



Department
for Transport



Department
for Business
Innovation & Skills



SUPPORTING COMMERCIAL SPACEPLANE OPERATIONS IN THE UK

Summary and Government response to the consultation on criteria to determine the location of a UK spaceport

The Government's Space Innovation and Growth Strategy 2014-2030 and Space Growth Action Plan both include an ambition to "establish a Space Port in the UK by 2018 and identify further reforms to regulation needed to allow commercial space flights in the UK". In August 2012, the Department for Transport and UK Space Agency tasked the Civil Aviation Authority (CAA) to undertake a detailed review of what would be required from an operational and regulatory perspective to enable spaceplanes to operate from the UK by 2018, pending demonstration of feasibility and a decision to do so.

The CAA's findings included key operational, safety, meteorological, environmental and economic criteria for selecting a suitable site for a spaceport. These include:

- an existing civil or military aerodrome which has a runway which is, or is capable of being extended to, over 3000m in length;
- could accommodate areas of segregated special use airspace to manage spaceflights safely; and,
- is located away from densely populated areas in order to protect the uninvolved general public.

Based on the CAA's essential operating criteria and strong recommendation to base a spaceport at a coastal location, the CAA identified the following eight aerodromes which might feasibly host sub-orbital operations:

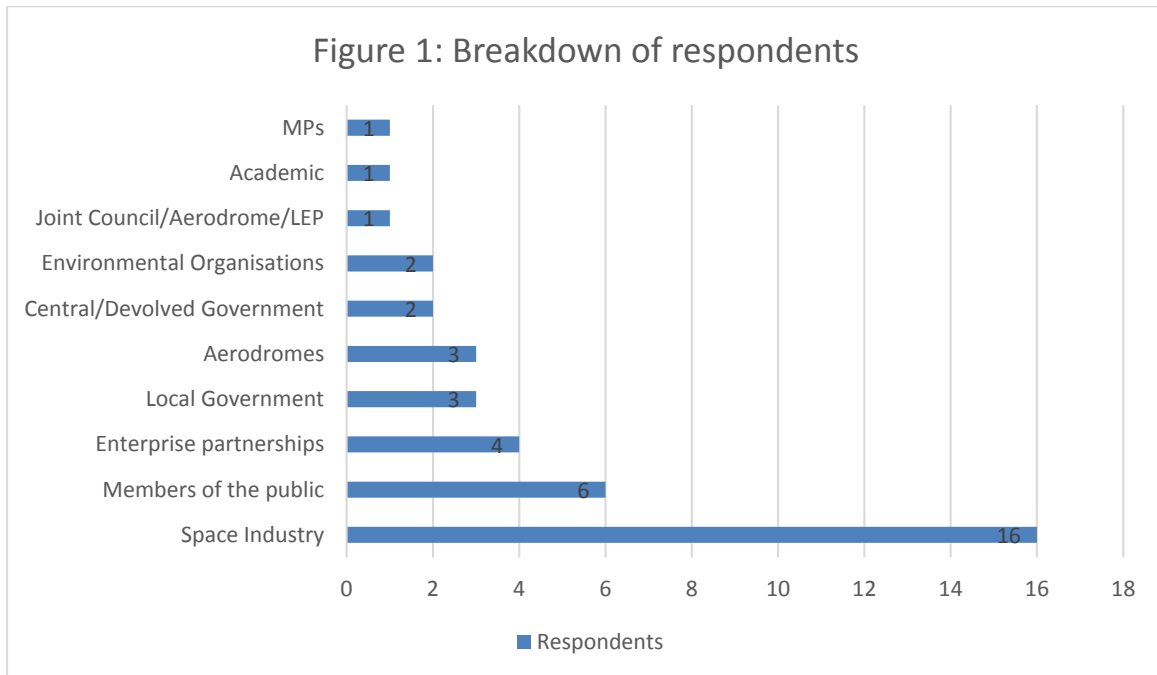
Campbeltown Airport
Glasgow Prestwick Airport
Kinloss Barracks
Llanbedr Airfield
Newquay Cornwall Airport
RAF Leuchars
RAF Lossiemouth
Stornoway Airport

Between 15 July and 6 October 2014, the Government invited views on the key criteria identified by the CAA and whether there are any other factors or criteria which should be considered in selecting a site for a spaceport in the UK.

