



Reform of the Outer Space Act 1986: Summary of responses and Government response to consultation.

An Executive Agency of:



**Department
for Business
Innovation & Skills**

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Executive Summary

The purpose of the consultation was to seek views of stakeholders on proposed changes to the Outer Space Act 1986, as promised in the Government Growth Review published in March 2011. In which the Government set out its intention to reform the Outer Space Act 1986 by introducing an upper limit on liability for UK operators.

The Government is grateful to all 15 respondents for their contributions to this consultation.

Overall the majority of respondents were positive about the benefits of capping the unlimited liability requirement under the Outer Space Act to €60 million, for the majority of missions. Views were mixed on the benefits of waiving the capped liability and insurance requirement for the in-orbit operation of a CubeSat, which meets certain criteria. These are addressed under section 3 Summary of responses to consultation and Government response.

After carefully considering the responses Government has decided to set in motion the process required to cap the unlimited liability to €60 million, for the majority of envisaged missions. The favoured route to achieve this is via a Legislative Reform Order which would give the Secretary of State the power to set / vary this liability limit.

However, as a result of respondent's comments it is apparent that more consideration should be given before waiving the capped liability and insurance requirement for the in-orbit operation of a CubeSat. Therefore, Government will reconsider its policy regarding the treatment of CubeSats and other nanosatellites and this will be addressed after the liability cap has been implemented. It should be noted that if after further investigation additional concessions for CubeSats / nanosatellites were to prove desirable it is unlikely further changes to the Outer Space Act would be required. These could be accommodated within the existing discretionary powers of the Secretary of State.

1. Introduction

The UK Space Agency issued a consultation paper on the 31st May 2012 on the Reform of the Outer Space Act 1986. The closing date was the 31st August 2012 and 15 responses were received.

The UK Space Agency is grateful to all respondents for their time and comments.

Understanding this document

The consultation document presented six specific questions for consultees to address. The structure of this report follows a similar lay-out. A summary of the views expressed by respondents to each of the questions is presented. Not every response is used in each case as some submissions repeated views already expressed by others, whilst some did not answer any of the questions directly. The views contained within this document are those of respondents and should not be taken to reflect present or future Government policy.

2. Background

The Outer Space Act 1986 (OSA) is the legal basis for the regulation of activities in outer space carried out by organisations or individuals established in the UK or one of its Crown Dependencies or Overseas Territories. The aim of the OSA is to ensure compliance with the UK's obligations under international treaties and principles covering the use of outer space. One of these is the Liability Convention, under which the UK Government is ultimately liable for third party costs for accidental damage arising from UK space activities.

The licensing regime under the OSA enables the UK Government, amongst other things, to offset some of the unlimited liability that it is exposed to under the terms of the Liability Convention. There is a requirement on licensees to obtain third party liability insurance (usually to a minimum of €60 million) both during the launch and while the satellite is in operation. Also, there is an indemnity from the licensee to the Government against any proven third party costs resulting from the activities. The latter point is an unlimited liability on licensees.

UK space operators have long argued that the unlimited liability placed upon them is very difficult to manage in terms of financing/underwriting. Further, they say that these licence conditions relating to insurance place them at a significant commercial disadvantage when competing for business internationally. They argue that given the global nature of the space industry this could result in work being lost to countries outside the UK.

The OSA has continued without amendment for over 25 years. The UK Space Agency has recently reviewed the Act and its licensing regime and identified areas where there is potentially room for improvement. In particular, the treatment of contingent liabilities under the Act is now out of date and inconsistent with practice in other space faring nations and in other UK sectors that have comparable contingent liabilities (e.g. nuclear power, offshore oil).

The UK Space Agency developed proposals to update the UK approach on the treatment of liability under the OSA, the aim of which is to help level the playing field for UK companies when competing for international business.

A consultation was initiated to allow stakeholders the opportunity to comment on the benefits of the proposals. The consultation was aimed at the space community, and those with an interest in space. A copy of the consultation is attached at Annex A for information.

3. Summary of responses to consultation and Government response

Question 1: What are the benefits of capping the unlimited liability requirement under the OSA to €60 million, for the majority of missions? Please detail how this might benefit you or your organisation and any wider benefits you perceive.

