



Consultation on criteria to determine the location of a UK Spaceport

Consultation Response from
Glasgow Prestwick Airport

Monday 6th October 2014

Prepared in conjunction with



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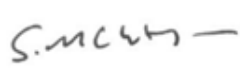
I Respondent

This consultation response has been prepared by Glasgow Prestwick Airport and represents the views of Glasgow Prestwick Airport. Glasgow Prestwick Airport is the owner of the Prestwick runways, airfield and associated passenger terminal and facilities. Glasgow Prestwick Airport also owns and controls significant hangarage and development real estate on its large airfield footprint.

Glasgow Prestwick Airport is the collective term for the legal entities forming the airport land, infrastructure and operating company, under the ultimate ownership of TS Prestwick Holdco Ltd (SC462050).

2 Authorisation

This consultation response has been authorised and signed off by the responsible persons noted below.

Name	Title	Signature	Date
Iain Cochrane	Chief Executive Officer		6 th Oct 2014
Stuart McIntyre	Prestwick Spaceport Bid Director		6 th Oct 2014

3 Confirmation of Participation

Glasgow Prestwick Airport is delighted to confirm that it wishes to participate in the Department for Transport's detailed process to select the preferred location for the UK's first Spaceport.

4 Overview of Prestwick Airport

Prestwick Airport was established in 1935 as a site for elementary flight training for ab-initio RAF pilots as part of the UK Government's response to the military build-up in Germany ahead of the Second World War. The airport site was selected due to the consistently favourable weather conditions experienced in this area of South Ayrshire. The airfield is surrounded by high ground (all 4 quadrants) and this affords it protection from the vast majority of adverse weather phenomena. This unique Ayrshire microclimate has enabled the airfield to benefit from favourable cloud bases and excellent surface visibility. This factor contributed to it becoming the dominant transatlantic ferry port for US and Canadian built aircraft entering the European war theatre. It subsequently became the primary gateway for long-haul transatlantic passenger operations into Scotland. The airfield was heavily developed with a full concrete base underpinning its 3000m runway and extensive hard standing. A broad aerospace and engineering industry was established in the area to provide aircraft build, modification and repair capabilities, emerging in the post war era as Scottish Aviation before being absorbed into British Aerospace in 1977. A further 1,905m cross runway was later added.

Prestwick and its local population have welcomed many types of aircraft operations over the years including military fighters, large wide body jets and the largest specialist transports and Antonovs. It was also a frequent training location for Concorde flight crews giving the local airspace controllers experience at defining and controlling special aircraft inbound and outbound trajectories as well as deconflicting flight paths with other commercial and military traffic.

Transport links to Prestwick have been progressively developed since its formation with a mainline rail station on site, fuel offloading siding and unbroken motorway links directly from the airport to the backbone of the UK's motorway network. Recent development of the M77 and Glasgow M74 southern orbital extension means that by road Prestwick is now only 30 minutes from the centre of Glasgow, 1 hour 20 minutes from Edinburgh Airport, less than 2 hours from the border with England and only 6 hours 15 minutes from London Heathrow.

While Prestwick continues to be engaged in passenger operations, the structure of the airline industry currently favours the bases at Glasgow and Edinburgh with Prestwick playing a more strategic aerospace and aviation role as a base of freight, strategic diversion and hijack, executive transport, military transit, search and rescue operations as well as maintaining a strong industrial capability both on the airfield and in the immediate vicinity.

With its favourable meteorological patterns, over sea take-off paths, substantial developed airfield, excellent local skills base, direct motorway and rail links and attractive business and industrial footprint, Prestwick is well placed to launch the UK's first Spaceport and support the growth of the UK's space industry.

5 Consultation Questions

5.1 CAA's high level recommendation

Question 1

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-licenced aerodrome; and/or*
- *an existing military aerodrome, subject to approval from the MoD.*

Answer

We believe that full EASA certification should be a minimum standard for any location to be considered. This ensures not least that commonality of standards will exist with any other European airfield which, for any reason, might need to be utilised in an emergency or diversionary scenario. Furthermore we believe that Air Traffic Services should be facilitated by Certified and Designated Air Navigation Service Providers (ANSP's) to ensure a consistent EU standard of safe service delivery.

Question 2

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?

