not consider that there is a negative impact on a protected group from this policy. It will only bar those who do not meet the eligibility criteria but, in the interests of safety and security concerns within this market, and impact on the UK's international obligations - we feel this is essential*." This will be reviewed for the final-stage impact assessment.

6.18 The impact of informed consent for spaceflight participants was covered by the consultation-stage impact assessment under the high scenario for pilots and flight crew. Other possible spaceflight participants will be reflected in the final-stage impact assessment.

Question

75. Will your organisation have to purchase any equipment or systems to comply with the proposed secondary legislation? Please provide details, including estimated costs in £ if possible or qualitative costs if not monetisable.

Consultation responses

6.19 In the consultation-stage impact assessment, "*the costs associated with meeting technical standards and regulations in the proposed secondary legislation are assumed to be zero compared to the space industry's current best practice in the UK and abroad, because the proposed legislation is outcomes focused (prescribing what rather than how licence applicants need to do), has considered existing safety and security legislation where possible, and only makes prescriptive regulations to mitigate specific safety and security risks*."

6.20 This meant that both capital and operational expenditure for licence applicants and holders were assumed to not represent additional "compliance costs" in the consultation-stage impact assessments, except for roles that the draft Regulations prescribe for certain safety and security critical roles that must be performed on behalf of spaceports, range control service providers, launch operators and orbital operators.

6.21 Whilst a quarter of respondents (25%, N=52) said they would not need to purchase any equipment or systems to comply with the proposed secondary legislation, almost a fifth (19%) said they would and a few (n≤5) respondents answered "*maybe*" or "*not sure*". Most respondents (48%) did not answer this question.

6.22 When filtering this for respondents that said they are considering applying for a licence under the Act (n=21), almost two fifths of these respondents (38%) said they would need to purchase equipment and systems, with almost a fifth (19%) answering "*maybe*" or "*not sure*" and almost a fifth (19%) answering "*no*". Most of the respondents answering "*yes*", "*maybe*" or "*not sure*" to this question were spaceports or part of a spaceport consortium. Almost a quarter of respondents (24%) considering applying for a licence under the SIA did not answer this question.

6.23 Some respondents (N=52) provided qualitative information that there may be additional costs to business in terms of purchasing equipment and systems to comply with the proposed secondary legislation, although respondents provided limited information on actual costs. In addition, some responses said these would be either part of anticipated costs or not attributable to the draft Regulations i.e. the proposed regulations do not pose additional costs to business, over and above existing business practices and/or regulatory requirements e.g. infrastructure required for environmental reasons.

6.24 The consultation-stage impact assessment acknowledged that there may be additional costs to business in terms of purchasing equipment and systems to comply with the proposed secondary legislation, and the final-stage impact assessment will do the same. The illustrative analysis shown in the "*compliance costs*" section of the impact assessment gave "*an indication of the baseline capital and operational expenditure (CAPEX and OPEX), and potential additional compliance costs for spaceflight activities that will be enabled in the UK supply-chain i.e. spaceports, range control service providers, launch operators and orbital operators.*" This will be kept the same in the final-stage impact assessment.

6.25 In addition, the final-stage impact assessment will also consider some capital expenditure to be directly attributable to the draft Regulations and therefore additional, including some range control service provider and data and communications infrastructure costs, based on information provided by consultation respondents.

Question

76. Will you or your organisation have to implement or change any processes to comply with the proposed secondary legislation? Please provide details, including estimated costs in £ if possible or qualitative costs if not monetisable.

Consultation responses

6.26 In the consultation-stage impact assessment, "*the costs associated with meeting technical standards and regulations in the proposed secondary legislation are assumed to be zero compared to the space industry's current best practice in the UK and abroad, because the proposed legislation is outcomes focused (prescribing what rather than how licence applicants need to do), has considered existing safety and security legislation where possible, and only makes prescriptive regulations to mitigate specific safety and security risks.*"

6.27 This meant that both capital and operational expenditure for licence applicants and holders were assumed to not represent additional "compliance costs" in the consultation-stage impact assessments, except for certain safety and security critical roles that the draft regulations prescribe, which must be performed on behalf of spaceports, range control service providers, launch operators and orbital operators.

6.28 Whilst a large proportion of respondents (27%, N=52) said they would not need to implement or change any processes to comply with the proposed secondary legislation, the same proportion (27%) said they would and a few (n≤5) respondents answered "*maybe*" or "*not sure*". Most respondents (42%) did not answer this question.

6.29 When filtering this for respondents that said they are considering applying for a licence under the SIA (n=21), almost three fifths of these respondents (57%) said they would need to implement or change process, with around 10% answering "*maybe*" or "*not sure*" and almost a fifth (19%) answering "*no*". Most of the respondents answering "*yes*", "*maybe*" or "*not sure*" to this question were prospective orbital operators, spaceports or part of a spaceport consortium. Around 14% considering applying for a licence under the SIA did not answer this question.

6.30 Some respondents (N=52) provided qualitative information that there may be additional costs to business in terms of implementing or changing processes to comply with the proposed secondary legislation, with a number mentioning "*complexity*", "*licence application*" requirements and "*administrative*" costs, although there was limited information on actual costs. In addition, some responses said these would be either part of anticipated costs or not attributable to the draft Regulations i.e. the proposed regulations do not pose additional costs to business, over and above existing business practices and/or regulatory requirements e.g. the Assessment of Environmental Effects (AEE).

6.31 The consultation-stage impact assessment acknowledged that there may be additional costs to business in terms of implementing or changing processes to comply with the proposed secondary legislation, and the final-stage impact assessment will do the same. The Illustrative analysis shown in the "*compliance costs*" section of the impact

assessment gave "*an indication of the baseline capital and operational expenditure (CAPEX and OPEX), and potential additional compliance costs for spaceflight activities that will be enabled in the UK supply-chain i.e. spaceports, range control service providers, launch operators and orbital operators.*" This will be kept the same in the final-stage impact assessment.

6.32 In addition, the consultation-stage impact assessment captured a significant amount of operational expenditure related to familiarisation, engagement and compliance through both prescribed and non-prescribed roles, including staffing, information and administration costs for licence applications and the regulatory monitoring regime. From the consultation responses, it is not clear whether the expected cost of familiarisation, engagement and compliance with the proposed secondary legislation detailed in the consultation-stage impact assessment caused some respondents concern or, or if the actual detail of the draft Regulations, guidance and Regulator's Licensing Rules caused some respondents concern. Either way, the final-stage impact assessment will continue to acknowledge high familiarisation and engagement costs, even if operational expenditure compliance costs remain unchanged.

Question

77. Are there any benefits associated with the proposed secondary legislation that are either misrepresented or not captured in the accompanying Impact Assessment? Please provide details, including estimated benefits in £ if possible or qualitative costs if not monetisable.

