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## Space Industry Bill [Lords]

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**15 January 2018**

Volume 634

 **Column 648**

*Second Reading*

 5.47 pm

### **The Minister of State, Department for Transport (Joseph Johnson)**

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I beg to move, That the Bill be now read a Second time.

Very few people realise just how important the space industry is to our daily lives. Satellites, in particular, provide many critical services that we all take for granted. Navigation satellites provide the precision timing needed to enable global financial transactions. Weather satellites enable farmers and the emergency services to plan how best to protect people, property and produce from extreme weather, and provide unique insights into our changing climate.

Communication and imaging satellites let us monitor disasters and threats to our national interests, and allow us to watch and react to live news events unfolding anywhere on earth.

Satellites, a specialty of the British space industry, play a crucial role in our economy, supporting more than £250 billion of our GDP. In the future, tens of thousands of new, smaller satellites are planned, creating a global launch opportunity worth £10 billion over the next 10 years. This is an opportunity that the UK is well placed to pursue. Our long coastline, aviation heritage, engineering capability, thriving space sector and business-friendly environment all make the UK attractive for new commercial launch services. We already license space activities that are carried out by UK companies from other countries, but we could carry out space activities from our own shores. We have already announced a £50 million programme to kick-start markets for small satellite launch and sub-orbital flight from UK spaceports as part of our industrial strategy, and we have received 26 separate proposals for grant funding.

### **Mr Nigel Evans (Ribble Valley) (Con)**

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I am a small shareholder in ManSat and president of the parliamentary space committee. The Minister said that satellite technology is one of this country's specialities, but is he as concerned as I am by what I read in the newspapers about British companies being frozen out of bidding under the Galileo project owing to Brexit?

## Joseph Johnson

Share

I thank my hon. Friend for his question. That is a subject of some concern and one that I had occasion to raise on numerous occasions with Commissioner Bieńkowska in my previous role as Science Minister. We want to ensure that our space sector continues to be able to compete on a level playing field, and, as long as we are full members of the European Union, we have every expectation that businesses should be able to bid and win contracts under programmes such as Galileo and Copernicus.

Through this Bill, we seek to be a global exemplar of good regulation by balancing the need for flexibility and foresight with an absolute commitment to public safety. As such, the Bill provides a framework for the development of more detailed rules in secondary legislation, supplemented by guidance and supported by a licensing regime. The Bill was developed by my right hon. Friend the Member for South Holland and The Deepings (Mr Hayes) by drawing on expertise from across Government, including the Department for Transport, the Department for Business, Energy and Industrial Strategy, the UK Space Agency, the Civil Aviation Authority and the Health and Safety Executive. I also express my thanks to the wide-ranging scrutiny carried out by noble Lords in the other place, which was done with enthusiasm as all parties acknowledged the importance of the Bill and wanted to make it a success. The Bill that is being considered by this House is now better as a result of their hard work. I hope that that collaborative attitude will govern the passage of the Bill through this House. The collegiate approach to the development of this Bill, which my right hon. Friend spearheaded, will continue as we develop secondary legislation, consulting on key issues and providing confidence to the public and investors that the UK will develop safe, business-friendly regulation in the public interest.

The Space Industry Bill is necessarily broad in scope, but it benefits from the experience and best practice of international launch, as well as our own world-class aviation regulator, resulting in a safe, proportionate and comprehensive enabling framework in one piece of legislation. In turn, the activities defined in this Bill and its subsequent regulatory framework would benefit many in the UK. Entrepreneurs would benefit from new opportunities to build innovative commercial enterprises. Local economies would benefit from the creation of spaceport sites with related jobs. Our small satellite industry would have direct access to domestic launch capacity, reducing dependence on foreign launch services.

## Jim Shannon (Strangford) (DUP)

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 **Column 649**  
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Certain regions in the United Kingdom of Great Britain and Northern Ireland will be able to have specific projects, but Northern Ireland will not. Will there be job opportunities for those with the qualities and the talent, even if they reside outside where the opportunities for businesses to create projects are located?

### Joseph Johnson

Share

Indeed. I was in Belfast just a few weeks ago for one of the UK launch programme's roadshow events, where we gathered together small and medium-sized businesses in Northern Ireland with expertise in space to showcase all the benefits that are to be gained from participating in the programme and taking part in the activities that the Bill will enable.

### Diana Johnson (Kingston upon Hull North) (Lab)

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If I am correct and the Bill will open the way for commercial spaceflights within the next 20 years, does the Minister realise that such flights will arrive many years quicker than Transport for the North's proposals for improvements to transport in the north, including rail electrification to Hull?

### Joseph Johnson

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We want to move forward on many fronts, and the Bill will enable us to capture some of the significant opportunities that are out there for British businesses in the space sector.