Answer

We agree that, in order to achieve the goal of an operational Spaceport by 2018, an existing operational airfield location should be selected.

Furthermore, because any Spaceport development will entail periodic disruption to existing commercial operations, its economic viability during the developmental phase will be dependent on there being capacity to accommodate this development within the level of commercial activity ongoing.

Finally, because Spaceport operations will require aircraft handling and airfield services at a level and classification equal and in some cases exceeding those of existing EASA regulations, it will be imperative that any airfield being considered possesses developed and operational ground infrastructure, facilities and services that meet the needs of current Civil Aviation Authority (CAA) regulations.

It is important in considering the possible qualification of a site to also consider whether the location has the local skills base or population required to staff such an operation.

Question 3

Do you agree that greenfield sites should not be considered?

Answer

The high cost and extensive consultation and planning process required to develop a greenfield site will be substantially

prohibitive. Further, the dependency on skilled aviation and aerospace labour, which is necessarily focussed and located around existing operational facilities, make the staffing of a greenfield operation challenging unless it is located close to an existing operation. We agree, therefore, that greenfield sites should not be considered.

5.2 CAA's Criteria

Question 4

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.

Answer

We agree with the general criteria that the CAA have identified as being relevant in the consideration of a permanent location for a UK Spaceport. However, in order to be effective in identifying suitable or unsuitable sites we believe that each of the criteria must be specified in greater detail and that the specifically pertinent aspects of each criteria should be assessed within a defined overall value system. Therefore, we would like to propose that the following sub-criteria be considered for adoption in the assessment of sites:

5.2.1 Weather

Safe, punctual and economically viable operations will depend on favourable meteorological conditions prevailing at the chosen location. This will be a primary determinant of the operational capacity that each location offers. The pertinent meteorological aspects that bear on this are as follows:

a) Visual Meteorological Conditions

By calendar month, in percentage terms, the amount of time that meteorological conditions have deteriorated below the proscribed minima (for cloud and visibility) required for an aircraft to operate under Visual Flight Rules.

b) Cross Winds and Precipitation

By calendar month, in percentage terms, the frequency of cross winds exceeding a.) 15kts and b.) 25kts on the main runway of the location. By calendar month, the number of days that precipitation was observed at each location. This dataset will allow clarity on the extent to which operations may be constrained due to crosswinds whilst also accounting for differing crosswind tolerances on wet and dry runways.

Measure

Topography and localised effects can have a profound impact on the prevailing meteorological conditions at a chosen location. Assumptions should not be made on the basis of latitude, regional position or runway elevation.

A site should be discounted if it is not able to demonstrate a minimum level of operational availability for each calendar month as determined by the statistical analysis of the Met Office's 20 year dataset.

5.2.2 Safety

a) Audited EASA Regulatory Compliance

Rationale

Adoption of the mandated EASA standards is critical to ensure that a common safety framework applies to all airfields at which a space vehicle might land in the event of a diversion.

Measure

A location should be discounted if it is not able to demonstrate audited compliance with EASA standards.

b) Audited Safety Management System

Rationale

An active and embedded safety management system is critical to ensure that appropriate procedures are in place to provide both a safe operational environment and emergency response to any safety related situation. Compliance is assured through mandatory audit by relevant bodies including the CAA, HSE and DfT.

Measure

A location should be discounted if it is not able to demonstrate an embedded and audited Safety Management System.

c) CAA/DfT Compliant Security Regime

Rationale

Implementation of an effective and CAA/DfT compliant security regime is critical to ensure that Spaceport operations are conducted securely. This is especially important given the presence of hazardous rocket fuels and oxidants.

Measure

A location should be discounted if it is not able to demonstrate a CAA/DfT compliant security regime.

d) Category 7 Airport Fire Service

Rationale

The spaceplanes to be operated are considered experimental and the range of fire risks is exacerbated by the presence of rocket fueled engines and oxidants. A minimum Category 7 fire service upgraded to include specific capabilities associated with safe handling of rocket oxidant fires is imperative.

Measure

A location should be discounted if it is not able to demonstrate an existing Category 7 Fire Service with an acceptable upgrade plan.

e) Emergency Management Plan

Rationale

An established and practised Emergency Management Plan is critical to ensure an appropriate response to any emergency situation. This must include appropriate multi-agency relationships and structures.

