



Department for
Business, Energy
& Industrial Strategy



Call for evidence to inform orbital liability and insurance policy

A call for evidence seeking views on orbital liability limits and alternatives to traditional third-party liability insurance

Closing date: 3 December 2021



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Any enquiries regarding this publication should be sent to us at: legislation-ukxa@ukspaceagency.gov.uk

Introduction

The government has committed to review key concerns and proposals raised by respondents to the consultation document entitled “Unlocking commercial spaceflight for the UK: consultation on draft insurance and liabilities requirements to implement the Space Industry Act” (“the Liability, Insurance and Charging consultation”). For further information, see the [consultation document](#) and the [Government’s consultation response](#).

Therefore, the government is issuing this call for evidence to gather evidence, data and information that will assist in policy development.

Within this context, the government is seeking views and evidence from industry on the matters outlined below. Any views and evidence submitted will be considered as part of this review.

The call for evidence is addressed primarily to orbital operators who either are licensed under the [Outer Space Act 1986](#) (OSA) or are considering making applications under that Act or the [Space Industry Act 2018](#) (SIA), as well as providers of insurance services for the space sector. It may also be of interest to launch operators and those carrying out associated activities under either of these Acts. The government would also welcome views from other stakeholders with an interest, either those associated with the space sector, or more generally, including those who provide financial services other than insurance.

A response form is provided in Annex A, which includes the questions set out in the main body of the call for evidence.

This document does not constitute a formal proposal by the government and any decisions on proposed approaches to be adopted will be taken in light of this call for evidence. This may result in alternative approaches or policies to those noted or considered in this document. The government will consult further on its proposed approach.

Contents

Introduction	3
General information	6
Why we are conducting this call for evidence	6
Call for evidence details	6
How to respond	8
Confidentiality and data protection	8
Quality assurance	8
1. Background to the call for evidence	10
2. Background on insurance requirements and liability for orbital operations	11
Insurance market and costs	12
3. Limits of Orbital Operator Liability	14
Possible approaches to setting limits of operator liability in orbital licences	14
Modelled Insurance Requirement for orbital operations	14
Risk criteria approach	16
Factors the government is considering in developing its approach	18
4. Call for evidence questions on orbital operator liability limits	19
General questions	19
Questions on the impacts of the current insurance approach and amending operator limits of liability	19
Questions on fixed and variable limits of liability	20
5. Mutual Model	21
Wider consideration	21
6. Other possible models identified by government and respondents to the consultation	23
Possible alternative models to third-party liability insurance	23
Decommissioning bonds	23
Government 'space' bond	24
Corporate bond	24
Escrow accounts	24
Options to increase space insurance market capacity	24
Catastrophe bonds	25
ATOL-type scheme	25

UK aggregated policy – UK government purchases insurance on behalf of its licensees	25
UK aggregated policy – UK space sector led body purchases insurance on behalf of its members	25
7. Call for evidence questions - Alternative insurance models	26
Question on registering interest in setting up an alternative insurance model	26
Questions on mutual models and alternative models identified	26
8. Next steps	28

General information

Why we are conducting this call for evidence

In response to the Liabilities, Insurance and Charging consultation issued in October 2020, respondents raised several proposals with respect to insurance and liability for spaceflight activities including:

- lowering the limit of operator liability for in-orbit operations; and
- use of alternatives to insurance as forms of security to meet an operator's liability obligations (e.g. operator-led mutual, decommissioning bonds, escrow accounts, performance and surety bonds).

This call for evidence is seeking evidence and views to inform policy consideration and development with regards to:

- In-orbit operator liability limit:
 - o Seeking views on potential reduction of insurance requirements and limits of operator liability for orbital operators; and
 - o whether a fixed limit is replaced by the potential adoption of a variable liability limit, setting insurance requirements for orbital operations either in a similar way to the Modelled Insurance Requirement approach developed for launch activities from the UK, or by using a smaller number of risk criteria.
- Alternatives to insurance:
 - o Seeking views and examples of alternatives to traditional third-party liability insurance to cater for various spaceflight-related risks, including specific views on an industry proposal to adopt a new approach to insurance provision. Any future model taken forward would need to be able to cater for any changes to the current methodology for calculating insurance requirements; and
 - o The impacts of alternatives to traditional insurance on the insurance market and space sector.