The majority of respondents commented positively on the benefits of capping the unlimited liability for the majority of missions. A cross section of comments received follows:

- *This will provide greater regulatory certainty which will benefit UK-based satellite operators in raising finance.*
- *Capping the liability will bring the UK in line with other nations regulations regarding the liability of commercial space projects.*
- *Removal of the unlimited liability regime is a crucial step towards encouraging expansion of the UK as a space faring state for private commercial entities.*
- *Reduced liability exposure may result in lower insurance costs thereby leading to reduced overall costs.*
- *Reduces commercial risk. The existing law exposes a satellite operator to unlimited third party liability. Though liability claims are extremely rare, in the hypothetical event that such an event occurs, it would seem counter-productive to expose entities to such substantial and potentially devastating risk. Ultimately, such risk may result in the forced sale of assets or may force an operator out of business potentially depriving customers, governments and consumers of essential and important satellite services. The more balanced, common-sense approach proposed by the UKSA pursuant to this consultation would avoid these harmful results.*

One respondent welcomed the review of the liability cap and did not doubt that it would be beneficial to the space community. However, they had concerns surrounding the manner in which the value of €60 million was chosen, and other concerns focussed on the need to revise this value in the light of changes to space based operations and emerging evidence about changing levels of risk. They also went on to note that having a consistent figure across the 'majority of missions' relieves operators of the burden of calculating their liability for each launch, but a mechanism may need to be identified by which this value can be kept under review.

Government response

The Government welcomes the support given by the majority of respondents for capping the liability to €60 million for the majority of missions.

The mechanism by which this may be achieved is via a Legislative Reform Order (LRO). This may give the Secretary of State the power to set / vary the liability limit.

This approach would negate the need for further changes to the Outer Space Act 1986 should a future review conclude that the liability limit should be changed for the majority of missions. It should be noted that the Government would also retain the flexibility to increase the liability cap / insurance requirement for any non-standard, high risk mission.

Question 2: Would the removal of the unlimited indemnity raise the prospect of moral hazard? For example private satellite operators may have less incentive to mitigate the risk of an incident which could lead to third party claims against them. Please give reasons for your response.

The majority of respondents did not believe that the removal of the unlimited indemnity would raise the prospect of moral hazard. Most respondents had similar views with a few exceptions and a brief overview follows:

Several respondents commented that no satellite operator wants to expose to unnecessary risk the very spacecraft upon which its commercial survival and its customers' services rely. While others drew attention to the fact that satellite operators will still be required to obtain insurance of at least €60 million. The terms of these policies place obligations on the operator to ensure that they operate their space assets in line with good practice and minimise the risk of an incident.

Two respondents highlighted that raising finance for space projects is a daunting task and how the lending criteria of the banks involved in satellite projects altered significantly after the credit crisis (circa 2008). They went on to say that lenders now look for sound business models with proven track records; sound and reliable technology; history of the relationship with the lender; financial investment from the borrower and substantive protection for the advance in the form of controls over the commercial project. There are also an increasing number of design standards, guidelines and best practices, such as the expectation that GEO satellites be boosted to a graveyard orbit and LEO satellite re-entered within 25 years of the end of their lives, that are readily being adopted in the industry to ensure that the finite resource of space is still available for use in the future.

One respondent, whilst not believing that capping the liability would lead to an increase in moral hazard, proposed that in association with capping the liability, the UK Space Agency should mandate, as part of the licensing process, that all UK licensed operators should join the Space Data Association (SDA), or similar body. They felt that the development of the SDA was seen as a positive factor by insurers.

Two respondents felt it would be beneficial if appropriate regulatory processes were created, their development and implementation should be independent from that part of Government responsible for promoting the space industry itself.

Government response

The Government acknowledges the majority of respondents did not believe the removal of the unlimited indemnity would raise the prospect of moral hazard and the reasons given.

We recognise that there are nearly 20 satellite operators participating in the SDA and agree that encouragement to join the SDA, or similar body, might be a consideration for future licence applicants.

The structure of the UK Space Agency is under review. However, we do not believe the current structure is likely to create any conflict of interest. The UK Space Agency is currently separated into three directorates, Policy and Operations; Technology, Science and Exploration; and Growth, Applications and EU programmes. The regulatory function sits within Policy and Operations and is not directly involved in promoting the industry. Also, any Government mission would be subject to exactly the same scrutiny as any other licence application.

Question 3: What are the benefits of waiving the capped liability and insurance requirement for the in-orbit operation of a CubeSat that meets the specified criteria? Please detail how this might benefit you or your organisation and any wider benefits you perceive.

Not all respondents chose to answer this question and of those who did views were mixed on the benefits of waiving the capped liability and insurance requirement for the in-orbit operation of a CubeSat. A selection of views is presented below:

One respondent thought that it was essential, otherwise Pico satellite developers may move abroad. They then went on to say they wanted the new PocketQub standard included in any opt-out clause. They explained that PocketQubs are 5cm cubes which are being developed in the USA and Italy and are the future of university programmes due to low costs to launch.