Consultation responses

6.33 The majority (69%, N=52) of respondents did not answer this question. Of those that did answer, most (21% of all respondents) did not think any benefits associated with the proposed secondary legislation were misrepresented or not captured in the consultation-stage impact assessment. A few (n≤5) respondents were "*not sure.*" Some of the respondents (n≤5) who thought there were misrepresented or missing benefits in the impact assessment provided additional details, including about the UK launch market forecast scenarios (which drive a significant amount of the costs and benefits), tourism benefits and environmental impacts.

6.34 Both tourism benefits and environmental impacts were considered in the consultation-stage impact assessment. However, the indirect benefits that spaceflight services could provide for monitoring weather and climate, for example through earth observation satellites, were not referenced in the impact assessment. These benefits will be considered and the UK launch market forecast scenarios updated for the final-stage impact assessment.

Question

78. Are there any costs associated with the proposed secondary legislation that are either misrepresented or not captured in the accompanying Impact Assessment? Please provide details, including estimated benefits in £ if possible or qualitative costs if not monetisable.

Consultation responses

6.35 The majority (56%, N=52) of respondents did not answer this question. Of those that did answer, most (19% of all respondents) did not think any costs associated with the proposed secondary legislation were misrepresented or not captured in the consultation-stage impact assessment. A few (n≤5) respondents were "*not sure*" and a few (n≤5) respondents did think there were misrepresented or missing costs in the impact assessments provided additional details, including about engagement costs (licence application and monitoring regime), compliance costs (security, safety, legal etc.), spaceflight participants, and wider economic impacts (environment and airspace).

6.36 Evidence about the impact of engagement and compliance has been captured through the other questions. Environmental and airspace impacts were at the very least described qualitatively in the consultation-stage impact assessment. The impact of informed consent for spaceflight participants was covered by the July 2020 consultation. These impacts will continue to be reflected and considered in the final-stage impact assessment.

Question

79. Will you or your organisation familiarise themselves with the secondary legislation and accompanying guidance?

80. If you answered 'yes' to question 79, please provide details of the type and number of employees you expect to familiarise themselves with the secondary legislation and accompanying guidance for your organisation.

81. If you answered 'yes' to question 79, please also include an estimate of how long you expect this take (in working days) and an estimate of the cost in £ if possible.

Consultation responses

6.37 The majority (60%, N=52) of respondents said they or their organisation would familiarise themselves with the secondary legislation and accompanying guidance[8]. Only a few (n≤5) said they or their organisation would not. A large proportion (37%) did not answer this question. This supports the inclusion of familiarisation costs in the consultation-stage impact assessment.

6.38 The respondents (N=52) who said they or their organisation would familiarise themselves with the secondary legislation and accompanying guidance, covered both potential licence applicants (n=20) and others (n=11), and all segments of the space industry supply chain, as defined in the 'UK space industry: Size and health 2018' report. The majority (64%) of respondents answering "*yes*" to this question were in the "*space operations*" segment of the supply-chain, with many others (19%) in the "*ancillary services*" segment of the supply-chain, including several trade associations and legal and financial institutions. The wide range of respondents answering "*yes*" to this question suggests that the number of organisations incurring familiarisation costs across the supply-chain should be increased in the final-stage impact assessment.

6.39 When filtering this for respondents that said they are considering applying for a licence under the SIA (n=21), almost all (95%) said they would or their organisation would need to familiarise themselves with the secondary legislation and accompanying guidance across all types of licences. This supports the inclusion of familiarisation costs for all licence types in the consultation-stage impact assessment.

6.40 A large proportion of respondents (N=52) provided both qualitative and quantitative information about familiarisation costs. This included a wide range of evidence that broadly supported the analysis in the consultation-stage impact assessment.

- For respondents that provided actual cost information (n=9), familiarisation costs for each of the licence types and "*other stakeholders*" in the central scenario ranged from £10,000 to £100,000 per individual or organisation in both the consultation responses and impact assessment, but were £5,000-£50,000 lower on average across the consultation responses than in the impact assessment. The exception to this was prospective orbital operators, whose expected familiarisation costs were substantially higher. This suggests familiarisation costs should be lowered in both the central and high-scenario in the final-stage impact assessment and be slightly increased in the low scenario, except for orbital operators where familiarisation costs should be increased across all scenarios.
- The number of individuals and employees expected to familiarise themselves with the secondary legislation and accompanying guidance was broadly similar to the impact assessment, albeit with slightly lower headcounts on average (n=16). However, the headcount range across respondents was wider across than in the impact assessment. This suggest the number of individuals and employees expected to familiarise themselves with the secondary legislation and accompanying guidance should be reduced in the low and central scenarios but increased in the high scenario.
- The type of individuals and employees expected to familiarise themselves with the secondary legislation and accompanying guidance was broadly similar to the impact assessment, albeit with slightly higher paid occupations from respondents on average (n=22), with the majority saying Professional occupations would need to familiarise themselves, and a large proportion saying Managers and Directors would need to. This suggests the type of occupations should be adjusted towards higher paid occupations in the final-stage impact assessment across all scenarios.
- The time that respondents said they or their organisation would spend familiarising themselves with the secondary legislation and accompanying guidance was broadly similar, albeit a little lower across all respondents and scenarios than in the consultation-stage impact assessment (n=14). This suggests that the time spent reading the accompanying legislation and guidance will be more targeted than the consultation-stage impact assessment assumption that each occupation will read every aspect of the secondary legislation and accompanying guidance. This will be tweaked in the final-stage impact assessment.
- 11 respondents indicated their organisation was a consortium of different space market activities. In addition, there were a few (n≤5) responses from trade associations. This could indicate there are potential efficiencies for familiarisation costs that were not captured in the consultation-stage impact assessment. This will be considered in the final-stage impact assessment.
- A few (n≤5) responses that provided qualitative and quantitative information related to engagement and compliance costs were excluded from the familiarisation cost analysis, but will be captured elsewhere for the final-stage impact assessment.

Question

82. If you answered 'yes' to question 79, what type and number of employees do you expect to engage with the regulator on behalf of you and/or your organisation during:

    a) The licensing process
    b) The regulator's monitoring regime

83. If you answered 'yes' to question 71, how long (in working days) do you expect you and/or your employees in your organisation to spend on:

    a) Engaging with the regulator during the licensing process
    b) Engaging with the regulator to monitor compliance

Consultation responses

6.41 Many respondents (40%, N=52) are considering applying for a licence under the SIA. The consultation-stage impact assessment outlined the regulatory "*engagement costs*" that are anticipated for these businesses when applying for a licence and during the regulator's monitoring regime.