### Vicky Ford (Chelmsford) (Con)

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Given the fast growth of the sector and the fact that its businesses create jobs three times faster than the average British company, does the Minister share my concern about the lack of interest in this Bill from the Labour party?

### Joseph Johnson

Share  **Column 650**  
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The Bill has been developed collaboratively with the support and involvement of all parties, and I am grateful for the constructive approach taken by the Labour party. My hon. Friend is absolutely right, however, to say that there are tremendous opportunities for British companies in the space sector. We have a market share of about 6.5% at the moment, but the Government's ambition is to increase that 10% by 2030, and the Bill will play an important role in enabling us to take advantage of the great opportunities.

### Mark Garnier (Wyre Forest) (Con)

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The Minister is being generous with his time. Having worked with him for the past two years on helping to develop this country's space industry, I absolutely share his vision for how fantastic things can be for Great Britain. There are many technical details that can help us to achieve our target of 10% of the global space market, and one of those important details is the liability that

space companies have on launches. We currently have unlimited liability, but were we to find a system whereby there could be limited liability on insuring spacecraft, that could bring a huge amount of space activity to this country.

## Joseph Johnson

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My hon. Friend raises an extremely important point that was the subject of considerable discussion when the Bill was in the other place, and we will return to it in detail in Committee. For the time being, I can say that we recognise that launch from the UK is an important new activity, and, given the risks involved, further work needs to be carried out on the appropriateness of capping either liability to Government or to third parties in prescribed circumstances. State aid issues must also be considered in relation to any such cap that we might want to introduce. However, we plan to announce a call for evidence on all issues relating to insurance and liabilities early this year following the Bill's Royal Assent.

## John Howell (Henley) (Con)

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Does the Minister share my view that companies such as Reaction Engines, which is based in my constituency, hold the future for space vehicles that can be used over and over again?

## Joseph Johnson

Share

Indeed. Reaction Engines is a great example of the kind of British company that is well placed to take advantage of all the opportunities that the Bill will enable. We have been supporting Reaction Engines and its SABRE technology through Innovate UK and the Department for Business, Energy and Industrial Strategy, and, from memory, I believe that it has received around £55 million over recent years. We want it to be a great success, and have every confidence that it will be.

British-based scientists will benefit through increased access to microgravity and investment in institutional capability in launch, spaceflight and related sciences, attracting world-class scientists to the UK. Young people seeking careers in science, technology, engineering and maths will gain new opportunities and greater inspiration from an expanding UK space sector. The UK as a whole will benefit from access to a strategic small-satellite launch capability, contributing to our understanding of the world, the provision of public and commercial services, the delivery of national security and new opportunities for investment and export.

## Robert Courts (Witney) (Con)

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The Minister has just referred to the skills that will be supported by the Bill. Does he agree that it presents a real opportunity to inspire the next generation, so that those growing up across Oxfordshire can look to ensure that this country really excels in an area in which it already takes a lead?

 **Column 651**

## Joseph Johnson

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Absolutely. There is nothing like space to generate STEM inspiration, which we saw when Tim Peake became one of the first British astronauts—if not the first British astronaut—to visit the International Space Station last year. We have seen on many occasions the power that space has to capture the imaginations of young people, and we have every confidence that the development of a domestic launch capability will have comparable effects over time.

The UK as a whole will benefit from access to a strategic launch capability. Today, we stand at the dawn of a new commercial space age. We can once more reach for the stars, but not at vast public expense or in a way that is dependent on the good will of others elsewhere in the world. We can do so in the best spirit of British innovation and by enabling commercial markets for small-satellite launch and sub-orbital flight from UK spaceports. The sky will no longer be the limit for our talented scientists, engineers and entrepreneur, and with modern, safe and supportive legislation, we will attract the capability, infrastructure and investment we need to make that a reality. I commend the Bill to the House.

🕒 6.00 pm

## Andy McDonald (Middlesbrough) (Lab)

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It must be a blessed relief for Government Front Benchers to move their attention away from their trials and tribulations here on planet Earth and to lift their eyes up to the heavens. Much of the country is doing likewise, aghast in sheer disbelief at the Government's continued appalling judgment on our country's transport system.

It is perhaps no surprise that the Secretary of State for Transport is not present for the Second Reading of this important Bill—perhaps he is explaining to the Prime Minister how he came to the view in July 2017 that Carillion was a safe bet and fit to be awarded the High Speed 2 contract, despite dire profit warnings. He is making a habit of not being at the Dispatch Box when his decisions make the news for all the wrong reasons.

Just as the Secretary of State has today delegated responsibility for the Space Industry Bill to the newly appointed Minister of State, the Government have produced a Bill that delegates more powers than it has clauses. That said, I also pay tribute to the right hon. Member for South Holland and The Deepings (Mr Hayes) for his open attitude to producing the best possible legislation, which is consistent with his attitude throughout. I commend him for that, and I trust that the same arrangement will continue with his successor so that we can produce the best possible Bill.