Call for evidence details

Issued: 22 October 2021

Respond by: 3 December 2021

Enquiries to: legislation-ukxa@ukspaceagency.gov.uk

Please do not send responses by post as they may not be picked up in current circumstances.

Consultation reference: Call for evidence to inform orbital liability and insurance policy

Audiences:

The call for evidence is addressed primarily to orbital operators who either are licensed under the Outer Space Act 1986 (OSA) or are considering making applications under that Act or the Space Industry Act 2018 (SIA), as well as providers of insurance services for the space sector. It may also be of interest to launch operators and those carrying out associated activities under either of these Acts. The government would also welcome views from other stakeholders with an interest, either those associated with the space sector, or more generally, including those who provide financial services other than insurance.

Territorial extent:

UK-wide as space policy is a reserved matter and responses are welcome from respondents in all parts of the UK.

How to respond

Outline whether responses should be provided in a particular preferred format, where electronic responses should be emailed to, which address to send hardcopy responses to, whether to use different addresses for responses for the devolved administrations, etc.

Email response form to: legislation-ukxa@ukspaceagency.gov.uk

A response form is available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027748/Call for Evidence orbital operator liability - Form A - response form 1 .odt](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027748/Call_for_Evidence_orbital_operator_liability_-_Form_A_-_response_form_1_.odt)

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Confidentiality and data protection

Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our [privacy policy](#).

We will summarise all responses and publish this summary on [GOV.UK](#). The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

Quality assurance

This consultation has been carried out in accordance with the government's [consultation principles](#).

If you have any complaints about the way this consultation has been conducted, please email: beis.bru@beis.gov.uk.

1. Background to the call for evidence

The government issued the Liabilities, Insurance and Charging consultation in October 2020, covering the proposed approach to determining insurance requirements for launches licensed under the Space Industry Act 2018, the liabilities provisions contained in the draft Space Industry Regulations and associated guidance. In response to this, industry raised several policy proposals regarding existing orbital liability and insurance policy which government has committed to reviewing.

These proposals included the lowering of in-orbit limits of operator liability and the acceptance of other forms of financial security as alternatives to traditional insurance to cover third-party liability (TPL) requirements for orbital operations and/or end-of-life activities. This call for evidence relates to these issues.

Where applicable, it should be noted that the questions relate to licences issued under both the Space Industry Act 2018 (SIA) and the Outer Space Act 1986 (OSA). The issues raised may also be of interest to other parties involved in spaceflight activities in addition to orbital operators and we would welcome comments from such parties.

2. Background on insurance requirements and liability for orbital operations

Under the [Liability Convention](#) (one of the suite of United Nations (UN) space treaties), the UK government is ultimately liable for damage to the persons or property of other states caused by the space activities of its nationals or caused by such activities carried out from its facilities or territory. This means that another state suffering damage can bring a claim against the UK government under these treaties. On the ground and to aircraft in flight, the liability is absolute which means that the state bringing the claim would not need to prove fault. In space, the liability is fault-based. The Liability Convention therefore provides foreign nationals with the ability (via their own Government) to seek compensation (from the UK government as the responsible launching state) for damage or loss without having to prove fault.

In the UK, the UN space treaties are currently implemented through the OSA for activities by UK entities overseas and the SIA, which along with the [Space Industry Regulations 2021](#) enables spaceflight and associated activities to take place from the UK.

Under the provisions of these Acts, operators carrying out spaceflight activities are required to indemnify the government (or in the case of the SIA, listed persons or bodies in section 36(2)) for any claims brought against them for loss or damage caused by those activities. In the SIA, operators are also required to indemnify claims made by third parties where damage arises in the UK, in its airspace or territorial waters. The government has made clear that limits of operator liability will be included in all operator licences issued under both the OSA and the SIA, and in the case of the SIA, the limit will apply to liability both under section 34 and section 36 of that Act.

Note: Operators should note that limits of liability will not be aggregated when liability arises under different sections of the SIA or if a licence covers both OSA and SIA licensed activities. For example, where an operator is liable to a limit of €60m for an activity under section 34 and to a limit of €60m under section 36, the liability for a given event would be limited to a total of €60m (not €120m).