6.42 Of these respondents, a large proportion of respondents (n=21) provided both qualitative and quantitative information about engagement costs. This included a wide range of evidence that broadly supported the analysis in the consultation-stage impact assessment:

- Only a few (n≤5) respondents provided actual cost estimates, so the sample size is too small to use to update the estimates in the final-stage impact assessment. However, these responses will be used to calibrate the engagement costs.
- Overall, it appears that the engagement costs estimated in the consultation-stage impact assessment were much higher than what either businesses anticipated or need to have provisions for. This implies that either engagement costs should be brought down in the final-stage impact assessment, or provisions by industry for engaging with the regulator should be increased. There is not enough evidence at this stage about which is more likely or appropriate, so the final-stage impact assessment will make limited changes to overall engagement costs.
- The number of employees expected to engage with the regulator was broadly similar to the impact assessment, albeit with slightly lower headcounts from respondents on average (n=15). However, the headcount range across respondents was wider across than in the impact assessment. This suggests the number of individuals and employees expected to engage with the regulator should be reduced in the central scenario but increased in the high scenario.
- The type of individuals and employees expected to engage with regulator was broadly similar to the impact assessment, albeit with slightly higher paid occupations from respondents on average (n=9), with the majority saying Directors, Managers and Professional occupations would need to engage with the regulator during the licence application process and monitoring regime. This suggests that the type of occupations should be tweaked towards higher paid occupations in the final-stage impact assessment across all scenarios.

- The time that respondents said they or their organisation would spend engaging with the regulator during the licence application process and monitoring regime was broadly similar to the central scenario, albeit a little lower across all respondents except prospective orbital operators, particularly for the monitoring regime, than in the consultation-stage impact assessment (n=15). However, some respondents said time spent engaging with the regulator would be higher than in the consultation-stage impact assessment. This suggests that the time spent engaging with the regulator in the central scenario should be brought down, particularly for the monitoring regime, in the final-stage impact assessment, but the range kept wide in the high scenario.
- 10 respondents indicated their organisation was a consortium of different space market activities. This could indicate there are potential efficiencies for engagement costs that were not captured in the consultation-stage impact assessment. This will be considered in the final-stage impact assessment.

Question

84. If you answered 'yes' to question 71, what type and number of people are you likely to designate and/or employ for the prescribed roles set out in the proposed secondary legislation? Please provide details, including associated cost estimates in £ if possible or qualitative costs if not monetisable.

Consultation responses

6.43 The consultation-stage impact assessment outlined the prescribed roles that the draft Regulations prescribe for certain safety and security critical roles that must be performed on behalf of spaceports, range control service providers, launch operators and orbital operators in the "*compliance costs*" section and "*Annex 2*".

6.44 The draft Regulations do not require that prescribed roles must be held by separate individuals, except in the case of the Launch Director and Safety Manager. These roles must be filled by separate people to ensure that any safety concerns raised by the Safety Manager are addressed by the Launch Director before the Launch Director gives final approval for launch to take place. A security manager will only be needed for orbital operators where there are issues relating to national security.

6.45 When filtering this for respondents that said they are considering applying for a licence under the SIA (n=21), a large proportion of respondents provided both qualitative and quantitative information about the type, number and cost of prescribed roles. This included a wide range of evidence that broadly supported the analysis in the consultation-stage impact assessment.

- Only a few (n≤5) respondents provided actual costs estimates, so the sample size is too small to use to update the estimates in the final-stage impact assessment. However, these responses will be used to calibrate prescribed role costs.
- Overall, it appears that the prescribed role cost estimated in the consultation-stage impact assessment were slightly lower than what either businesses anticipated or need to have provisions for. However, some of the responses conflated prescribed role costs with overall staff costs. This implies that the range of overall prescribed

role costs should probably remain roughly the same in the final-stage impact assessment, with the central scenario costs increasing slightly.

- The number of employees expected to be assigned to prescribed roles had quite a wide variation, ranging from 1 to 15 (n=7), with some businesses and consortia providing headcounts that implied prescribed roles may be spread across a smaller pool of individuals, and others providing headcounts that implied prescribed roles would be over-subscribed (i.e. over and above the requirements in the draft regulations) or conflating prescribed roles with overall staffing. This suggests that the central scenario assumption in the consultation-stage impact assessment that businesses will employ the minimum permitted number of staff for prescribed roles may not be valid, and the central scenario headcount should increase in the final-stage impact assessment. However, the high scenario will remain the same in the final-stage impact assessment as there are few reasons to suggest businesses will employ more staff than is necessary for compliance.
- The type of employees expected to be assigned to prescribed roles was broadly similar to those in the consultation-stage impact assessment (n=10), with a mix of Directors, Managers and Professional Occupations, with salaries or cost information provided by a few (n≤5) respondents indicating salary costs of roughly £60,000 to £130,000. Some respondents appeared to conflate prescribed roles with other staff.
- Nine respondents indicated their organisation was a consortium of different space market activities. This could indicate there are potential efficiencies for engagement costs that were not captured in the consultation-stage impact assessment. This will be considered in the final-stage impact assessment.

Liabilities, charging and insurance consultation responses

Question

27. In your view are there persons affected by the proposed secondary legislation that have not been captured in this Impact Assessment?

- Who, in your view, has been omitted?
- How do you think they are affected?
- If possible, quantify the costs and benefits in £.

Consultation responses

6.46 Over a third of respondents indicated that there had been omitted persons/groups. Of those, the majority indicated that compliance for existing/established orbital operators had not been captured. For example, the impact assessment did not reflect the additional administration, financial and personnel time for existing orbital operators to understand new procedures and make operations compliant, plus additional liabilities under Section 34.

6.47 However, the Government does not consider there to be an additional cost burden in general. Firstly, the in-orbit third-party liabilities (TPL) policy is the same approach currently implemented under the Outer Space Act 1986 (i.e. no additional costs). Also, with respect to the liability arising under section 34 of the SIA, satellite operators will be

covered by the launch TPL policy for the launch phase. The Government understands that the risks of an unplanned re-entry during the in-orbit phase of a mission (albeit very low) are covered by existing TPL policies (for which the insurance requirement and the limit of liability would be set at €60m for standard missions as per the current policy). However, there may be cases where an additional cost burden might arise for satellite operators. The Government will consider how to minimise the risk of a cost burden as part of its forthcoming review on liability limits and insurance.

6.48 Respondents indicated there were other omitted groups, including statutory consultees, official observers and the health of those impacted by radiation from space objects. However, insufficient detail was provided to model these impacts.

Question

28. Will you have to change any processes to comply with the proposed secondary legislation? Provide details of your changes (including estimated costs in £).

Consultation responses

6.49 Over a third of respondents indicated that they will need to change processes to comply with the proposed secondary legislation. Respondents provided some detail around those changes, including:

- additional familiarisation / transitional costs to comply with the SIA orbital regime
- additional costs relating to assessment of re-entry possibilities
- additional licensing costs (due to a longer, more costly process)

6.50 A number of respondents also commented that the SIA orbital regime is more suited towards launch related licensing, and that the draft legislation does not distinguish between different operator types.