Views were also invited on the eight potentially feasible locations that the CAA had identified based on its criteria. In particular, whether any of these locations should be disregarded, together with the reasons for doing so, and whether any other locations should be considered.

The consultation document posed 11 questions concerning the CAA's high-level recommendations, criteria and potentially feasible locations, and elicited 39 responses. Not all respondents responded to all of the questions posed; some focused on particular aspects and some advocated particular locations.

The majority of responses came from companies or individuals associated with the wider space and aerospace economy, including two spaceplane operators, interested aerodromes, local councils and local enterprise bodies. A breakdown of responses is in Figure 1; a list of respondents is at Annex 1.



This Document is in three parts:

- Part 1 summarises responses to the questions on the key criteria and the Government's response
- Part 2 summarises responses on the questions on the eight potentially feasible locations and the Government's response
- Part 3 sets out the Government's decision

Part 1

Summary and Government Response – criteria for a UK spaceport

CAA's high-level recommendations

The Government asked three questions on the CAA's high-level recommendations regarding the location of a UK Spaceport.

Q1. Do you agree with the CAA's high-level recommendation that if a decision were taken to proceed, sub-orbital operations should preferably commence, either on a permanent or a temporary basis, from one (or more) of the following:

- an existing EASA-certificated aerodrome;
- an existing UK CAA-licensed aerodrome; and/or
- an existing UK military aerodrome, subject to approval from the MOD.

Most respondents agreed with this high-level recommendation, with 22 respondents supporting it explicitly. However, some respondents – Space Miles, Highlands and Islands Enterprise, Highlands and Islands Airports Ltd, Moray Economic Partnership and Machrihanish Airbase Community Company (MACC), owner of

Campbeltown Airport – had reservations about the term “temporary” and emphasised that there needs to be a permanent long-term commitment to the site as a spaceport.

XCOR reasoned that using existing facilities would avoid unnecessary expenditure on new infrastructure and could use existing environmental analysis. XCOR also thought it would help leverage the existing aerospace supply chain and spread recurring costs amongst more customers. A number of other respondents cited minimising cost as a key consideration.

Virgin Galactic thought that the use of such sites would also be consistent with the United States Federal Aviation Administration Office of Commercial Space Transportation (FAA AST) licensing requirements. Virgin Galactic also suggested that use of a military airfield, particularly one already hosting US flights, might help operators of systems originating in the US meet US export control criteria.

Natural England thought that making use of an existing aerodrome was less likely to have significant effects on the natural environment than creating new capacity, because the land take would be less – though it was feasible that a new location could have fewer significant impacts than an existing site.

Argyle and Bute Community Planning Partnership agreed with this recommendation because such civil sites would already have a certain level of facilities. They thought the same may be true of military sites, but were concerned that military considerations may lead to delay.

Space Development Ventures argued for the exclusion of military airfields as these might restrict access to the site and give the impression that spaceplanes were for mainly military purposes.

Foster & Partners thought there might also be a role for unlicensed aerodromes where high-risk aerospace technology development can take place, and developers are “allowed to fail” with trial and error testing regimes for spacecraft technology development.

An individual respondent said all business options should be considered.

Q2. Do you agree that in order to make maximum use of existing infrastructure, the location should preferably still be active but at a low level of aircraft movements and should have existing and appropriate ground infrastructure/facilities and service provision?

Again, most respondents agreed with this recommendation, with 23 expressively supportive.

XCOR thought that a single spaceplane operator could not fully support the operational cost of an airport based on current projections. XCOR cited US experience of airports/spaceports with multiple and diverse tenants existing together. The combination of several sub-orbital operations a day with moderate aircraft traffic, commercial service, military service and general aviation could be co-ordinated.

The Welsh Government thought that using existing facilities would help de-risk the project and increase the location's attractiveness to potential investors and reduce the potential burden on the public sector. A point echoed by Llanbedr Airfield Estates LLP.

SKEO Solutions did not believe a standalone solution would be viable or attract the right levels of investment to be sustainable.

However, although supportive of the recommendation, HE Space thought it unlikely that a UK Spaceport would host routine aviation, which would need to be relocated; therefore a recently disused site may simplify planning and consultation.