Currently TPL insurance for each mission is provided by established insurers, although parent guarantees may also be accepted in addition to insurance. TPL requirements are set out in licensing conditions and determined by the regulator (the Civil Aviation Authority as of 29 July 2021) on a case-by-case basis based on the associated risks of the mission. Depending on the number of satellites operated by an operator, this limit can be determined per satellite, or on a per occurrence or aggregate basis.

The indemnity limit for standard missions is normally set at €60m. For high-risk missions the liability limit will be set on a case-by case basis, following an appropriate risk assessment by the regulator.

For low-risk missions, the insurance requirements may be waived following a risk assessment. This may be applied to low-risk missions launched from the International Space Station (ISS) or launched to an operational altitude below that of the ISS.

The current approach to applying this waiver is under review as part of the insurance and liability review. This is considering whether a change is required to reflect emerging risks in the orbital environment below the International Space Station. Whilst not part of this call for evidence, the Government will consult on such proposed changes before implementation.

The insurance requirement may also be waived following the end of operations once the satellite has been placed to the satisfaction of the BEIS Secretary of State (for example in a graveyard orbit) and, where appropriate, passivated and switched off.

Passivation is defined as an action to permanently deplete or make safe all on-board sources of stored energy in a controlled way in order to prevent break-ups.

As with the application of the waiver noted above, this waiver is also under review and any change will be consulted upon before any change is made.

Orbital operators should note that following the outcome of the review of orbital liability limits, the intention is for a pound sterling figure to be calculated and used in licences, as is the intention for calculating launch insurance requirements. Further details on this change will be communicated to operators following the outcome of this review. As of 13 October, the €60m would equate to approximately £50m.

Insurance market and costs

Insurance is viewed as a key cost by operators when considering overall launch costs. The requirement to hold TPL insurance is mandatory in UK licences, although the costs of purchasing TPL are smaller than costs for insuring assets. The cost, availability and level of TPL insurance required are viewed by respondents to last year's consultation as key elements of the UK's competitiveness, although these are just some of a number of factors that need to be taken into account by operators.

There is currently capacity in the insurance market to cater for the UK government's liability and insurance requirements. However, changes in the orbital risk profile have led to discussion about the insurance market's desire to cover such risks in future. The risk profile is changing as a result of the numbers of satellites in-orbit and proposed over the next few years and there are increasing concerns about the risks posed by space debris. The government's future approach on insurance will also be considered in this context.

A further consideration in terms of deciding whether an alternative approach should be taken to meeting TPL requirements for orbital operations (and wider spaceflight activities more generally) will be to determine what the impact of any potential policy intervention would have on the insurance market generally. This would include the potential for sudden withdrawal of insurers from the market but also whether all operators should be included in any new scheme.

In reaching decisions on any change to the current approach, the government's view is that addressing one issue therefore should not lead to adverse impacts in terms of the availability or cost of insurance for operators or create a market failure or economic shock.

This call for evidence seeks further views and evidence therefore on these issues to help inform whether interventions can be made without creating adverse impacts.

3. Limits of Orbital Operator Liability

In response to the Liability, Insurance and Charging consultation, respondents indicated that the government should consider reducing the in-orbit TPL requirement from the current €60m for standard missions to make the UK's TPL requirement internationally competitive. Some of the responses suggested reducing the requirement to a €20m limit, which some respondents said applied in the Netherlands. As noted above, any future limit will be set in pounds sterling.

Evidence from UKSA commissioned research has found that the UK TPL requirements for orbital operations are similar to many other countries (in particular European countries where the limit is closely aligned with requirements for launch), although there are some examples where TPL requirements are lower (as per the Netherlands example included above) and/or not required (e.g. in the US). However, different countries have varying levels of launch and orbital profiles which impact their liability and insurance regimes, limiting comparisons between regimes.

Possible approaches to setting limits of operator liability in orbital licences

As noted above, in future the government anticipates setting any limit of operator liability included in a licence issued under either the OSA or the SIA in pound sterling. Further communications on the timing of and how this change will be calculated will be set out at a later date.