Measure

A location should be discounted if it is not able to demonstrate an established and proven Emergency Management Plan.

f) Bird Hazard Management Plan

Rationale

Bird hazards represent a critical risk to Spaceport operators and it is essential that Spaceports have an effective and proven Bird Hazard Management Plan and capability.

Measure

A location should be discounted if it is not able to demonstrate a proven Bird Hazard Management Plan.

5.2.3 Airspace

a) Segregated Airspace Zones

Rationale

Safe operation of Spaceplane requires segregated airspace to be established that encompasses Spacecraft departure and return flightpaths with minimum impact on commercial traffic routings. It will be necessary for NATS, in conjunction with any other involved air traffic authority if necessary, to endorse a solution that creates the required zones for any Spaceport location.

Measure

A location should be discounted if it is not able to demonstrate an airspace segregation plan which has the written endorsement of NATS and other involved authorities including DGAC in France, IAA in Ireland and any other involved European airspace control partners.

5.2.4 Environmental

a) Noise management planning and procedures

Rationale

In order to ensure that noise emission regulations are satisfied it is essential that the site has robust noise management plans. Impact assessments along with the appropriate noise mitigation strategies are required. These will include:

- Air noise relating to either airborne spacecraft or those on the ground, as they prepare for departure or are decelerating along the runway following landing. These noise sources must be analysed and mitigated to

demonstrate compliance with recognised industry standards.

- Ground noise will arise from spacecraft manoeuvring on the apron and taxiways, together with a range of ground vehicles, power units and plant. These noise sources must be analysed and an appropriate management plan established.
- Road and rail noise will arise from the peripheral road and rail activities associated with Spaceport operations. These noise emissions are governed by the relevant Environmental Noise regulations to which compliance must be demonstrated.

Measure

A location should be discounted if it is not able to demonstrate an acceptable noise management plan.

b) Air Quality management plan and procedures

Rationale

The Spaceport location has an obligation to manage air quality and monitor pollution levels to ensure these remain below prescribed levels.

Measure

A location should be discounted if it is not able to demonstrate an acceptable air quality management plan.

c) Water Quality and Pollution Control management plan and procedures

Rationale

The Spaceport must ensure the protection of the aquatic environment in and around the site including (where necessary) the capture, disposal and treatment of surface water. A detailed assessment of involved watercourses and their ecological and environmental sensitivities will be required. This will result in the development of an appropriate overall management plan and detailed spill response plan. These will take into consideration the spill infrastructure required to deal with any future spill scenario.

Measure

A location should be discounted if it is not able to demonstrate an acceptable Water Quality and Pollution Control management plan.

d) Sustainable Drainage Management Plan

Rationale

It is important to manage flood risk on-site and, where feasible, reduce flood risk through the implementation of appropriate design and operational mitigations. It is also necessary to establish a recovery plan to maximise the capture and re-use of chemicals during de-icing operations. This will enable the highest concentrations of de-icing chemicals to be captured separately, thus reducing the concentrations entering the surface water run-off system.

Measure

A location should be discounted if it is not able to demonstrate an acceptable drainage management plan.

5.2.5 Transport

- a) Travel time to the nearest long haul international airport by road or road/rail.

Rationale

The objective and purpose of the Spaceport is to catalyse industrial growth in the Space Industry. Implicitly, this will entail international relationships with global industry partners and customers. In order not to create a fundamental barrier to this growth the Spaceport location must be accessible within a reasonable timeframe using readily available commercial transport.

Measure

Our proposal is that a location should be discounted if it is not accessible by road or rail within 2.5 hours from a longhaul airport or within 1 hour from a longhaul connected regional airport.

- b) Distance to nearest rail siding

Rationale

Given the specialist materials and fuels that will need to be carried to the Spaceport site, the use of rail facilities for certain categories of goods will be necessary. This will allow materials to be carried away from congested road networks to the greatest extent possible.

Measure

We therefore propose that any location that can offer an onsite rail siding capability should be scored favourably for the presence of this feature.