Another respondent felt a waiver on the in-orbit requirements would be welcomed by CubeSat operators. They then explained that CubeSat operators may still find launch insurance premiums prohibitive unless multiple satellites can be launched under the same insurance policy. This would require a measure of coordination between the organisations wishing to procure a particular launch.

Two respondents commented that CubeSats are unlikely to cause very much damage if they strike the Earth or objects on it, assuming they survived re-entry, but there was potential for significant damage if they collide with other space objects. They said that in these circumstances, fault will determine liability, but the potential liability could be significant. They continued by saying that a balance needs to be struck between protecting the UK position in terms of liability and advancing the UK position in relation to the promotion of scientific and technology demonstration projects. It makes sense to have a scientific environment that makes access to space easier and the UK is regarded as a centre of excellence in this regard. They also stated that it seems logical that the benefits outweigh the burdens providing such projects follow the design principles generally adopted in the industry such as re-entry within 25 years of end of life, etc.

One respondent made the following observations: In-orbit operations may be low risk for certain orbit types (e.g. GSO), but low earth orbit operations (like those carried out by CubeSats) are not inherently low risk. Low earth orbits are increasingly congested with space debris, and play host to large numbers of short term missions (like earth monitoring and weather satellites). Operations in that orbit are likely to increase the likelihood of collisions with other satellites as well as space debris.

The same respondent continued by saying any change in liability must be linked to increased responsibility on the operator of CubeSats to (a) maintain a level of situational awareness (i.e. their orbit relative to other satellites and known concentrations of space debris), and (b) incorporate a minimum degree of in-orbit manoeuvring capability. The specification of both of these should be developed further, in consultation with the space and communications industries and as part of the discussion on the 'National Space Security Policy'. They finished by agreeing that licence applications for CubeSats should have to demonstrate significant scientific or educational merit, in addition to the above strict space debris mitigation guidelines, to benefit from a change in reduced liability risks.

Another respondent questioned why CubeSats have been singled out for special treatment. CubeSats are merely one particular type of nanosatellite of a proprietary design layout. They believe that if the OSA is going to give special treatment to this particular type of nanosatellite then it should give special treatment to all nanosatellites.

The response from a further respondent suggested the term 'CubeSat' appeared restrictive and suggested that robust legislation should not exclude the possibility of other small spacecraft formats being available to operators. The respondent further suggests that categories of spacecraft, perhaps defined by mass, may be a more appropriate division. Also, the possibility of different liability caps for different categories should not be excluded. They also pointed out that in the event that the lowest category or categories have zero

liability as a result of the proposed waiver, the possibility of moral hazard reappears.

Government response

As a result of respondent's comments it is apparent that more consideration should be given before waiving the capped liability and insurance requirement for the in-orbit operation of a CubeSat. Therefore, the Government will reconsider its policy regarding the treatment of CubeSats and other nanosatellites. We believe a robust and future proof policy should be in place that includes all of the emerging categories of nanosatellites. Also, one that is mindful of the risks involved in operating in a densely populated region of space.

The Government does not want to delay capping the unlimited liability to €60 million, for the majority of missions, as this is likely to benefit most UK operators. Therefore, the review into the treatment of nanosatellites is likely to take place after this has been implemented. As mentioned in the Government response to question 1 the favoured route to achieve this is via a Legislative Reform Order which might give the Secretary of State the power to set / vary the liability limit. This approach leaves the door open for any future changes to policy regarding the treatment of nanosatellites, as it is unlikely further changes to the Outer Space Act would be required.

Question 4: If possible please give your best estimate on the number of UK registered CubeSats that may be launched in future if these proposals are adopted. When responding to this question provide any supporting evidence you have and comment on whether you think adoption of the proposals would make a significant difference to the number of CubeSats launched.

11 of the 15 consultation respondents were not able to provide an estimate on the number of UK CubeSats that may be launched, or did not provide an answer to this question.

One respondent replied there is no apparent evidence to suggest this would make a difference to future launches.

Another respondent commented that the CubeSat community was growing faster than Moore's Law at present, with PocketQubs at a much higher rate globally. They then went on to list several proposed UK missions.

One respondent whilst acknowledging they had no detailed knowledge estimated that perhaps one UK registered Educational CubeSat might be launched each year following the proposed reform of the UK Outer Space Act.