The UK's space industry is an important and burgeoning part of our economy. It was valued at £13.7 billion in 2014-15, supporting almost 40,000 jobs. This Bill will establish a licensing regime for spaceports, spaceflights and satellite launches that is currently missing from the statute book

and will put in place the regulatory framework to allow further expansion of the industry.

The UK Space Agency's assessment, published in 2016, showed that the UK had a 6.5% share of the global space industry, and we hope the Bill will help to increase that share as the space industry grows globally in the coming years. Accordingly, Labour will be supporting the Bill as it continues its passage into law, although not without reservation about certain aspects, which I will spell out.

I put on record my party's thanks to our Front-Bench colleagues in the other place for their valuable work on this Bill. They secured a number of important concessions from the Government, particularly the removal of the Henry VIII powers, which has much improved the Bill and for which we are grateful. However, we will still press Ministers on delegated powers and on the Bill's impact on the environment, health and safety regulation and land powers.

During the Bill's passage through the other place, the Government gave assurances that they would table amendments in this House on a duty to carry out full environmental impact assessments as part of the licensing process. We look forward to Ministers following up on that assurance in the Bill's later stages.

Similarly, the Government gave an assurance in the other place that a specific regulator, either the Civil Aviation Authority or the UK Space Agency, will be a single point of accountability for health and safety on each individual mission. However, we will seek further details from Ministers on the relationship between the Health and Safety Executive and the CAA or the UK Space Agency, and on how best practices will be shared.

In relation to joined-up thinking on health and safety matters, will the Minister illuminate us on whether the Government have put any thought into how this Bill and the recently introduced Laser Misuse (Vehicles) Bill will cover legislative issues relating to the pointing of lasers at suborbital spacecraft and horizontal-launching spacecraft?

Moreover, can the Minister shed light on the Government's thinking on clause 33(5), which addresses

“provision for an operator licence to specify a limit on the amount of the licensee's liability”

in the unlikely event of “injury or damage” being caused by licensed spaceflight activities? My recollection is that a figure of £20 million was suggested in my previous discussions with Ministers. Will the Minister confirm whether that is the case? If it is, I suggest the Government reconsider the limit.

We recognise this is a highly technical and highly skilled environment and that the chances of something happening will hopefully be extremely remote, but, if it were to happen, the consequences could be dire. In those circumstances, £20 million may not be anywhere near sufficient. Two catastrophic injury cases could take a large share of that sum. In the case of brain

injury or other catastrophic injury, the costs incurred by long-term support, accommodation or care would be considerable. I ask the Minister to think about how we might work around that difficulty.

The Government conceded in the other place that the wording of the Bill needs to be tightened to clarify that any restrictions over land would be temporary and would need to be established individually for each specific mission. Further clarity is also required on the ability of those affected by such restrictions to appeal against the decisions. We want Ministers now to outline how the Government expect the powers to be used and to ensure that the Bill provides an adequate legislative framework should the UK's space industry undergo significant growth in the future, as we all want to see.

Finally, returning to the point I outlined at the start, the Bill appears to have been introduced well before the Government have done sufficient work to allow Parliament to scrutinise the legislation—the Bill contains 100 delegated powers in 71 clauses. Despite the Government's concession to remove the potential Henry VIII power from clause 66, clause 67 still has a catch-all regulation-making power that allows the Government to make general provision for regulating space activities and "associated activities". We look to the Government to better define those associated activities.

Furthermore, the Government appear determined that significant statutory instruments arising from the Bill's delegated powers will be affirmative when they are first made, with negative procedures following afterwards. As the Bill progresses, we will seek to persuade the Government that such statutory instruments should be consistently affirmative each and every time they are made.

We will be supporting the Bill on Second Reading, but unfortunately the Government have introduced a Bill that is inadequately detailed and imprecisely worded. We will seek to change that as the Bill progresses, but sadly the Government have been too busy making a mess of our public transport by hiring failing companies to build national infrastructure projects and by bailing out private companies when they fail to run our rail network.


It is time that this Government made decisions in the interest of the UK economy and hard-pressed taxpayers, instead of dishing out corporate welfare. It is time they started focusing on the day job.

🕒 6.08 pm


### **Mr John Hayes (South Holland and The Deepings) (Con)**

Share

It is an honour and a pleasure to speak from the Back Benches for the first time not quite in a lifetime but in very many years. It is a particular pleasure to speak in a debate on a Bill that I helped to shape, as the Minister generously acknowledged. I am grateful both for his words and for the words of the shadow Secretary of State. It has been a pleasure to work on this subject, and indeed on transport more widely, with colleagues on both sides of the House.