In terms of setting the limits of liability themselves, there are several possible options to setting operator liability limits. These are:

- Do nothing – retain the current approach to setting liability limits for orbital operations.
- Fixed limit – lower the current limit for standard missions but still provide for a higher limit for higher risk missions.
- Variable limit – instead of a fixed limit, to develop a more risk-based approach for calculating insurance requirements for orbital operations, similar to the current approach for setting insurance requirements for UK launches. This takes two forms as set out below.

Modelled Insurance Requirement for orbital operations

Under this approach, a fully risk-based calculation would be applied to all missions and would be based on modelling of orbital risks and the possible extent of financial loss for a given mission. A Modelled Insurance Requirement (MIR) has been developed for setting insurance requirements for UK launches based on information provided in the safety case. This means that the insurance requirement will be tailored to the specifics of each launch to reflect the different risks (such as launch operation type, launch vehicle, geographical location of launch).

The MIR approach for launch (which this approach would be similar to) is set at a level of loss that might be exceeded in 1 in 10 million launches. Such a parameter is not applicable with respect to orbital operations so another approach would be needed. The same general risk sharing approach used to determine the MIR threshold for the launch could be applied however to developing a more risk-based approach for orbital operations. The rationale for the government's decision to use the 1 in 10 million threshold for setting the MIR value and applying the financial values and categories of loss can be found in pp. 23-30 of the [consultation document](#) issued in October 2020.

This would look at setting the insurance value at a level which would provide sufficient protection for government whilst also determining appropriate financial values to be applied to risk factors or categories of loss to minimise operators' insurance costs (i.e. minimise the potential for over-insurance). The categories of loss may also include an element of business interruption or launch costs to replace the affected satellites and the loss of services arising from the impact on the satellite. As with the MIR applied to launch therefore, it is likely that an MIR would lead to reduced insurance requirements and therefore operator costs.

One potential option for how this risk appetite could be determined for orbital operations is by setting the insurance requirement based on a level of expected annual damage (EAD) that is deemed acceptable from an insurance perspective. The EAD is an expression of the rate at which an object in-orbit will statistically accumulate financial loss over time. For any object, it is calculated by summing the product of annual probability of a critical near-miss with each collision partner and the financial loss that would result if the critical near-miss were to result in a collision.

An alternative could be to set the insurance value at the level of loss that might be exceeded in 'x' number of years (for example 100 or 1000) and determined either for all orbit classes as a single amount or determined for each orbit class. This level would be informed by the probability of critical near-miss and levels of financial loss that would result if the critical near-miss were to result in a collision.

The government could develop an EAD or similar approach in determining its overall level of risk appetite which would then inform the approach taken.

Further consideration would need to be given as to how frequently the MIR assessment would need to be carried out to reflect the changing nature of the orbital risk. Changes in the orbital environment would be due to the launch of new objects or the addition of objects through the fragmentation of old objects. The risk presented by a mission would therefore change over its mission life meaning that it would be difficult to define a fixed value over the duration of a mission.

Any consideration of the frequency of update would need to take into account a variety of factors, including the extent of change in risk that would require a change and the practical implications of purchasing insurance if regular updates were required. For example, this could be reviewed annually or over a longer period, depending on the length of mission. Such uncertainty may cause issues in terms of mission budgeting. Other policy issues would also

need to be addressed, including if any of the mission parameters change (for example the life of the operations is extended) or to reflect different stages of a mission (for example to account for differences in risk between the active stages of in-orbit servicing missions and those periods where the satellite is not engaging in such activities).

A further consideration is the impact on the regulator of adopting such an approach, both in terms of the initial assessment and determination of the MIR value and the impact of reassessing the risk but also reviewing of risks once a licence has been issued. The level of assessment required is likely to be extensive and this will add both time and costs for both the regulator (in terms of developing extensive modelling capacity), and operators (with far more detail required of applicants, similar to a safety case as required for launch).

Based on the initial assessment of these issues, the government considers that developing a full MIR approach is unlikely to be practical in the short-medium term. This approach could be reconsidered however once further modelling has been developed and if there are any future regulatory requirements on assessing mission safety.

The government would welcome views however on whether there is any appetite for developing a full MIR approach in the longer term and the feasibility of adopting any of the other types of methodology that could be applied as an MIR approach.