6.51 As already noted, the Government does not consider there to be additional cost burdens imposed on satellite operators (for example from the liability arising under section 34 of the SIA). This is because existing requirements for in-orbit TPL will remain the same under the SIA as under the Outer Space Act 1986. Furthermore, the Government understands that a TPL policy covers unplanned re-entry risk and satellite operators will be covered by the launch policy for the launch phase. However, there may be cases where an additional cost burden might arise for satellite operators and the Government will consider how to minimise the risk of an additional cost burden as part of its forthcoming review of insurance and liabilities. The Government considers the familiarisation costs monetised within the consultation-stage impact assessment to be proportionate.

6.52 Finally, it was suggested that putting a limit of six weeks on the licence application process will increase UK attractiveness. However, safety is at the heart of the SIA regulatory regime and therefore it is not proposed to put time constraints on the application process, as this could affect the quality of the UK licensing regime.

Question

29. Do you think there are benefits associated with the proposed secondary legislation that are:

- misrepresented in this Impact Assessment?
- not captured in this Impact Assessment?
- Which benefits (including estimated benefits in £)?

Consultation responses

6.53 A few respondents indicated that there are misrepresented benefits, and around half indicated there are benefits not captured (for example, seaborne launch). However, there was little detail provided, for example on how to quantify those benefits.

Question

30. Do you think there are costs associated with the proposed secondary legislation that are:

- misrepresented in this Impact Assessment?
- not captured in this Impact Assessment?
- Which costs (including estimated costs in £)?

Consultation responses

6.54 Around half of respondents indicated that there are misrepresented costs and costs not captured in the consultation-stage impact assessment. Of those, the majority highlighted additional liabilities imposed under section 34 of the SIA (e.g. familiarisation costs, administration costs of managing new obligations). Overall, respondents considered costs to be higher than quantified in the impact assessment.

6.55 It is not clear from the responses whether these costs are specifically attributable to section 34 of the SIA or to other legislative requirements in the draft Regulations. The consultation-stage impact assessment for liabilities and insurance assumed that most of these costs were already captured in the consultation-stage impact assessment for the draft Regulations.

6.56 The consultation-stage impact assessment for the draft Regulations captured a significant amount of operational expenditure related to familiarisation, engagement and compliance through both prescribed and non-prescribed roles, including staffing, information and administration costs for licence applications and the regulatory monitoring regime. From the consultation responses, it is not clear whether the expected cost of familiarisation, engagement and compliance with the proposed secondary legislation detailed in the consultation-stage impact assessment caused some respondents concern, or if the actual detail of the draft regulations, guidance and Regulator's Licensing Rules caused some respondents concern. Either way, the final-stage impact assessment will continue to acknowledge high familiarisation and engagement costs, even if operational expenditure compliance costs remain unchanged.

Question

31. Do you plan to familiarise yourself with the:

- proposed secondary legislation?

- accompanying guidance?

Consultation responses

6.57 Around two thirds of respondents indicated they will familiarise themselves with the secondary legislation and guidance.

Question

32. Provide further details of the following in terms of familiarisation costs

- Type / grade of employee who will familiarise themselves
- Number of employees at grade
- Expected time per employee
- Expected cost per employee

Consultation responses

6.58 Around a third of respondents provided information, although fewer provided information across all the sub-questions. A wide range of responses were provided in relation to quantifying familiarisation costs, although with no clear consensus. This is likely to be due to a small, patchy sample size, which makes it difficult to draw broad comparisons for different types of space sector organisations.

6.59 The Government has cross-checked the information provided alongside responses to a similar question asked in the July 2020 consultation and the assumptions based on the responses provided.

Question

It is assumed that all information required to set the liability limit and insurance requirements (for either Option) is provided by the operator as part of the safety case, and hence this engagement cost is accounted for in the 'SIA Secondary Legislation IA'. On this basis, there are no (additional) engagement costs to business from this legislation.

33. Do you agree with the statement above?

Consultation responses

6.60 Over a quarter of respondents did not agree with the statement. Similar to points raised across other responses, some indicated higher administration and ongoing engagement costs with the SIA orbital regime. One respondent also highlighted that additional costs could arise through the regulator's lack of expertise and/or unfamiliarity with the processes (i.e. requiring higher support from applicants).

6.61 Some respondents also indicated that costs are likely to be higher, due to some specific insurance and liability points not being captured within the wider modelling, although these would be more apparent once the Regulations are in force.

Question

34. It is assumed that insurance premiums are 0.1% of the insurance cover provided, up to £50 million of insurance cover. In your opinion is the figure of 0.1% realistic?

35. Do you expect premiums to be higher / lower? Why?

Consultation responses

6.62 Around a third of respondents indicated the figure of 0.1% was realistic. However, a third of respondents also indicated that the expected premium would be higher. It was noted that a rate of 0.1% is a fair generic assumption and considered in line with historical rates for established geostationary satellites, although it can vary significantly depending on mission parameters. A general trend across aerospace of rising insurance premiums was also noted.

6.63 For TPL in-orbit, respondents indicated that rates would increase for low-Earth orbit (LEO) satellites, given the increasing number of objects at low-earth orbit.

6.64 Based on the responses, the Government revised the assumption, from 0.1% to 0.125%.

Annex 2: Additional questions regarding liabilities, insurance and charging

Background

7.1 In addition to asking questions about certain policy aspects of the proposed approach to regulating commercial spaceflight, the Government sought views on its proposed approach to charging, liabilities and insurance requirements for licensees in a separate consultation.

7.2 The consultation focussed primarily on establishing the insurance requirements for launch activities, as the current policies for insurance and liabilities set out for in-orbit operations under the Outer Space Act 1986 (OSA) would also apply under the Space Industry Act 2018 (SIA).

7.3 In total 31 individuals and companies responded to this consultation. Some respondents did not reply to all of the questions asked.

Question

1. Do you agree with the use of the MIR approach for setting insurance for launch? Provide your preferred approach.

Consultation responses

7.4 The vast majority of respondents who replied to this question supported the Modelled Insurance Requirement (MIR) approach. Respondents noted that the MIR approach produces a bespoke insurance requirement reflecting the risk of each launch and that this incentivises safety. Some noted that this is similar to the Maximum Probable Loss approach used already in the US.

7.5 Some respondents raised a few points of caution on the MIR approach, stating that the MIR approach could be a challenge for new operators who cannot demonstrate the heritage of their launch vehicle(s). There were also concerns about ensuring that relevant scenarios were captured in the assessment of 'reasonably foreseeable' accidents to ensure that the insurance amount was set at the right level.

7.6 A few respondents requested further clarifications on the methodology and calculations for spaceports and range control service providers, while others suggested refinements to the MIR approach (such as insurance bands).