MACC and Argyle and Bute Community Planning Partnership thought a low level of movements was desirable given the current regulatory uncertainty over spaceplane operations. However, Highlands and Islands Enterprise argued that it was not necessary to specify a low level of aircraft movements; rather, the aerodrome should be able to handle a mix of uses. The joint response from the Cornwall and Isles of Scilly Economic Partnership, Cornwall County Council and Newquay Airport Ltd (Cornwall joint response) made a similar point that the number of movements should not be considered a constraint, as long as the spaceport operator could demonstrate how different types of aerodrome activity could be safely integrated.

One of the individual respondents disagreed with this recommendation, stating that interested companies or individuals should be given the option to use existing facilities or develop bespoke infrastructure.

Q.3 Do you agree that greenfield sites should not be considered?

22 respondents agreed with this recommendation, with some believing that greenfield sites should only be considered in exceptional

circumstances, for example if no existing facilities proved feasible (Argyle & Bute Community Planning Partnership).

The main considerations against greenfield locations were that they would have a more significant environmental impact, be more costly, and take longer to develop than existing aerodromes. For example, Foster & Partners thought it would take an additional five to seven years to deliver a spaceport on a greenfield site, compared to developing at an existing aerodrome, and that operations from a greenfield site from 2018 would not be feasible.

Some respondents thought that greenfield locations should not be ruled out altogether. HE Space thought some areas in central and northern Scotland may have areas of land that meet safety criteria but are still more accessible than some of the potentially feasible locations identified. Catena Space thought greenfield sites might offer the best opportunity to cater for both horizontal spaceplane and vertical launch operations. Surrey Satellite Technology Limited (SSTL) said that selection of an existing aerodrome may over-constrain the process and not allow the selection of a site which provides the greatest long-term economic potential. Given that most sites are remote, and that the space tourism market is unproven, it may be prudent to select a site where vertical launch operations could be introduced, even if this required a wholly new construction.

The Government's Response

Overall, the Government believes that the CAA's high-level recommendations set the broad parameters for identifying a suitable location in the UK for sub-orbital, horizontal spaceplane operations.

It is essential that spaceplane activities are regulated and it would only be possible for the CAA to do so if they operated out of a licensed or certificated aerodrome. As such, the chosen location would either need to be licensed or be able to obtain a license within an acceptable timeframe.

The Government notes the points made about seeking a permanent location for a UK spaceport. That is the Government's primary aim, but does not rule out the possibility of spaceplane operations from a temporary location pending the development of permanent facilities.

The Government notes the concerns expressed about developing a military aerodrome as a spaceport. It should be noted that, in their

response, the Ministry of Defence has ruled out Kinloss Barracks and RAF Lossiemouth because of military operational considerations and that the planned future use of RAF Leuchars is likely to preclude it from being a permanent spaceport. However, at this early stage in identifying the best location, the Government does not wish to rule out the possibility of using a military airfield altogether.

Some respondents questioned the need to specify that the spaceport should only have a low level of aircraft movements. The CAA made this recommendation because they considered that it may be difficult for aerodromes with medium-to-high levels of aircraft movements to incorporate spaceplane operations with existing activities, particularly given that on present understanding, spaceplane operations would require the restriction of airspace and aerodrome operations for significant periods at a time. However, the Government accepts that the key factor is the aerodrome's ability to demonstrate that they will be able to manage a mix of demands at the site and that it is for aerodrome operators to assess the feasibility of doing this.

Most respondents agreed that greenfield locations should not be considered, for similar reasons cited for agreeing with the CAA's recommendations above about using an existing aerodrome. We note the arguments of some respondents that we should not rule out development at greenfield locations because they may offer the possibility of collocating horizontal spaceplane and vertical launch operations. However, the focus of this consultation is to identify a location from which to operate horizontal sub-orbital spaceplane operations and Government believes that developing at a greenfield location is unlikely to be consistent with our ambition to enable such operations in the UK from 2018.

CAA's criteria

Q4. Do you agree with CAA's analysis identifying the criteria to be considered in identifying a permanent location for a UK spaceport? If not, please explain why.

18 respondents agreed with the CAA's analysis, including the two spaceplane operators who replied. XCOR said it used similar analysis when assessing potential sites, categorising them into "Must-haves"

“Desirable” and “Bonus”. Virgin Galactic thought that the availability of airspace was a key consideration.