Risk criteria approach

A risk-based approach would be based on a set of risk criteria which would be applied to all missions rather than to higher risk missions. This approach would reflect in-orbit risk for all mission types. This type of approach would appear to be more practical than the full MIR approach, although consideration would still need to be given on the risk criteria to be adopted, how such criteria would be weighted and the evidence needed to enable an insurance amount to be calculated. A decision would also need to be taken on whether an upper limit would be applied to the level of insurance required.

This call for evidence outlines two methods to develop such an approach, but others may be possible and we would welcome views on other options:

Method 1

- Use the value as applied to future standard missions as the baseline to all mission assessments.
- Identify the set of risk criteria to be applied, which can reduce or increase the insurance required on the basis of each criterion.
- Define these criteria and quantify the extent to which they increase or decrease the insurance requirement. Algorithms could possibly be developed and applied to support this assessment and would reflect any agreed weighting of criteria. For example, issues which increase or decrease risk could either increase the insurance required by a financial value or by a multiplication factor.

- An illustrative example of what this might look like in terms of risk criteria and how such an approach would work is set out below.

Illustrative risk criteria and illustrative impacts on liability calculations

- Standard value – This could be a high value starting point applied to all cases
- Propulsion capability - Reduction of insurance requirement where the satellite has working propulsion capability that lowers overall safety risks
- Orbital class - This could have several subcategories to reflect any risks with a particular orbit class
- Length of operations - For short missions, this could reduce the amount, increase for longer missions
- De-orbit plans - This could reward those operations with active de-orbit proposals.
- Total insurance requirement would be calculated using the additions / reductions applied by the various risk criteria

Method 2

- This would use the same set of risk criteria identified in Method 1 but start with a low baseline value (for example £5 or £10 million) and add risk factors onto this.
- An illustrative example of what this might look like in terms of risk criteria and how such an approach would work is set out below.

Illustrative risk criteria and illustrative impacts on liability calculations

- A default value would be applied (lower than for standard missions)
- Propulsion capability (reduction or keep at default value in cases that lower overall safety risks) - Increase in insurance requirement applied where propulsion capability (or lack of) increases overall safety risks
- Orbital class - This could have several subcategories to reflect any risks with a particular orbit class (addition to baseline set at '0' for lowest risk orbits)
- Length of operation - For example, addition to the baseline for short missions in low-risk orbits could be set at '0' or increase for longer missions in higher risk orbits
- De-orbit plans - This could reward those operations with active de-orbit proposals, (addition to the baseline set at '0' for optimum de-orbit plans), and higher values applied for those without de-orbit plans
- Total insurance requirement - would be calculated using the additions / reductions applied by the various risk criteria

It should be noted that the example criteria and the impacts are purely illustrative and the impacts set out do not relate to any one particular considered scenario. Examples of other potential criteria could be mission type (for example to reflect whether this is a proximity mission), whether this was a single satellite or constellation, and the heritage of the satellites under consideration.

The government would welcome views on and evidence of the impacts of this approach, or any variations on this type of approach.

Factors the government is considering in developing its approach

The government will develop its policy considerations based on the following factors:

- The views of operators in terms of using a more risk-based approach to setting insurance requirements
- The extent to which risk can be quantified through modelling by operators and the regulator
- Developing a methodology for setting the government's financial risk appetite (as per the approach to setting insurance requirements for launch) and the impacts on government exposure to losses by changing its current approach
- Impacts on operator costs and any additional regulatory burden
- Impact on regulator costs and any additional regulatory burden
- The competitiveness of any new proposed approach
- The changing nature of the space environment
- The impacts of combining any new approach to liability limits with any new model of insurance applied.

4. Call for evidence questions on orbital operator liability limits

Respondents are requested to provide answers to the following questions. Please use the form attached at Annex A to provide your answers.

General questions

1. The intention is that following the outcome of the orbital liability review, any limit applied in licences will be set as a pound sterling figure. Does this create any issues?
2. What are your views on how the insurance market will develop over the next 5-10 years?
3. What is your proposed level of licensable activity under the OSA and SIA for orbital operations over the next 5 to 10 years (for example numbers of satellites, length of potential missions etc.)? This will help determine demand levels for insurance and alternative approaches.