5.2.6 Runway

- a) Runway, Taxiway and Hard-standing Construction

Rationale

Rocket engines utilise an oxidant in order to burn fuel and generate thrust. The oxidant (usually liquid oxygen, nitrous oxide or hydrogen peroxide) when mixed with asphalt produces a potentially explosive combination. Hence, to maintain safety in the event of an oxidant leak or spill, the surface and underpinning construction of the runway, taxiways and hardstanding must be of a concrete construction. The risk can be limited by the use of a concrete base and an asphalt wearing surface, however a full asphalt wearing surface and base presents a significant hazard.

Measure

A location should be favoured if the runways, taxiways and hardstanding to be occupied by fueled spacecraft are of a full

concrete construction or a concrete underpinning. The presence of an asphalt wearing surface must be linked to an appropriate asphalt/oxidant fire risk management plan.

b) Runway Category

Rationale

The range of operator concepts includes the use of widebody aircraft as carrier/launch aircraft. Accordingly, any future Spaceport facility will require a Code E runway.

Measure

A location should be discounted if the runway does not meet or exceed Code E specifications (as defined in CAP 168 and associated EASA implementing rules).

c) Cross Runway Capability

Rationale

Wind direction variation during operational sorties may create crosswind limitations on landing that were not present at take-off. Hence the presence of a cross runway that is compatible at least with the needs of the orbital craft on landing will be a highly desirable feature.

Measure

We therefore propose that any location that can offer a suitable cross-runway to facilitate orbital craft landing should be scored favourably for possessing such a capability.

Question 5

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

Answer

In addition to the criteria set out in the DfT Consultation and discussed in our response to consultation Question 4, we believe there are two further criteria required. These are material and relevant in selecting a Spaceport location that is capable of delivering against the Government's stated objective behind the programme, namely the growth of the UK Space Industry. We have set out these criteria with their specific sub-criteria below:

5.2.7 Local Skills and Training

a) Skills Base

Rationale

Any successful Spaceport location will depend on access to suitably skilled aerospace, engineering and associated technical skillsets. Such skills are not generally mobile in any quantity and therefore it will be critical for the success of a location that the local workforce contains an existing technical skills base.

Measure

A location should be preferred to the extent that the location contains a skilled population employed in

engineering or technical roles within the aerospace or aviation sectors.

b) Innovation Capacity

Rationale

A technologically innovative environment will be critical if a designated site is to attract leading high technology companies and contractors to the Spaceport and the region around it. The Spaceport should therefore have a quality science and innovation plan to establish and promote the development of world leading technologies and businesses that will wish to exploit the Spaceport as a resource. Examples of the technologies and capabilities that will develop in tandem with the Spaceport include research of the upper atmosphere, space weather, space medicine, microgravity research, high performance composites, space-plane aerodynamics, constellation deployment and small payloads. Therefore, the innovation capacity within the space and aerospace sectors must be a central criteria for the selection of the Spaceport location.

Measure

A location should be discounted if it cannot provide an acceptable high quality science and innovation plan detailing how innovation will be promoted and nurtured at the location and which confirms the presence and support of the following critical elements within the region:

- Innovative providers of advanced aviation technologies.
- Space technology providers for small satellites which may be launched from the Spaceport.
- Leading universities involved in space related activity.
- A space industry champion to enhance the coordination and capability of a region in its space development and associated links that the region has to other recognised space clusters.
- Governmental support structures to enhance technology led business development.

5.2.8 Industrial Footprint

a) Local Aerospace Industrial Footprint

Rationale

In order to support the development of the Spaceport, its operations and those of the associated operators, co-located supply chain and payload developers it is imperative that any Spaceport location offers an existing operational aerospace industrial footprint. Without this, the goal of underpinning growth in the UK Space Industry will be sub-optimised. An existing aerospace industrial footprint at the selected location is a key indicator of the industrial suitability of any location. An existing aerospace industrial footprint confirms that the necessary social and civil infrastructure exists to support the anticipated industrial development.

Measure

A location should be discounted if the location cannot demonstrate that it possesses established operational aerospace engineering activity and the associated civil and social infrastructure / amenities in the area to support it.

b) Local Industrial Development Capacity

Rationale

The UK Spaceport project seeks to underpin the growth of the UK Space Industry. It is implicit therefore that the Spaceport location must be able to provide for the local establishment of space industry and aerospace firms co-operating and integrating with Spaceport operations. To enable this growth it is critical that the Spaceport location offers appropriate and linked industrial real estate.