Catena only partially agreed with the CAA’s analysis. Their reservation was that the analysis was based only on spaceplane operations whereas the criteria should cater for all known current market applications, including launch of small and nano-satellites. MACC also questioned the limited scope of the consultation (i.e. sub-orbital) and recommended a more ambitious Government commitment, including vertical launch from the site.

Liverpool (John Lennon) Spaceport Feasibility Working Group (LPL) questioned the relevance of the analysis of airspace criteria, stating that airspace could be managed through “Dynamic Airspace Management”. LPL also said that more clarity was needed on the safety criteria.

The Cornwall joint response said that more detail on certain requirements was needed, such as the need for segregated airspace and how this would be delivered, and sought reassurance that policy post consultation would allow flexibility and permit the necessary airspace changes. They also identified that the cooperation of the MOD regarding military danger areas was also vital. The Cornwall joint response also said that specific, measurable, achievable, realistic and timely criteria/targets will be required to proceed effectively. Glasgow Prestwick Airport thought that the criteria needed to be specified in greater detail to make the selection process effective.

Natural England noted that CAA’s analysis of environmental impacts focused on a limited range of impacts such as noise, air quality, carbon emissions and hazardous substances. They recommended building on these to include criteria for landscape, biodiversity, soils and geodiversity. They also advised that a coastal location could have significant impacts on the natural environment, both terrestrial and marine, and detailed consideration of the impacts would be needed.

Q5. Do you think there are any other criteria that should also be taken into consideration? If so, please explain why.

LPL proposed that there should be a requirement for three alternative landing sites near the spaceport.

Several respondents wanted elements of vertical launch and/or orbital launch capability included. SSTL wanted the inclusion of criteria relating to suitability for vertical launch operations, or proximity to the nearest location that would be suitable for vertical launch. The Moray Economic Partnership also advocated consideration of requirement for the vertical launch of satellites. The Highlands and Islands Enterprise response similarly said the ability to integrate both vertical and horizontal launch should be investigated. The Scottish Space Network argued that sites should be analysed with regard to their efficiency and effectiveness as a site for orbital as well as sub-orbital launch. Catena proposed the potential to launch small satellites, which they argued could be done from any of the eight potentially feasible sites.

Foster & Partners recommended inclusion of attractiveness to a range of operators and that economic criteria should hold substantial weight in the elimination of sites.

One of the individual respondents argued that sustainability should be an additional criterion because investment in the UK spaceport should not be short term and account should be taken of long-term development and investment for the area in which the spaceport is located.

Argyle & Bute Community Planning Partnership proposed criteria relating to political and business support creating an investable case. This was echoed by MACC.

Llanbedr Airfield Estates proposed criteria relating to working with military and civilian operations. Gwynedd Council proposed consideration of alignment with other requirements of the UK Government, such as Remotely Piloted Aircraft Systems (RPAS).

Natural England recommended that environmental criteria should be developed for the full range of impacts on the environment and ecosystem services and that these should be developed in close consultation with the relevant statutory bodies representing England, Scotland and Wales. The response also referred to existing appraisal approaches to environmental impacts, including the Treasury's Green Book Supplementary Guidance "Accounting for Environmental Impacts"; the DfT's "Applying an Ecosystem Services Framework to Transport Appraisal"; and the Airport Commission's "Appraisal Framework".

HE Space thought that good international and local trunk road connections were necessary to attract the necessary skills from overseas. They thought that, of the eight shortlisted locations, only Glasgow Prestwick Airport and RAF Leuchars, could be considered to have good transport connections. The Moray Economic Partnership also made the point that the site needs to offer a good quality of life that is not too remote in order to attract a skilled workforce.

Glasgow Prestwick Airport advocated measuring against the Government's objective of growing the space economy, proposing factors such as the local skills base, capacity for innovation, the aerospace industrial footprint, and capacity for local industrial development.

Q6. Do you agree that these are relevant criteria? What weight should be attached to them?

Overall, most respondents agreed that the criteria identified by the CAA were relevant. However, there were more divergent views on the weighting that should be attached to them.

XCOR proposed weighting in terms of "Must-haves", "Desirable" and "Bonus". The "Must-haves" focused on the ability to fly safely and operate efficiently, including the regulatory environment, runway length and configuration, population densities along intended trajectories, airspace congestion/flexibility, environmental impact and weather. They argued that any site which did not meet the "Must-have" requirements must be excluded. XCOR stated that weather is a significant commercial consideration and that where there is more than one site meeting the "Must-have" criteria, a site with materially more flying days (i.e. 10-15% more) should be the preferred location.