Questions on the impacts of the current insurance approach and amending operator limits of liability

4. What are your views on current level of insurance premiums for orbital operations? In responding to this question, please provide further information on the level of premium, level of cover provided, numbers of satellites covered by the policy and orbit(s) in which your satellites operate.
5. If the current levels of insurance required did not change (i.e. kept at €60m pound sterling equivalent) but an alternative model to the current insurance market which provided cheaper insurance were to be as developed, would this improve UK competitiveness compared with lowering the limit of liability only?
6. Are there any situations where insurance cover is not available, or where the cost of cover is adversely impacting your organisation? If so, please provide further details.
7. To what extent do insurance premiums currently reflect mission-specific risks? How do these vary with respect to single satellites, fleet policies and constellations?
8. What would be the scale of reductions in insurance premiums if the limit of liability were to be lowered? How would these change by operator type (e.g. established operator, start-up), orbit type (e.g. LEO or GEO) and numbers of satellites insured (e.g. single satellite / fleet / constellation).

Please consider this question in terms of comparing premiums of liability of between £10-60m (based on steps of £10m reductions (i.e. reducing from £60m to £50m, from £60m to £40m etc.).

9. If the UK Government retained its current approach, what would be the impact? Which jurisdictions do you see as having a more favourable approach?

Questions on fixed and variable limits of liability

10. Do you have a preference for keeping a fixed limit approach or adopting a variable limit approach? Please provide an explanation for your answer.

11. What do you see as the advantages and disadvantages of fixed limits and variable approaches?

12. If you prefer a variable approach, do you have a preference for either Method 1 or Method 2 under the risk criteria approach?

13. In terms of the risk criteria approach, we would welcome your views on the following:

- What risk criteria should be used if such an approach is adopted?
- How would you weight these risk criteria in comparison to each other?
- Which types of operations would you categorise as higher and lower risk?
- Under the risk criteria approach, would the reduced insurance costs compensate for any additional costs needed to reduce risk? Would such an approach incentivise safer missions, for example by promoting the use of propulsion capabilities on satellites?
- Should an upper limit be applied under a risk criteria approach and if so at what level?
- Would a high upper insurance limit incentivise safer missions?
- If a risk-based approach required that the insurance amount was regularly reviewed, how often and what criteria would you apply to such a review? What would be the implications of requiring such a review?

14. What are your views on adopting a full MIR approach in the longer term?

15. Are there any other similar risk-based approaches that you are aware of used in other jurisdictions that are either in use or under development?

16. Are there any other options for setting limits of operator liability that you consider appropriate in addition to those identified in the call for evidence? If so please outline these and how they could be applied.

5. Mutual Model

The UK government received a proposal in response to the consultation for the establishment of a not-for-profit operator owned and run mutual to provide an insurance facility for operators of small satellites. The aim of this mutual would be to increase the availability of and reduce the cost of TPL insurance for operators of small satellites. The fund would be used to meet claims made against members of the mutual.

The UK government is considering the viability, suitability and operability of the proposed mutual model and may consider options in line with HM Treasury guidelines of managing public money to support the initial development of such a model.

Whilst the government's assessment is concerned primarily with whether such a model will meet government's TPL regulatory requirements, the assessment will also assess whether the following benefits could also arise from this and any other models identified below, including whether the model:

- reduces the cost for comparative levels of cover as compared with the traditional insurance market
- promotes more competitive pricing for insurance
- provides suitable cover as currently provided for in the insurance market for UK licensed activities for the full range of satellite missions
- increases the availability of insurance for satellite operators
- ensures that any new proposed approach does not create an additional market failure or costs for operators not covered by a particular scheme
- assesses the impact of the proposal on the level of the government's exposure to losses
- is sustainable in the longer term and adaptable to the evolving risks in the orbital environment
- is self-sustaining without any additional government underwrite
- provides a guaranteed resource to enable operators to comply with their responsibilities set out in licence conditions and to comply with legislation
- can adapt to any proposed changes to liability limits, including if a more refined risk-based approach is adopted.

Wider consideration

The government would also consider additional factors when assessing mutual and other possible models. These are:

- Timelines for implementation
- Costs of implementation
- Regulatory or administrative burden for implementing and running such a model
- How such a model could support other strategic objectives for growth of the sector
- How such a model would affect competitiveness with other states

6. Other possible models identified by government and respondents to the consultation

Respondents to the consultation identified a number of possible alternative financial instruments / approaches to traditional TPL insurance to cater for certain types of risks. The government is considering whether such approaches are appropriate, as well as seeking views on whether there are other possible approaches which might be relevant.