A further respondent highlighted that over the last decade there have been around 100 CubeSat missions globally. They went on to say that whilst launch costs for CubeSats remains high they would expect to see no dramatic increase in the number of CubeSats launched either globally or in the UK. In the UK they would expect to see about one mission per year. If a much lower cost means of launching CubeSats appears they felt we could see a dramatic increase in the number of missions. They concluded that in the absence of such a launch capability, they would not expect the change in the UK law to make a significant difference. If the launch situation were to change for the better then they felt the change in the UK law would probably make a significant difference.

Government response

It is difficult to draw any conclusions from the answers to this question. However, this reinforces our belief that a further review of the Governments policy regarding nanosatellites should be undertaken.

Question 5: Do you believe these proposals adequately balance the risks to Government arising from UK space activity, with the need to enable UK industry to exploit fully the opportunities available to them? If no please explain why.

The majority of respondents who answered this question believed that the proposals adequately balance the risk to Government arising from UK space activity, whilst enabling UK industry to exploit the opportunities available to them.

One respondent (whilst agreeing with the above) also commented that in real terms risk would not increase for the Government as the unlimited liability is unrealistic, as noted in the consultation document. A significant claim, if one were to occur, may well result in insolvency for the company, leaving Government liable in any event. Conversely the risk reduction will encourage greater investment in the UK space industry, potentially boosting revenues.

Another respondent (again agreeing with the above) felt this combination enables industry to gain competitively in the market, better serve customers in the UK and abroad and generally better serve the public interest. Moreover, the proposed approach would help to level the playing field with other jurisdictions that already limit third party liability for licence applicants.

One respondent explained that they believed the risk to Government was extremely low. As far as they know there has never been any successful claim for damages from the UK Government in the 50 years of the space age. The benefits from an improved legal situation e.g. economic growth stimulated by the changes far outweigh any perceived risks.

The UK Government already has the ongoing liability risk and has had it for five decades since Ariel 1 was launched in 1962 noted one respondent. With this in mind, they did not believe capping the liability poses any additional risk to Government. By contrast they believed that maintaining the unlimited liability regime will ultimately harm the UK by acting as an impediment to satellite operators moving to the UK.

One respondent felt that more CubeSats will increase the risk of collisions.

Only one respondent actually answered no and also commented that while a welcome start they are still a lot worse than any other country.

Two respondents noted that operators will still have to incur insurance costs for in-orbit operations throughout the life of the satellite. One of which felt the UK would still be out of line with the rest of the world because of this. The same respondent also suggested that further consideration be given to either reduction or complete removal of this requirement.

Government response

The Government notes that the majority of respondents believe the proposals adequately balance the risk to Government arising from UK space activity, whilst enabling UK industry to exploit the opportunities available to them.

The Government currently does not have any plans to remove the insurance requirement of €60 million for the majority of missions for in-orbit operations of a satellite, although the Government does not rule out a further review in the future.

Question 6: Do you think the key assumptions used in the Impact Assessment (set out on pages 12/13) are reasonable? Can you suggest any improvements to them? If so, please provide any supporting evidence.

Many appeared to support the majority of key assumptions but commented on certain areas. There were a variety of responses, some of which are presented below:

The TPL insurance pricing assumptions are reasonable noted one respondent. Whilst another stated to the best of our knowledge the UK Space Agency's impact assessment seems generally appropriate and valid.

One respondent whilst supporting the majority of the key assumptions used on pages 12-13 made the following comments. With regard to assumption i. referring to the number of UK satellites in orbit at any one time, they agreed that the number of operational GEO satellites will remain relatively stable. However, they felt it important to note that the number of MEO satellites will likely increase. With regard to assumption ii. they suggested that a distinction be made between the useful lives of the various categories of satellite including LEO, MEO and GEO. The average life of a GEO stationary satellite today ranges from 15-20 years. The average life of a MEO satellite is approximately 10 years. They concluded by saying that if the UK Space Agency calculation reflects a combined average of the useful lives of LEO, MEO and GEO satellites, then no change may be necessary.

Assumption (vi) of a 0.1 probability of 3rd party claim in the event of a launch failure looks too high according to one respondent. They also felt that assumption (vii) of £50 million average value for LEO satellites appears too high for the UK. Most UK satellites in LEO are built by one UK company and would typically be valued at £10-£30 million.