Measure

A location should be discounted if the location cannot confirm the availability of sufficient industrial real estate directly linked with the facility. This must be underpinned by an associated industrial real estate development plan with in-principal support in writing from local planning authorities and land owners.

Question 6

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

Answer

We believe the criteria identified by the CAA, as expanded upon in our answer to Question 4 and as supplemented by our proposed additional criteria as set out in our answer to Question 5, are the relevant criteria that can successfully identify the optimum location for the UK's first Spaceport. Qualification clearly requires all of the criteria to be met satisfactorily. We suggest that each sub-criteria is scored as:

- 5 points – criteria fully complied with
- 2 points – criteria partially complied with

In order to then distinguish between qualifying sites we suggest that the following weightings / factors be applied in calculating a final score:

Proposed Weightings

Weather	20
Operational availability	20
Safety	10
Audited EASA Regulatory Compliance	2
Audited Safety Management System	2
CAA/DfT Compliant Security Regime	2
Category 7 Airport Fire Service	2
Emergency Management Plan	1
Bird Hazard Management Plan	1
Airspace	20
Segregated Airspace Zones	20
Environmental	10
Noise management planning and procedures	3
Air Quality management plan and procedures	3
Water Quality and Pollution Control	2
Sustainable Drainage Management Plan	2
Transport	10
Travel time to the nearest longhaul international	8
Distance to nearest rail freight yard.	2
Runway	10
Runway, Taxiway and Hard-standing Construction	4
Runway Category	3
Cross Runway	3
Local Skills and Training	10
Skills Base	5
Innovation Capacity	5
Industrial Footprint	10
Local Aerospace Industrial Footprint	5
Local Industrial Development Capacity	5

Question 7

If more than one location closely meets 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?

Answer

We believe that the leading additional consideration should be the ability to support growth in the UK space industry sector. Local growth would be a beneficial outcome but only in absolute terms. Local economic or regional growth should not be measured as growth from the baseline of the existing local economy as this would counterproductively reward relatively low levels of absolute growth. Any measure of growth utilised to support this assessment should be measured in absolute economic terms.

5.3 A Coastal Location?

Question 8

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?

Answer

The most pressing uncertainty relates to risk during take-off phases and second stage deployments. Hence over sea take-off into generally prevailing winds should be a primary consideration. If the prevailing wind is generally South Westerly then westerly airfields should be considered. Airfields in the East should only be considered if the runway orientation generally supports Easterly take off. In terms of population density the key consideration should be population density with reference to the orientation of the main runway. Significant population overflight should be seen as undesirable. Laterally adjacent or local populations will be indicative of the availability of relevant civil services and facilities and as such, should be considered as a merit.

5.4 CAA's shortlist of potentially feasible locations

Question 9

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

Answer

Based on the preliminary criteria presented the sites identified appear appropriate for inclusion in the detailed assessment process.

Question 10

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

Answer

Without specific analysis against finalised specific criteria we are not in a position to suggest that any site be disregarded at this stage. However, we would suggest that as a priority, NATS are requested to perform an independent feasibility analysis on the challenges and implications of defining segregated air corridors within the South of England airspace serving Newquay and Llanbedr, the West of Scotland airspace serving Prestwick, Campbeltown and Stornoway and the East of Scotland airspace serving Kinloss Barracks, RAF Lossiemouth and RAF Leuchars.

Question 11

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

Answer

No

6 Conclusion

The next millennium will see space operations and transport technologies develop at an increasingly rapid pace. The Government has identified that the progression into the world of space technologies has already begun. They have recognised that, to participate as a leading nation, the UK must take the strategic steps necessary to enable the growth of the broad based Space industry across all regions of the UK. A first UK Spaceport has become a top priority for this national journey. We believe that the choice of location must serve to underpin this top level industrial, technological and economic objective.

Glasgow Prestwick Airport welcomes the opportunity to participate in the process to select the location for the UK's first Spaceport. We believe the very same reasons that allowed us to play such a pioneering role in the development of the aviation and aerospace industry in the UK from its commercial beginnings in the 1930's remain true today. This makes Glasgow Prestwick Airport a highly suitable location from which to drive this pivotal stage of UK aerospace and space industry development.