A number of respondents such as Virgin Galactic, HE Space, Foster & Partners and Spacemiles proposed various weighting strategies or percentage-based weightings of criteria, with foci on particular elements such as commercial-based weighting, deliverability, weather and attractiveness to tourists.

Highlands and Islands Enterprise considered that selection should be based on the long-term strategic view (2030), not immediate short-term quick wins. It strongly recommended that a spaceport, as a driver of growth, be given additional weighting. Two individual respondents made

a similar case for economic impact carrying the largest weighting after safety and minimum technical requirements.

QinetiQ suggested greatest weighting should be given to the ability to deliver sustained, safe operation of experimental aircraft in available segregated airspace with a proven track record for managing complex air operations.

Natural England advocated using established appraisal methods rather than developing a new weighting system, for example the DfT's Webtag – though noting that this does not include appraisal of ecosystems services. They proposed setting up an external advisory group to advise on a broad range of issues to ensure criteria and appraisal methodologies – covering biodiversity, geodiversity and landscape – are developed.

Q7. If more than one location closely meet the essential operating criteria, safety, meteorological, environmental and economic criteria, do you agree that we should also consider factors around the contribution to local and national growth? If so, what weight should be given to these factors?

There was consensus that the contribution to local and national growth was a key factor, with some giving it equal weighting to all other criteria. For example, Wyle Laboratories stated that “The case for building a spaceport is as much an economic argument as any other, indeed it may be considered the principal argument ... The contribution to local and national growth should be given equal weight to the other criteria in so much as it is an economic reason for establishing a spaceport.”

Foster & Partners saw the spaceport as “an engine to drive long-term economic and social health” and recommended that “economic criteria should hold substantial weight in the elimination process of determining one site to be more suitable than another”.

HE Space thought this should have similar weighting to environmental issues.

The spaceplane operators agreed that the contribution to local and regional growth could be a consideration, but not at the expense of the primary operational criteria.

The Government's Response

Overall, the Government considers that the criteria identified by the CAA provide the appropriate framework for identifying a permanent location for a UK spaceport for sub-orbital, horizontal spaceplane operations. However, in order to consider whether hosting spaceplane operations is appropriate, and before developing detailed proposals, we recognise that potential spaceports will require more clarity on a number of factors, such as detailed runway requirements, associated landside and airside facilities, airspace, safety and associated regulatory requirements, which are to be developed. The Government is therefore developing a detailed technical specification of spaceport requirements to increase understanding of 'what is a spaceport' and the detailed technical requirements for spaceplane operations.

One respondent questioned the relevance of the analysis on airspace. In the early stages of its assessment, the CAA discounted aerodromes which were situated in, beneath or immediately adjacent to complex or busy airspace. The CAA considered that it is likely to be impractical, without significant service provision impacts, to incorporate Spaceplane operations with existing activities at busy aerodromes and within busy airspace; particularly given that, on present understanding, spaceplane operations would require the segregation of airspace and restrictions on aerodrome operations for significant periods.

Most spaceplane operators aspire to conduct satellite launches from their sub-orbital spaceplanes or carrier aircraft and these aspirations will be taken into account in the development of Government's technical specification of spaceport requirements. However, the Government does not believe that suitability for vertical launch should be a criteria. The CAA's initial analysis was that vertical launch facilities had differing requirements and may not be easy to collocate with horizontal spaceplane operations.

The contribution to wider economic growth is a key factor and, indeed, could be the primary driver for aerodromes and partners to develop and submit proposals to become the UK spaceport. The Government believes that this will be a key factor if more than one location can demonstrate it can meet the key operational criteria.

The Government notes the points raised about assessing the wider environmental impacts. The focus of the CAA's work was on the operational requirements for, and impacts of, spaceplane operations, including the aviation-related environmental impacts. The Government

recognises that developing existing aerodromes to be a spaceport – for example, any necessary runway extensions, landside and airside developments, and any necessary transport infrastructure improvements – would give rise to wider environmental impacts. We shall consider these as we develop the detailed specification.

We agree with points made that we should draw on existing appraisal methods, where possible, to assess proposals against criteria.