7.7 Summary information on the liability and insurance requirements, as well as the methodologies to be used are shown in Table 1. It should be noted that separate calculations are not required for spaceports and range control service providers. Further explanation for the reasons behind this is presented in response to question 13.

7.8 As a result of the responses received to this question, the Government's approach to MIR will be retained without modifications, although the specific modelling process will be refined. The financial values to be used in the MIR have been reviewed, as set out in the consultation, and are presented in the next paragraph.

7.9 The Government Actuary's Department has updated the proposed values to reflect the latest statistics / discount rates. The Government has determined that the following rates will be applied:

Item	Previous value	Revised value
Death	£244,000 per death	**£221,000 per death**
Injury	£192,000 per injury	**£199,000 per injury**
Commercial / residential property	£1,739/m^2	**£1,843/m^2**
Agricultural land	£1.90/m^2	**£1.95/m^2**
Environmental damage	£250,000	**£250,000**

Question

2. Do you have comments on the financial values?

Consultation responses

7.10 Some respondents raised concerns about the scale of the financial values used. These included whether using regionalisation of land values etc. would be more appropriate than national averages, given the proposed location of spaceports, and whether higher values should be assigned to environmental damage, given the potential scale of accidents identified.

7.11 The Government will consider reviewing these elements following the first launches, once the spaceports and operations are established. As noted in the consultation document, the value applied for environmental liability is consistent with that applied in general environmental liability policies, although the Government recognises that the extent of potential environmental damage could exceed this level.

7.12 One respondent raised concerns regarding the worst-case scenario value and whether this impacted on the insurance amount. Another respondent was concerned that the values determined for death and injury were too low.

7.13 The determination of the worst-case scenario is to assess the level of the Government's contingent liability, rather than to be used as an insurance value, as the assessed value will be far in excess of the insurance available on the market. The inclusion of values for death and injury are only intended for insurance purposes and not intended to be compensation rates. The values of compensation paid could ultimately be considerably more (or less) than the value calculated for insurance.

7.14 The Government will consider reviewing these elements following the first pathfinder launches.

Question

3. Do you think the insurance requirement for each launch vehicle should be published?

Consultation responses

7.15 The majority of respondents who replied to this question thought that values should be published, noting that this aids transparency and that values are published for launch vehicles in the US.

7.16 Some respondents raised concerns about requiring publication. They were concerned about commercial sensitivities and that publication may disadvantage those operating new launch vehicles, as MIR values could be higher for launch vehicles with less advanced heritage than more established launch vehicles. Some respondents therefore suggested that it would be appropriate to review this again in 5-10 years' time.

7.17 In response to the feedback received from the consultation, the Government has decided not to require the publication of MIR values. In the interim, operators who wish to publicise their launch MIR will be able to do so. The Government will review this advice as part of the statutory review of the Space Industry Regulations, five years after the Regulations come into force and a launch market has been established in the UK.

Question

4. Are there additional requirements on insurance for sub-orbital launches?

   -What additional requirements?

Consultation responses

7.18 No specific additional requirements were flagged by respondents. Some respondents noted that insurance for sub-orbital activities is written in the aviation market but there were some comments that the launcher would be underwritten in the space market. It was noted also that such operations present a different risk profile to vertical launch. Using the MIR approach will take these risks into account in determining the insurance requirement.

7.19 One respondent suggested creating an experimental status for new types of launch(ers), with specific reference to sub-orbital technologies. The UK Government does not intend to exempt such operations from insurance.

7.20 A small number of respondents suggested that the UK could apply a compensation regime for sub-orbital activities similar to that applied in France. The Government does not intend to mandate this under a strict liability approach at this stage due to the informed consent provided for taking part in such activities. However, that does not prevent a claim being made under common law.

7.21 Some respondents also commented that point-to-point sub-orbital activities would need to be treated differently. The Government will review the insurance and liabilities arrangements as and when point-to-point sub-orbital services become available.

Question

5. Are there additional requirements on insurance needed for other launches (not involving vertical launch vehicles)?

   -What additional requirements

Consultation responses

7.22 Respondents largely repeated the points made in their responses to question 4.

7.23 The Government's response to those comments is set out above.

Question

6. How are insurance arrangements currently managed by insurers for:

   -Sub-orbital launches?

   -other launches not involving vertical launch vehicles?

Consultation responses

7.24 There were a number of comments received on the handling of insurance for sub-orbital activities and those involving aircraft in the spaceflight activities based on current practice, and similar points were made as per questions 4 and 5. Two respondents suggested that a sui generis approach should be established for sub-orbital launches.

7.25 The Government recognises that this is an emerging and evolving insurance product. Given the legal implications in terms of applying a limit of liability to spaceflight activities involving carrier aircraft, the Government will work with potential applicants and insurers to develop insurance arrangements that meet the UK's legal requirements.

Question

7. How do you think the insurance arrangements will change in future for:

   -Sub-orbital launches?

   -other launches not involving vertical launch vehicles?

Consultation responses

7.26 Similar points to those made in Questions 4, 5 and 6 were repeated in response to this query.

7.27 The Government's response is set out above.

Question

8. Do you agree with the approach on setting insurance requirements in licence conditions?

   -Set out your preferred approach.

9. Do you have any comments on the licence conditions?

Consultation responses

7.28 There was broad support for including insurance requirements as licence conditions, with comments that the conditions could be tailored to the specifics of each mission. It was also noted that it was essential to include a limit of liability as a condition and it is the Government's intention to do this.

7.29 Some respondents were concerned about the implications for spaceports for example on monitoring licence conditions across multiple licensees, as well as the potential for licence conditions to be amended post-issue of the licence. This would be the result of on-going monitoring and compliance activity by the regulator.

7.30 Several respondents raised concerns about requiring written consent when the terms and conditions of the insurance policy relating to the licensed activities are changed (for example due to 'Bringing into Use')[10]. The Government will clarify in the guidance that written consent from the regulator is only for material changes in scope of activities and not where such changes are planned and reflected in the licence. Similarly, there would be no requirement for written consent where common conditions applied in the insurance market are changed.

7.31 A couple of respondents were concerned about the condition that additional insurance may be required if the satellite fails to reach its intended orbit. This is an existing condition in licences issued under the OSA and the Government does not intend to remove this requirement. This provides the same level of protection for the Government as a risk assessment prior to launch might have indicated that the resulting orbit was a higher risk than for a standard mission and therefore additional insurance may have been required.

7.32 One respondent suggested that since multiple parties may be involved in a launch campaign, it makes sense that the insurance is purchased through one entity, such as the spaceport licensee. The Government agrees that one entity would be required to purchase the insurance. Under normal commercial practice it would be the launch vehicle provider (launch operator licensee), but the Government will consider alternative approaches, although it should be noted that liability does not attach to the spaceport licensee.