The government is conducting further analysis to inform potential consideration of whether one or more alternatives should be developed. As part of this, there will be criteria that such models must meet to be deemed acceptable. These are set out in section 5 above).

The section below sets out some examples of the alternative approaches identified both by government and respondents to the consultation.

Possible alternative models to third-party liability insurance

This section provides an overview of a number of options identified, in addition to the proposed mutual model set out in section 5 above. The government would welcome views on these options and suggestions for other models not included here.

Decommissioning bonds

This type of approach is used already in other sectors (for example in the decommissioning of oil and gas infrastructure) and was flagged in a number of responses to the consultation. This would provide a resource to provide assurance that funding for decommissioning will be available to cover the decommissioning costs throughout the period of the decommissioning activity.

Decommissioning bonds as applied to orbital operations could potentially cover the time between the end of the operational life of the satellite through to disposal. Consideration would need to be given however as to the treatment of satellites placed into different types of disposal orbits. For example, decommissioning bonds may be more appropriate for satellites operating in LEO and MEO, whereas those operating in GEO and subsequently placed into a graveyard orbit may not be suitable to be covered by such bonds due to the longevity of risk.

Other types of bonds are also being considered to determine whether these are appropriate (for example performance and surety bonds).

It should be noted that decommissioning funds as applied in the nuclear sector for example, where a fund is established and is collateralised by funding from operators, has been discounted for the purposes of establishing such a fund to cater specifically for residual liability

arising following the end-of-life operations. It may be more appropriate to extend other models to include such liability rather than creating a fund specifically for this purpose.

Government 'space' bond

This type of approach could be used to meet wider strategic objectives for growth in the sector. Such an approach could be similar to the ['green bond'](#) approach adopted although the purpose of such a bond would differ in this case. The bond would establish a resource to meet liability claims but additionally the reserve created could be used to collateralise loans to space companies.

Operators could be required to invest in the bond to a particular level as a licence condition. The nominal value would be repaid once the operator's licence had expired, unless a claim had been made on the fund (resulting from either a default loan payment or liability claim), in which case the capital returned would be pro-rated to reflect the level of investment.

Further consideration is needed as to whether this model would be appropriate for certain types of investors as return of the original level of capital is not guaranteed, as well as the interest rate paid which may impact on the attractiveness of such an option.

However, by diversifying risk over a wider client base (including possibly to be open to members of the public) this could have the advantage of creating a bigger pool of resource which could be used to cover claims and provide loans. Any losses would be spread across a larger number of investors, thus reducing losses per investor on a pro-rated basis as compared with other models.

Corporate bond

As per the government bond without an investment element, issued by individual corporate entities. Could be a liability bond held by the operator / operators. This has been included to seek views on such an option, although is likely to be discounted as being unviable if the bond is required for each operator.

Escrow accounts

This option is included here as it was raised as an option in the consultation. An escrow account is an account held by a third party on behalf of the beneficial owner of the money in the account. In this case, the operator could put aside money into such an account to meet any liability. It is unlikely however that this would be a realistic approach unless the account was set up on a sector-wide basis, given the limits of operator liability that apply.

Options to increase space insurance market capacity

The government would welcome views on ways in which the market capacity for the provision of space insurance could be increased from current levels. This could take into account use of such facilities as reinsurance sidecars, insurance special purpose vehicles or other means of attracting private investment. The government would welcome views as to whether such options are already employed or whether these are viable given current market conditions.

Catastrophe bonds

This option could make use of the existing catastrophe bond market and could possibly be devised to cater for risks over a longer time frame than is usually covered by an insurance policy. As these are high-yield instruments, this may make such an option unattractive if it leads to higher costs for operators.

ATOL-type scheme

ATOL is the UK's financial protection scheme and protects holidaymakers when they book an ATOL protected holiday with an ATOL holder. It will provide support so that they are not at a financial loss or without assistance abroad if the ATOL holder ceases trading. In this case, the scheme would be similar to the discretionary mutual model approach but instead run by government. This is one of a variety of risk pooling arrangements that are provided across different sectors. It may not be feasible to extend existing schemes to meet our requirements, in which case the viability of establishing a new scheme would be needed, given the inherent challenges in developing a self-sustaining risk pooling scheme where there are a limited number of users.