Whilst acknowledging the need to work closely with potential spaceplane operators, from information received to date, the Government does not believe it necessary to specify the exact requirements for alternate or diversionary landing sites at this stage

A coastal location?

Q8. Do you agree with the CAA’s analysis and strong recommendation that until there is a better understanding of sub-orbital spaceplane safety performance, spaceplane operations should only take place in areas of low population density and the resulting view that only a coastal location is suitable to protect the uninvolved general public.

Some 20 respondents agreed with the CAA’s key recommendation that in order to protect the uninvolved general public, the spaceport should be developed at a coastal location.

In addition to the safety of uninvolved general public, Spacemiles thought there would be a strong aesthetic case for a coastal location from the perspective of a space tourist.

The Marine Conservation Society, reinforced by Natural England, raised concern about the environmental impact of a coastal location.

Some respondents thought there might be scope for a non-coastal location. For example, Virgin Galactic said its operations could be constrained to a relatively narrow area, so a coastal location may not be compulsory. Foster & Partners also thought it depended on the definition of coastal, the key point being a flight path clear of dense populations.

The Government’s Response

Ensuring the safety of the uninvolved general public will be of paramount importance. Overall the Government believes that the CAA's strong recommendation on a coastal location for spaceplane operations is valid at this stage of spaceplane development. The Government notes that there will be particular environmental impacts associated with development at a coastal location, and we shall consider these as we develop the detailed specification.

Part 2

Summary and Government Response – potentially feasible locations for a UK spaceport

CAA's shortlist of potentially feasible locations

Q9. What are your views on the CAA's shortlist of eight potential sites?

Each of the shortlisted sites generated interest and had their advocates.

Some respondents, such as Space Development Ventures, Foster & Partners and others, performed an analysis of each location, with varying outcomes and rankings.

MOD reviewed the three military sites identified in the CAA's report, based on the current and future operational usage, and ruled out further consideration of Kinloss Barracks and RAF Lossiemouth because of overriding operational factors. In the case of RAF Leuchars, the MOD

said that the planned future use of the site is likely to preclude it from being a permanent spaceport but there may be a possibility that the site could be used as a temporary facility for a limited period of time. The MOD said it was not possible to give a definitive response on the suitability of RAF Leuchars as a future spaceport without significant additional information on what exactly would be required.

The MOD also commented that the development of a spaceport at any of the potentially feasible locations will require detailed work on supporting airspace structures, and wishes to be closely involved in such work to ensure that proposed changes do not adversely impact current UK operations or military flying training.

Q10. Are there any locations on the CAA's shortlist which you consider should be disregarded? If yes, please give your reasoning.

As noted in the section on the CAA's high-level recommendations, some respondents called for the exclusion of all military sites, for example, because selection of a military site sends the 'wrong message' to investors, operators and members of the public, suggesting that operations would be managed by the military.

Spacemiles said that Campbeltown, Stornoway and Llanbedr should be disregarded because they were unviable without rapid and significant tourism investment, and that Kinloss Barracks and RAF Lossiemouth were too remote and had no significant tourist attractions. An individual respondent thought Glasgow Prestwick Airport, RAF Leuchars and Newquay Cornwall Airport should be disregarded because of the population size within ten miles, adding that a similar case could also be made to exclude Kinloss Barracks and RAF Lossiemouth.

Catena and SSTL wanted all eight sites excluded because they were not suitable for vertical launch. MACC requested that any location which cannot be considered for permanent operations, or cannot feasibly support fully orbital spaceplane operations, should be disregarded.

LPL said that none of the eight potentially feasible locations could meet its proposed criteria regarding emergency landing facilities and should all be rejected.

The Government's Response

The Government does not believe that Kinloss Barracks and RAF Lossiemouth are feasible locations for a spaceport because of overriding military operational factors.

Regarding emergency landing facilities, whilst acknowledging the need to work closely with potential spaceplane operators, from information received to date, the Government does not believe it necessary to specify the exact requirements for alternate or diversionary landing sites at this stage.

The Government therefore believes that the other six sites identified by the CAA are potentially feasible locations for a UK spaceport noting, however, that the planned future use of RAF Leuchars is likely to preclude it from being a permanent spaceport.

Q11. Are there any additional locations that you consider should be on the CAA's shortlist? If yes, please explain why.

