

To: minister for UK Space and Innovation

Date: 23/05/2025

From: DCMS

Subject: Space Industry Trailblazer Investment

Suggested approach and decision: Investment into a Centre for Unmanned Spaceflights

It has been proposed that there should be a substantial investment into the UK space Industry under the banner 'Space Industry Trailblazer Investment'. It is hoped that should investment be successful; within the next 20 years the UK will become the world's leading force in the space industry. We will properly assess the avenues available for this type of investment, of which there are three, as follows: 'The Space Tourist Hub', 'a Centre for Unmanned Spaceflight', 'The Clear Skies Project'. The Space Industry has recently stated that within the next 10 years it intends to raise its global market share from 6.5% to 10%, as well as boosting job creation, with the industry already employing 50,000 people and indirectly enabling the employment of a further 100,000 people. They believe that the Space Industry will increase their already substantial contribution made by the Industry towards the UK economy, that being £12 billion per year. I am hoping from each separate proposal made that you will be able to properly decide on the path to be taken regarding our investment plan.

As already outlined, three options have been made available for such substantial investment, the first of which is 'The Space Tourist Hub'. Instances of a similar system are evident amongst other leading Space forces in the world, with Russians being able to pay approximately \$25 million in order to gain a place on board a transport to the International Space Station, and a more financially viable and commercial system emerging from the US recently in the form of 30-minute space flights to multiple paying customers at a time, with fees reaching approximately \$150,000 per person. Such examples indicate that a market is available for a 'Space Tourist Hub', however such pricing limits opportunities to those living in the upper bracket of wealth, and also indicate that investment would have long term benefits due to the lack of an established market.

This area shows great potential and the option stated above aims to capitalise on the lack of an established market in this sector. It is proposed that the Anglesey Spaceport in Wales will be utilised to accommodate passenger launch vehicles alongside regular space operations, therefore providing a service similar to that existing in the US already. The option aims to use government incentive to increase passenger capacity and decrease the cost of travel, although prices will remain high, approximately £40,000 per person. However, as the industry continues to grow, government investment can be used to further increase passenger capacity and decrease costs of travel, therefore broadening the market in the UK in order to increase accessibility. This option will create 20,000 new jobs, as well as increasing the UK's global market share in the industry by 4% within the next 5 years.

In the longer term it is hoped that the UK could further separate itself from the US system of space tourism by offering the development of a third generation of passenger space liners. This opens to the market to hotel resorts, and due to the reluctance of other major economies, this provides a gap in the market in which the UK can spearhead space travel and hence place itself at the forefront of the spaceflight industry by the mid 21<sup>st</sup> Century.

Such an investment plan does have considerable risks however; although the timescale of investment from the government is 5 years, the average money spent per year on this project is the highest of all options, with £3 bn being required in the first year to expand the necessary facilities and £2bn being required to fund further capacity. In addition to this, as stated, the project will require increased funding consistently throughout the first half of the 21<sup>st</sup> Century in order to grow the option to commercialised level and the limited evidence of an available market currently may dissuade certain investors from investing substantially, especially those who do not intend to grow the project in the long term. Additionally, the lack of such a system in the UK and the presence of one in the US creates a large amount of competition, providing the US with a basis from which they can grow such an industry, meaning the popularity of such a project abroad may further dissuade UK investors. Additionally, the Anglesey Bird Protection and

Preservation Society have expressed their concern regarding the development of this project, indicating that the building of a spaceport in Anglesey will jeopardise the existence of certain endangered species of birds in the UK, namely the rare Chough, of which there are only a few breeding pairs left. It is key to take such information into due to the current state of climate change protest in Britain, and the significant addition of emissions from a highly active spaceport will further aggravate such pressure groups. However Long term gain from such a project is key to successful investment, and as stated by the Department of Transport, this option is likely to lead to the best return in the long term.

The second option proposed is one that concerns the investment into the manufacturing of unmanned satellites: 'a Centre for Unmanned Spaceflights'. The market for Satellite manufacturing is already prevalent in the economy, and investment into this sector offers the opportunity to further bolster the progress of the UK space industry by building on the strong foundation provided and hence establish the UK as a world leader in this sector. The progress made by such a project will also increase the capability of constructing larger space-based hardware.

Such a market does exist in the UK, with our industry already providing many types and parts of unmanned spacecraft, however this does not cater for all types. The above option would allow for the establishment of new capabilities in this area where certain vacuums in the market exist, for instance the building of on-board power systems and reusable rocket launch vehicles. This further widens the potential that the UK space industry has in building unmanned technology, spanning across the entire spectrum of unmanned satellite systems. From this it is hoped that through this option, the UK space industry can become the dominant provider of the complete manufacturing solution in unmanned space-based satellites. However, unlike the 'Space tourist hub', it is difficult to accurately predict the growth of the UK global market in this sector due to the broad span of the project, but it is estimated that the option would create an additional 20,000 new jobs and an additional 3% to the UK's global market share by 2035. However, compared to the Space tourism project, despite the longer span of investment, 10 years, the annual investment into this option is far less, £1.5 bn per year, and the presence of a highly established market allows for secure investment into this sector with low risk. The only dissuasion for potential investors is the fierce competition as new nations enter this market, and the continuous competing between established space industries such as the US or China, therefore reducing the chance of complete success in this option. Both the Defence Consultant and the Department for International Trade have expressed positive views surrounding this avenue of investment, indicating that it provides the most robust and diversified economic solution, also stating that such investment will benefit many businesses.