UK aggregated policy – UK government purchases insurance on behalf of its licensees

In this example, the government would purchase a policy to obtain coverage for its licensees. In purchasing a collective policy for all licensees, rather than individual operators, this should lead to cost reductions for operators as compared with purchasing policies individually. Further work would be needed to determine the potential levels of savings based on these economies of scale as to whether such an approach is viable. This could be used in conjunction with other models (for example an ATOL-type scheme).

UK aggregated policy – UK space sector led body purchases insurance on behalf of its members

This is the same as the government-led approach set out above, although it is a sector-led approach. This could for example be used in combination with the mutual-led approach set out above. To some extent, this approach would apply under such a model where reinsurance is required to account for the shortfall between the level of funds available at a particular time in a given model and the maximum level of funds in the model proposed.

Any model approved would need to provide sufficient coverage to meet the requirements of licence conditions set out in licences of members of the scheme. This may then inform the viable sustainable size of funds under any proposed model. This collective policy could therefore be used in conjunction with other models. For example, if the proposed size of a mutual were 'x' and the coverage required in licences is 'y', a collective reinsurance policy could provide for the difference between 'x' and 'y' rather than setting the size of the fund to the requirements of 'y', which could make any particular model unviable.

7. Call for evidence questions - Alternative insurance models

Respondents are requested to provide answers to the following questions. Please use the response form attached at Annex A to provide your answers.

Question on registering interest in setting up an alternative insurance model

1. Would you be interested in establishing any of the potential models outlined in section 6 above (alternative insurance models) which could be delivered by the private sector or organisations that might have the capability to deliver such an approach? If so, which model and why would you want to establish this model? This will help to gauge the potential level of providers and next steps on engagement for any options taken forward. Please also provide further detail on your proposal using the detail in question 3 below.

Questions on mutual models and alternative models identified

2. Do you have any views on the advantages and disadvantages of any of the proposed models identified above? If so, please provide further detail and indicate whether you have a preferred approach.

3. Do you have any further ideas for alternative approaches not identified above? If so, please outline your approach to developing a new insurance model that will increase access to TPL insurance and reduce premia for operators.

In setting out your proposed approach, please consider the criteria set out in section 5 above and in particular the following points:

- What would be the typical premiums charged under your proposed model and what factors would you take into account in calculating premiums?
- How would you guarantee that the model would pay out on claims and not run out of funds?
- To what extent would your proposed solution reinsure risks and to what extent is such reinsurance available in the market currently? What is the effect of reinsurance on your premiums over time to demonstrate a benefit as compared with existing models?
- What would be the intended capacity provided by your model? Could it meet the same capacity as currently provided in the TPL insurance market / requirements of current UK licence holders?

- If there was a requirement to increase the capacity provided by the model or to adapt to an alternative approach to setting insurance and liability limits, could your model adapt? How would you meet additional capacity requirements and how would this impact premiums or the viability of the model?
- Would your scheme be open to all operators (including launch operators) and what eligibility criteria would apply? If not, what impact would this model have on operators not covered by the scheme?
- How many operators would you envisage being covered by your model? Is a minimum number of participants required to make your model viable?
- How could your model be established without financial support from government in terms of establishing the scheme or through underwriting the scheme?
- What would be the timeline for establishment of the model?
- How soon would you expect the model to reach a viable state without the need for a re-insurance facility?
- What would be the associated cost of establishing your model and how would you intend to finance this?
- How would your model impact on the existing insurance market, including promoting more competitive pricing?
- How would your model affect the attractiveness of the UK in which to base operations / obtain a licence?

8. Next steps

This information received from this call for evidence will be used to inform further policy development on the issues covered in this document.

The government's intention is to issue a response to this call for evidence, setting out its intended direction of travel on operator limits of liability and the other issues raised in this call for evidence and the wider review of insurance and liability requirements for UK-licensed spaceflight activities in early 2022.

This call for evidence is available from:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027748/Call for Evidence orbital operator liability - Form A - response form 1 .odt](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1027748/Call_for_Evidence_orbital_operator_liability_-_Form_A_-_response_form_1_.odt)

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