7.33 One respondent suggested that a condition precedent could be included in a licence so that insurance documents could be provided after the licence is issued but that the licence would not become operative until the insurance documentation is issued. The Government intends to require insurance documentation to be provided before the licence is issued, as per current practice, to reduce administrative burdens. To assist with the timings for placement of insurance, the regulator will provide an indication of the likely level of insurance required as early as possible before the licence is issued and this will be reflected in the licensing process.

7.34 There were some questions around the duration of insurance required and further clarity requested on the waiver of insurance for the lowest risk satellites.[11]

7.35 As a result of the feedback received from the consultation, the guidance will be updated. The issue of duration of insurance will also be covered as part of a review the Government intends to undertake. However, as these issues will be mission-specific, it is not possible to provide further information to that already published. Licensees and applicants are encouraged to engage with the regulator to discuss these issues.

[10] This refers to the requirement to bring into use an assigned frequency for a satellite within seven years of submission of the Advance Public Information to the International Telecommunications Union – Bureau Radiocommunication.

[11] This refers to missions categorised as low-risk SmallSat missions deployed from the International Space Station (ISS) or otherwise launched to an operational altitude below that of the ISS.

Question

10. In your opinion, should a downgrade clause be included in the space insurance policy?

Consultation responses

7.36 Around half of those who responded yes to this question suggested lowering downgrade clause requirements (to a BBB rating). Others noted that usually the issue of downgrading would be handled through the market reform contract. The point was also made that policies are renewed annually, so another insurer could be found at renewal.

7.37 On the basis of the feedback received from the consultation, the Government will not be specifying a particular financial strength rating for insurance in stakeholder guidance or licence conditions, but will provide further guidance to the regulator about assessing the prevailing market conditions.

Question

11. Do you have any comments on the guidance?

    -Provide details, if you have extensive comments, you may upload a file.

Consultation responses

7.38 The majority of respondents provided comments on the guidance material provided as part of the consultation. Their comments included:

- practical issues concerning the timing of securing insurance as part of the licensing process / contract pricing and amending insurance requirements for subsequent launches, including suggestions for a 'MIR envelope'
- further information on the definition of launch and in-orbit phases, as this will be important as to which operator (launch or orbital) is responsible for insurance coverage
- concerns about requiring written consent from the regulator if any changes to terms and conditions to insurance were made, which could affect issues such as 'Bringing into Use'
- whether it would be possible for applicants to appeal against the MIR amount calculated
- further clarity on the guidance for determining the MIR requirement and
- removing some of the more detailed information on insurance policies as this was considered to be too detailed.

7.39 In response to the consultation feedback, the guidance will be updated to reflect the suggestions and concerns of respondents, particularly around processes.

7.40 A number of respondents raised concerns about how risk is calculated, why the insurance documents must be provided to the regulator and whether the regulator should be allowed to impose further conditions on a licence after it has been issued.

7.41 As such cases will either be case-specific or will be requirements as part of ongoing compliance and monitoring activity by the regulator, the Government does not intend to make any change to the proposed approach.

Question

12. Do you agree with our proposed approach to limiting operator liability?

Consultation responses

7.42 The majority of respondents who replied to this question agreed with the approach taken on limiting operator liability, although further clarity was sought for the implications on satellite operators (including following disposal at end of a mission).

7.43 A number of respondents noted the importance of having a limit in place to support the sector but expressed concerns that having a limit that was too high would damage the sector.

7.44 One respondent stated that limits of liability should not be applied, to protect the public purse and to not undermine safety.

7.45 There were a number of comments received asking whether there were any issues arising from the different liability arrangements which apply in the UK and the US. The Government will be engaging with the FAA and licensees to whom this may apply to discuss handling of these issues further.

7.46 On the basis of the comments received, no amendments will be made to the proposed approach to limiting liabilities at this stage but the subject of liability limits for in-orbit operations will be included in a review of insurance requirements. Further guidance will be provided on limiting operator liability for satellite operators.

Question

13. Do you have comments on the draft regulations covering the limit of liabilities?

Consultation responses

7.47 A few respondents suggested including an upper limit on operator liability in the draft Regulations and also raised issues around sections 34 and 12(2) of the SIA. These were:

- the section 34 liability (enabling claimants to make a strict liability right of claim for damage caused in the UK) would be an additional burden. As stated in paragraph 4.110, the Government does not consider that this creates an additional burden in general, although there may be cases where an additional burden might arise for satellite operators. The Government will consider how to minimise the risk of an additional cost burden as part of the wider review being undertaken.
- With respect to section 12(2), there was concern that section 12(2) states that a licence ‘may’ contain a limit of liability with respect to claims made under section 36 of the SIA and that operators would be exposed to unlimited liability for claims under section 36. As stated in paragraph 4.109 , it is the Government’s policy intention that **all licences issued under the SIA will contain a limit of operator liability with respect to claims made under both section 34 and section 36 of the SIA**.

7.48 One respondent queried whether using the International Space Station (ISS) as a criterion for applying the waiver of insurance was still appropriate, given the changing nature of the orbital environment and the emergence of new in-orbit services.

7.49 Some respondents observed that in the US liability limits are not disapplied in cases of gross negligence or non-compliance with regulations / licence conditions.

7.50 Respondents sought clarification on whether an MIR calculation was required for spaceports and range control service providers.

7.51 The SIA does not impose a strict liability under section 34 on persons operating spaceports or providers of range control services or require them to indemnify the Government for claims brought against it. While this does not prevent anyone from bringing a claim against a person operating a spaceport or providing range control services and proving fault, spaceports and range control service providers will need to be covered by insurance when spaceflight activities are conducted. In line with usual commercial practice, the Government would anticipate that the spaceport and range control service provider(s) will be named as additional insureds on the insurance policy taken out by the launch operator licensee for a specific launch / series of launches.

7.52 There will be no requirement for the spaceport or the range control service provider to take out a specific policy themselves, separate to that taken out by the launch operator licensee. The spaceport and range control service provider will not be required as part of licence conditions to be covered by third-party liability (TPL) insurance outside of the period covered by the launch licence. This includes for pre-launch activities. A separate MIR calculation is therefore not needed for spaceports and range control service providers.

7.53 In response to the comments received, the Government will not be revising its position on limiting liability. The Government will, however, consider the wider issues on liability limits and insurance as part of the review it intends to carry out. A table at the end of this document sets out the liabilities and insurance requirements by operator type to assist with clarification.

Question

14. Do you have comments on the guidance covering the limit of liabilities?

Consultation responses

7.54 Respondents raised similar concerns to those already discussed in response to question 11. The guidance will be amended to address the concerns and suggestions of respondents.

Insurance for the in-orbit phase of a mission

Question

15. Do you agree with the proposed approach on third party liability insurance for the in-orbit lifetime of launch vehicle components?

Consultation responses

7.55 There was a mixed response to this question. Most respondents did not agree with the proposal, with some citing that it was an unnecessary burden and others saying that insurance for the in-orbit phase should be included as an extension of the launch phase or wider lifetime of the mission, rather than being considered separately.