The third and final option proposed is one titled 'The Clear Skies Project'. This option primarily concerns the possibilities of service industry in space. Britain already has involvement in the United Nations Committee for the Peaceful Uses of Outer Space (UNCOPUOS), with a major concern of this group being the threat posed by orbital debris around the earth to various types of unmanned satellites and manned spacecraft and space stations. The debris in question is formed primarily of refuse, wreckage or lost components and parts from former space missions. Such equipment can differ in size, from fragmentary pieces to entire decommissioned satellites. Due to their high velocity each piece poses a major threat. Should such a piece collide with an active satellite/craft/station the potential of destruction can be catastrophic, having an extreme economic impact for the owner of the system or even causing the loss of human life. Over the course of the past 20 years the NASA space shuttle has collided with debris several times, and the ISS has been forced to undertake greater evasive manoeuvres in order to avoid such debris. The worst case scenario leads to a chain reaction of more collisions known as 'Kessler syndrome'. The increased accumulation of debris could potentially render Earth's atmosphere as unusable for some decades. Due to the concern of both the UN and UNCOPUOS, the organisation has announced a competition named 'The Clear Skies Project'. Such a project entails the offering of a 15 year contract to the winning companies in order to 'sweep the skies clean' on the behalf of the UN.

Throughout history, the answer to this crisis has been to limit the amount of debris left in orbit, however this only hinders the issue. The above option indicates that the UK should become the first nation to provide services to reduce the threat imposed by space debris. Such a project would be one of the first to

use new innovative solar sail technology onboard a new orbital vehicle named 'Star Clipper'. The craft does not require chemical engines and can also power itself internally via its sails, therefore removing the necessity for fuel. Despite the time needed for the clipper to position itself, the craft would be capable of intercepting dangerous pieces of debris, elevating them into the graveyard zone, 22,400 miles above Earth, or downwards into the atmosphere to burn up. Larger pieces of debris would be directed to the designated 'spacecraft cemetery' located in the Southern Pacific Ocean. The clipper would be used directly to deal with urgent tasks, but also automatically remove other pieces of space debris. Additionally, the clipper can be used to rescue craft that have strayed from their position and are in danger of falling from orbit. The vehicle design has been configured by the UK business conglomerate GMF-X Ltd, who invented and hold the patent for the solar sail concept, Prospero Plc and Vektor Technologies Plc. However risks arise from such a project due to the lack of trialling of the Solar sails, with it requiring two more years of testing over the next two years. However, should the project be successful, the company would be in a clear position to win the competition and hence gain access to considerable international funds, therefore accounting for an extra 2% of the global market by 2035. As well as solar cleansing, this technology offers a cheaper, more light weight and lower risk alternative to travel compared to fuel or nuclear powered cells. This would offer a further 5% increase to the global market by 2035 to the UK space industry. Whilst investment is high, £4bn in the first year and £1bn each subsequent year, the span of investment is fairly short, 6 years, therefore meaning that the risk of investment is reduced. However, the lack of trialling for the technology poses a potential risk to investors and could act as a barrier to investment, yet, if successful, the gained revenue from such a project could pay dividends in return. However, despite the potential military benefits posed by the Space Clipper in reducing the risk of collisions between space junk with military satellites in orbit, the clipper could be perceived as a threat to certain nations, due to its capabilities of removing active satellites from orbit. This should be taken into consideration as the development of such technology could worsen international tensions.

Consequentially, I must ask that you make your decision on the avenue of investment from the above three options. From a personal perspective when assessing each option and comparing them side by side, the proposal of investment into the development of unmanned spaceflight. Despite its lower initial growth compared to the growth in the global market of 'The Space Tourist Hub', which proposes an additional 4% compared by 2030, compared to the 3% by 2035 of the unmanned spacecraft programme, investment into the programme is at a lower risk, with the UK having established an already stable and successful market within the economy of such a product. Additionally, both avenues provide the same increase in employment through their creation of 20,000 new jobs, therefore indicating that combined with the employment increase and the relatively low risk of investment due to an existing market, that investment into unmanned spacecraft seems more suitable. When comparing such a project to the 'Clear the Skies' initiative, the two same factors can be used to determine the path of investment. The initial growth of the UK space industry's shares in the global market from investment into unmanned satellites is greater than that of investment into the 'Clear the Skies' scheme, 2% addition to the global market by 2035, and despite the potential 5% growth of the project in future, the lack of trialling and the uncertainty regarding such potential growth means that the stable investment into an already established market makes this option far more suitable, coupled with the additional 20,000 jobs provided by this project. From the above information I should hope that you make the suitable decision and also take my recommendation into account.