Another respondent considered the assumptions used in the Impact Assessment did not appear to be relevant in relation to the purpose of the consultation, which is to bring legislation (related to third party indemnity insurance) in line with other countries in order to help competition in global markets. They commented most of the key assumptions identified are related to standard satellites and they assume a status quo in terms of numbers, length of time in operation and specifically exclude any risk associated with the likely increase in space density that will be seen over time. They felt the increased density aspect is the key risk issue in this debate and needs to be addressed with industry involvement. A likely increase in CubeSats over time in the LEO orbit is not addressed in any meaningful way in relationship to increased risks to current satellites.

One respondent felt that the number of UK satellites in orbit would increase over time. They also commented on the probability of launch failure. In 2011, Russian launch vehicles had a failure rate double that of US and Chinese launch vehicles. The failure probability of 10^{-2} appeared to them to be suitable for US, European or potentially Chinese launch vehicles. They believe that wider issues mean the failure probability associated with Russian launch vehicles should be closer to 6×10^{-2} . Considering Russian launch vehicles often provide the most cost effective access to orbit for CubeSats which are a central consideration of the report, they believe the figure assumed in the report should probably be reduced.

Government response

The Government is grateful to the respondents for their comments and the Impact Assessment has been updated where appropriate.

Additional comments

Some additional comments are listed below:

Several respondents sought clarification as to the manner in which the new liability cap would be applied to existing, operational satellites. They felt it important to apply the new liability cap to all operational satellites.

One respondent wished to comment regarding CubeSats generally. They expressed support for a liability regime that provides incentives for responsible spacecraft design and post-mission disposal of CubeSats. They further commented unlike more expensive GEO and non-GEO spacecraft, the low cost of CubeSats and the unique risks presented by a lack of propulsion systems suggests that careful attention must be focused on mitigation of orbital debris risks. In summary they would support a legal and regulatory regime that incentivises and imposes orbital debris mitigation requirements for CubeSats.

The same respondent sought confirmation that, with respect to MEO satellite systems, the liability cap would be imposed on the entire MEO system rather than on a per satellite basis.

Another respondent felt the Licence fee was disproportionately high for small satellites.

Government response

The Government agrees that it would be desirable if the liability cap applied to existing UK operational satellites. We will investigate how this may be achieved and the route existing licensees could use to request the liability cap be applied to their satellite/s.

We can confirm that with regards to MEO satellite systems the liability would be imposed on a per satellite basis.

We agree that further consideration should be given to the level of the Licence Fee. The Government only seeks to recover its costs for the assessments it carries out during the Outer Space Act licensing process. The fee has remained unchanged for many years and yet costs have increased. Therefore, a review of the fee structure should be carried out in the near future, which may result in the fee increasing, particularly for certain classes of satellite.

4. Next steps

After carefully considering the views of respondents the Government will immediately set in motion the necessary process required to cap the unlimited liability to €60 million, for the majority of missions.

The Government will retain the flexibility to increase the liability cap / insurance requirement for any non-standard, high risk mission. For each license application, a risk assessment will be performed to consider the potential risks posed by the mission and a commensurate level of liability / insurance cover will be determined. In the majority of cases, involving missions employing established launchers, satellite platforms and operational profiles, this liability / insurance cover would be limited to 60 million euro.

The favoured route to achieve this is via a Legislative Reform Order (LRO) which might give the Secretary of State the power to set / vary the liability limit. Although resource intensive a LRO is a good option for giving legislative effect to necessary reform that may not otherwise find Parliamentary time. A LRO is a statutory instrument made under the powers of the Legislative and Regulatory Reform Act 2006 (LRA) which can amend primary legislation to remove or reduce burdens.

It is difficult to give an exact date when the reform may take place but we hope it can be achieved during the second quarter of 2014, if approved by Parliament.

As discussed earlier in this paper, as a result of respondent’s comments the Government will reconsider its policy regarding the treatment of CubeSats and other nanosatellites at a future date. Therefore, it will not waive the capped liability and insurance requirement for the in-orbit operation of a CubeSat at this time. A further review will be carried out after the liability cap has been implemented.

5. List of respondents

Below is a list of organisations / individuals who responded to the consultation document.

Alba Orbital
AMSAT-UK
AON International Space Brokers
Atrium Space Insurance Consortium
avanti communications
Inmarsat Global Ltd
iridium
Lloyd’s Market Association
London Satellite Finance Network
O3b Ltd
SES
Surrey Satellite Technology Limited
Telenor Satellite Broadcasting AS
University of Glasgow (Space Glasgow)
Professor Dr. Lesley Jane Smith

ANNEX A: The consultation

Download the [consultation document](#) issued 31 May 2012.