7.56 A couple of respondents also noted that such an approach is not applied in other jurisdictions. A number of respondents commented that third party liability is not required beyond launch plus 30 days in the US and France, and the potential duration of insurance made insuring upper stages expensive.

7.57 A few respondents did, however, support the approach, with a couple of responses suggesting reviewing the 400km criterion.

7.58 As already noted, the Government intends to carry out a wider review of insurance and liabilities in 2021. This will look at the requirements for launch vehicle components in-orbit.

Question

16. If you are a launch vehicle operator:

    - What do you see as the relative costs between insuring upper stages left in-orbit and the operational impacts of ensuring the timely disposal of upper stages?

    - What are the practical considerations and issues we need to consider in setting the insurance requirement for in-orbit insurance for launch vehicle components (e.g. the length of time that upper stage is left in-orbit, changes in the orbital environment)?

Consultation responses

7.59 There were similar responses provided to those in question 15. Some respondents supported a TPL approach for in-orbit phases of a mission. Such an approach could encourage early / safe disposal of satellites and launch vehicle components. Maintaining the sustainability of the orbital environment was a key issue for many respondents. In addition, some respondents noted that they were either intending to actively de-orbit upper stages or that developments were ongoing in the sector towards active de-orbit, with suggestions that this would be cheaper than paying insurance for the duration that the upper stage was in-orbit. It was noted that coverage is available for upper stages that remain in-orbit and a couple of respondents supported the €60m insurance proposal.

7.60 There were some comments received on the practicalities of requiring active de-orbit in terms of payload performance and that once passivated, accurate projections of conjunction risk are difficult due to environmental factors. Considerations around space debris were also mentioned.

7.61 As noted in the summary, the Government intends to carry out a wider review of insurance and liabilities in 2021. This will look at requirements for launch vehicle components in-orbit and will take these issues into account.

Question

17. Is insurance already available to cover the in-orbit phase of a launch vehicle's mission profile until disposal by re-entry or insertion into a graveyard orbit?

Consultation responses

7.62 The majority of respondents who responded to this question commented that such insurance is available.

7.63 This will be considered further as part of the wider review of insurance and liabilities that the Government intends to carry out in 2021.

Question

18. Do you think such insurance is commercially viable?

Consultation responses

7.64 The majority of respondents thought that such insurance would be commercially viable, as it is already available.

7.65 This will be considered as part of the wider review of insurance and liabilities in 2021 that the Government intends to carry out.

Question

19. Do you have any further information on the approaches to in-orbit liability for upper stages or launch vehicle components in other jurisdictions?

Consultation responses

7.66 Respondents noted the approaches taken in the US, France and Japan.

7.67 The Government will consider this as part of the wider review being conducted on insurance and liabilities in 2021.

Insurance for the re-entry phase of a mission

Question

20. Do you agree with the proposed approach on third party liability insurance for re-entry activities?

Consultation responses

7.68 Again, there was a mixed response to this question, with slightly more opposed to requiring third party liability insurance for re-entry activities. Similar responses were provided to other questions, noting that insurance is available and already covers re-entry risks and noting the positions taken in other jurisdictions. It was noted that there is further

study to be undertaken on this point. Three respondents also suggested that the section 34 liability should be removed.

7.69 Respondents were concerned that the section 34 liability will be an additional burden to satellite operators. Some respondents were concerned that, as the risk of uncontrolled re-entry is extremely low, they shouldn't need additional insurance to cover this.

7.70 The purpose of section 34 is to provide for a strict liability right of claim to be made against the operator where damage is caused in the UK, thereby ensuring that UK nationals have the same no-fault basis to make a claim as foreign nationals, under the UN Liability Convention.

7.71 The Government does not consider that the liability arising from section 34 poses an additional cost burden for orbital operators in general, as satellite operators would be covered by the launch policy for any damage caused in the UK during the launch phase. The Government also understands that the risks of an unplanned re-entry during the in-orbit phase of a mission (albeit very low) are covered by existing TPL policies (for which the insurance requirement and the limit of liability would be set at €60m for standard missions as per the current policy). There may, however, be cases where an additional cost burden might arise for satellite operators and the Government will consider how to minimise the risk of an additional cost burden as part of the wider review process being undertaken.

7.72 To clarify, the MIR-calculated liability would relate to the launch phase only. An additional burden would arise if it is decided, as part of the wider review process, to introduce insurance requirements for the re-entry phase of the mission.

7.73 The Government will consider the issue of re-entry insurance requirements as part of the wider review being conducted on insurance and liabilities in 2021. Further guidance will also be provided to clarify the section 34 liability requirements with respect to satellite operators.

Question

21. Is insurance already available to cover the re-entry phase of either a launch vehicle component such as an upper stage or a satellite?

Consultation responses

7.74 The majority of respondents who responded to this question commented that such insurance is available.

7.75 This will be considered further as part of the wider review of insurance and liabilities that the Government intends to carry out in 2021.

Question

22. Do you think such insurance is commercially viable?

Consultation responses

7.76 The majority of respondents who responded to this question thought that such insurance would be commercially viable, as it is already available.

7.77 This will be considered further as part of the wider review of insurance and liabilities that the Government intends to carry out in 2021.

Question

23. Do you have any further information on the approaches to for re-entry liability for launch vehicle components including upper stages and satellites in other jurisdictions?

Consultation responses

7.78 Respondents noted the approaches taken in the US, France and Australia.

7.79 This will also form part of the wider review of insurance and liabilities that the Government intends to carry out in 2021.

Insurance for the in-orbit and re-entry phases of a mission

Question

24. Do you have comments on potentially requiring three separate conditions for third party insurance in a licence to cover all of the mission phases i.e. launch, in-orbit and re-entry?

Consultation responses

7.80 Whilst there were some responses that such a requirement would be a burden, more responses noted that if insurance is required for all three phases then this should be covered under a single insurance policy, as this would minimise costs but that each phase would need to be carefully defined.

7.81 As noted in the summary, the Government intends to carry out a wider review of insurance and liabilities in 2021 and will take this information into account.

Question

25. If insurance is required for two or three phases e.g. launch and in-orbit, do you have any suggestions as to how insurance policies could be developed to manage this?

Consultation responses

7.82 As noted in response to other questions, respondents stated that cover is available but that one policy should cover all three phases. There were some respondents that stated that missions might extend beyond the twelve-month period usually covered by insurance policies, with suggestions around template policies and those covering multiple satellites.

7.83 This will also be considered further as part of the wider review of insurance and liabilities that the Government intends to carry out in 2021.

Question

26. Are there other approaches for providing insurance you aware of? Provide further details.

Consultation responses

7.84 There were a number of potential models suggested by respondents, including a new model for providing insurance for small satellites, as well as a variety of other bonds and financial instruments to cover end-of-life and other activities.