An individual respondent advocated the Peacehaven/Newhaven area because it had good transport links and was relatively deprived.

Two respondents proposed consideration of the north coast of Scotland, including Dounreay airfield, because of potential to integrate horizontal and vertical launch capabilities.

The Hebrides Range, Benbecula, was suggested because it contained the "largest area of restricted airspace in Europe".

Foster & Partners argued that RAF Coningsby and RAF Marham should be considered further because they are approximately 15 miles from the coast, have 2750m length runways, and appear to have low population densities around them, including some very low density corridors between the airport and the coast.

One of the individual respondents suggested that RAF Fairford should be considered further because it was previously designated as an emergency landing site for the US Space Shuttle. LPL advocated Liverpool John Lennon Airport because it had alternative emergency landing locations nearby, which they contend overrides all other considerations.

The Government's Response

Shoreham Airport, in the Peacehaven/Newhaven area of southern England, was assessed during the early stages of the CAA's work and discounted due to its short existing runway, complex and busy airspace and local population density. Similarly, RAF Coningsby, RAF Marham and RAF Fairford were not considered potentially feasible locations because they sit below complex and heavily used civil and military airspace.

Liverpool John Lennon Airport was also initially excluded because of busy and complex airspace over the central belt of the UK, and large areas of quite dense population in the surrounding areas.

The airport at Benbecula would require significant runway extension which we do not think would be feasible due to the local topography.

We note that a number of respondents advocated consideration of the north coast of Scotland, primarily because of its suitability for vertical launch. However, the purpose of this consultation was to support the Government's ambition for sub-orbital spaceplane operations to commence from the UK from 2018. There are no licensed aerodromes on the north coast of Scotland, and the CAA's initial analysis was that spaceplane and vertical launch facilities had differing requirements and may not be easy to collocate.

Part 3 - Government decision

The Government believes that the CAA's criteria provide an appropriate framework to assess the feasibility of locations to become the UK spaceport for sub-orbital, horizontal spaceplane operations, and agrees that the following aerodromes remain potentially feasible locations:

- Campbeltown Airport
- Glasgow Prestwick Airport
- Llanbedr Airfield
- Newquay Cornwall Airport
- RAF Leuchars
- Stornoway Airport

We recognise that potential spaceports will require more clarity on a number of factors, such as detailed runway requirements, associated landside and airside facilities, airspace, safety and associated regulatory requirements, which are to be developed. The Government is therefore developing a detailed technical specification of spaceport requirements to increase understanding of 'what is a spaceport' and the detailed technical requirements for spaceplane operations.

The Government is not convinced that the other locations proposed by respondents are likely to be viable propositions for sub-orbital spaceplane operations. However, this does not preclude other locations submitting a detailed proposal if they believe they can fulfil the requirements in the technical specification.

The Government recognises that most spaceplane operators aspire to conduct satellite launches from their sub-orbital spaceplanes or carrier aircraft. These aspirations will be taken into account in the development of the Government's technical specification of spaceport requirements.

The Government notes the views of some respondents advocating the development of a vertical launch capability in the UK. However, our current focus is to identify the best location for sub-orbital spaceplane operations. This does not prejudice any long-term consideration of a vertical launch facility.

Annex

LIST OF RESPONDENTS

H E Space

Natural England

Wyle Laboratories

Saturn SMS Ltd

Foster & Partners

Highlands and Islands Airports Ltd

Highlands & Islands Enterprise

QinetiQ

Surrey Satellite Technology Limited

Welsh Government

Moray Economic Partnership

Argyle & Bute Community Planning Partnership

Avascent

Bangor WASP

Catena Space

Cornwall & Isles of Scilly Local Enterprise Partnership, Cornwall Council and Cornwall Airport Ltd

Fife Council

Glasgow Prestwick Airport

Gwynedd Council

Llanbedr Airfield Estates

Liverpool (John Lennon) Spaceport Feasibility Working Group

Machrihanish Airbase Community Company

Alan Reid MP

Outer Hebrides Planning Partnership

Scottish Space Network

Space Development Ventures

Snowdonia Enterprise Zone Board

Space Miles Holdings Ltd

Virgin Galactic

XCOR

Ministry of Defence

Marine Conservation Society

SKEO Solutions

There were six responses from interested persons as individuals