7.85 In response to comments received from this consultation, different approaches to insurance will be considered as part of the Government's forthcoming a review of insurance and liabilities.

7.86 Some respondents called for the Government to self-insure or more closely monitor operations rather than rely on insurance mechanisms.

7.87 The licensing process will include a process for monitoring operations and licence conditions (including insurance amounts) will be adjusted accordingly. The Government will be providing a potentially significant level of indemnity in high loss scenarios, so at this stage it is not considered appropriate for the Government to entirely self-insure. Also, the SIA requires the operator to indemnify the Government and third parties. The Government therefore does not intend to provide further re-insurance facilities at this stage.

7.88 As already noted, the Government intends to carry out a wider review of insurance and liabilities in 2021 and will take this information into account.

Question

27. Do you agree with the charging proposals?

Consultation responses

7.89 Around half of respondents agreed with the Government's charging proposals.

Space Industry Act 2018 charging proposals

7.90 There was broad support for the proposal to not charge fees for spaceport, range, and launch licensing activities until 2024 as this will support the growth of the UK's launch sector.

7.91 Some respondents also supported the approach on the grounds that fees should not be used to 'educate the regulator'.

7.92 A few respondents indicated that some flexibility would be required regarding the transition to a cost recovery regime for launch and related licensing. As stated in the consultation, the Government intends to review the proposals annually as the UK launch market develops.

Space Industry Act 2018 and Outer Space Act 1986 satellite licensing

7.93 There was broad support for the one-off charge of £6,500. Respondents indicated that it was reasonable, and its application across the SIA and Outer Space Act 1986 (OSA) aligned with HM Treasury charging guidance (Managing Public Money), ensuring that the same charges apply to all users of a similarly defined category of service.

7.94 Around a quarter of respondents disagreed with the charging proposals. These respondents mainly opposed the charging proposals for constellations, but expressed

support for the approach to new SIA licensing, and the one-off charge for satellite licensing across the SIA and OSA.

Constellations

7.95 There were some concerns around the suitability of the orbital charging model for constellation operators, particularly that the model would over recover licensing costs which would contravene HM Treasury's charging guidance[12], and could be detrimental to the UK's ability to create an attractive constellation market.

7.96 There was also some support for implementing the longer-term, flexible charging regime sooner than currently proposed.

7.97 The Government will look at ways to reduce the licence fees for constellation operators and provide further details in due course.

7.98 The Government will also implement the charging proposals to be effective from the launch of the UK Space Regulator, currently scheduled for later in 2021, and intends to review charges annually.

Charges for licences that fall under the SIA and OSA

7.99 A few respondents asked for clarity regarding the fees for licences that fall under both the SIA and OSA (defined as 'bundled licences'). For example, where a UK company procures an overseas launch for a satellite which they intend to operate from the UK, the 'bundled licence' would refer to:

- the OSA, to authorise the procurement of an overseas launch by a UK national and
- the SIA to authorise the operation of the satellite from the UK.

7.100 The Government intends to charge a single one-off fee of £6,500 for bundled licences, to align with orbital licensing which occurs wholly under either the SIA or OSA. This will be reflected in the relevant publications.

General comments

7.101 There was broad support from most respondents that charges should be set in line with fees in other jurisdictions to retain the UK's competitiveness. As such, the Government intends to review the charging proposals annually.

7.102 There was an objection against the removal of the fee exemption for academic institutions under the OSA (section 4) on the grounds that not all educational institutes are commercialised. However, both the OSA section 4A (5) and SIA Schedule 11 section 7(2) contain general waiving powers. These powers can be applied on a case-by-case basis to waive fees for academic institutions where appropriate. The Government considers that the proposal is reasonable and will not seek to amend it.

Question

28. Are you aware of any licensing fees in other jurisdictions? Provide details

[12] https://www.gov.uk/government/publications/managing-public-money

Consultation responses

7.103 Nearly half of respondents provided information around licence fee regimes in other jurisdictions that are publicly available, including Australia, Austria, Luxembourg, New Zealand and the US.

Question

29. Any other comments?

Consultation responses

7.104 Responses received reiterated many of the points raised under other questions (for example, the need for limits of liability). The Government has provided responses to these points and will also clarify guidance where appropriate.

7.105 A specific point was raised on the use of cross-waivers and compatibility with wider UK law and the approach used in other jurisdictions. The Government does not consider that there is a conflict with wider UK law noting, in particular, that Parliament has already agreed by passing the Space Industry Act 2018 that cross-waivers may be included in a licence condition. Furthermore, the use of cross-waivers would not remove liability in the event of death or personal injury. The Government will however assess the compatibility of such approach where two or more jurisdictions are involved in a launch. Further detail on cross-waivers will be set out in guidance

Table 1- Liability and insurance requirements by licence type under the SIA.

L – whether liable under section 34 and section 36 (note – this should be read as not generally taken to be liable in the normal course of events); I – How the insurance is calculated; P – How covered by an insurance policy; D – Duration of cover required (this will be defined in the licence but general approach included here); N/A – not applicable.

		Operator type			
		Launch operator licence (UK launch)	**Orbital operator**	**Spaceport (UK)**	**Range control service provider (UK)**
Space Industry Act 2018					
Launch (including procuring a launch)	L	Liable	Liable	Not liable	Not liable
	I	MIR.	MIR - set at the same amount as for launch operator.	MIR - set at the same amount as for launch operator.	MIR - set at the same amount as for launch operator.
	P	Launch policy (launch operator buys) - named insured	Launch policy - additional insured	Launch policy - additional insured	Launch policy - additional insured
	D	From point of launch to end of licence.	From point of launch to start of in-orbit coverage.	Only for periods covered by the launch policy.	Only for periods covered by the launch policy.
In-orbit (including uncontrolled re-entry)	L	Liable	Liable	Not liable	Not liable
	I	As per launch policy. TBC re upper stages etc. in-orbit.	€60m - standard missions; Higher for higher risk missions; waived for lowest risk cubesats.	N/A	N/A
	P	TBC beyond initial period covered by launch policy.	In-orbit policy (orbital operator buys) - named insured	N/A	N/A
	D	TBC	To the end of licensed activity / passivated and positioned satisfactorily.*	N/A	N/A
Controlled re-entry	L	Liable	Liable	Not liable	Not liable
	I	TBC	TBC	N/A	N/A
	P	TBC	TBC	N/A	N/A
	D	TBC	TBC	N/A	N/A

*The first part of the in-orbit phase for satellite operations may be covered by the launch policy.

Licensees and applicants should note that the table above sets out the liabilities and insurance requirements under general scenarios. The requirements will be specific to each mission and may vary from the above. It is important to engage with the regulator to fully scope out the liabilities etc. for each licence application. This table may be subject to amendment following the wider review of insurance and liabilities which will be undertaken.