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Reflecting during this sojourn on the Back Benches, I thought that parliamentary and political life constantly gives the impression, perhaps the illusion, of permanence, but in practice it offers the reality of impermanence; all things we do here are ephemeral. Knowing that guides and shapes how we behave; nothing lasts long. However, it is vital that Governments do things that are long lasting, far sighted and strategic, and not simply piecemeal or reactive. Of course Governments must deal with the day-to-day events, the week-to-week affairs of the nation, but they must also set their sights on a more distant horizon, what Kennedy called a “new frontier” and what popular culture called “the final frontier”—of course no frontiers are entirely final for me, as you know, Madam Deputy Speaker, but none the less it is important that Governments do just that.

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Governments in democratic polities struggle to do that, partly because of those daily and weekly imperatives; partly because no one wants to take responsibility for big decisions that might go wrong and so it is easier to deal with small things that can be corrected quickly; and partly because the five-year electoral cycle means that they get no credit for planning and thinking through things that might bear fruit 10 years or more later. Governments in democratic polities have a history of not doing those long-term things, so I am pleased to see that this Bill is an exception to that general thesis.

The Bill sets out a way forward for the space industry that is far sighted and strategic. It is vital that we should do so, but there is another challenge for Government in this respect: creating a legislative framework that is sufficient to allow and, indeed, encourage further investment, but not going so far as to attempt to predict an unpredictable future. This is a highly dynamic sector and the technology we are debating this evening will be unrecognisable by the time this Bill bears fruit those five or 10 years down the line, as it grows, alters and metamorphoses. Someone mentioned Reaction Engines earlier, and I was pleased and proud to go there as a Minister to see precisely what it is doing, and to witness and begin to understand—I say no more than that—the technological changes it envisages in propulsion. It is developing a whole new method of propulsion, which will change assumptions about the speed with which we travel and therefore open up all kinds of new chances to do so.

The speed and pace of technological change requires Governments to know when to be modest, as well as when to be bold. This Bill attempts to square that circle; to walk that tightrope, and it does so reasonably well. I acknowledge what the shadow Secretary of State said: when we do that, we risk—perhaps that is too strong and I should say open the possibility of—a great deal of secondary legislation. This Bill is, in essence, a framework, which will require further measures to bring it to life as we are clearer about what is required. That secondary legislation deserves proper scrutiny and should come to this House for consideration in exactly the same agreeable, convivial, co-operative and collaborative spirit that has engendered during the course of our considerations of these matters thus far. None the less, we need to have proper scrutiny, of a



non-partisan kind, as we enjoyed in another area we have been debating recently—electric and autonomous vehicles. My legacy is so wide and deep that I hesitate to go further, because we could speak about so many things. I am a man of the future with an eye to the past.

### **Sir Oliver Letwin (West Dorset) (Con)**

Share

*rose—*

### **Mr Hayes**

Share

Now I see the past coming back to haunt me.

### **Sir Oliver Letwin**

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I wish to echo my right hon. Friend's tribute to himself, as he was indeed a visionary on electric vehicles and there will in due course be a Hayes electric vehicle launched in this country.

 **Column 655**

### **Mr Hayes**

Share

My right hon. Friend and I enjoyed many happy moments—it seemed much longer than that—on the Automated and Electric Vehicles Bill Committee recently. His contribution to that Committee, may I say with absolute seriousness, was very important. It helped to shape and hone the legislation in a way that, had he not been there would not have happened. I could say the same about colleagues on the other side of the Chamber, too. Proper scrutiny in this House does improve legislation and we should never assume that we are merely going through the motions—that is not what this House is about. At its best, it is the very apex of good democratic polities.

### **Mr Nigel Evans**

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Will my right hon. Friend give way?

### **Mr Hayes**

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This is going to be a relatively short speech, but I am happy to give way to my hon. Friend.

### **Mr Evans**

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I am more past than future, that is for certain, but I am as excited as my right hon. Friend about the potential for space development, particularly in a multi-billion industry in the UK, which is growing at an incredible 8% a year. As we have the desire to put more satellites into space, so that we can do all these wonderful things he has spoken about, is he happy and content that the Bill gives sufficient regard to debris mitigation to ensure that we are not just putting more junk for the future into space?

### **Mr Hayes**

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To avoid delaying the House unduly, I refer my hon. Friend to *Room, The Space Journal*, which contains an article that I was reading just this weekend on exactly that point. It is headed “Space debris break point” and sets out precisely the kind of risks and problems he highlights. It is unsurprising he does so, given his interest in this subject and the expertise he has gained in it over many years. I am sure that reading that will allow him to take the matter further, perhaps by tabling some difficult written questions for the new Minister, of the kind that my officials used to bring to me, not just often, but daily. I merely echo what he and others have said: that the UK space industry is indeed a leading world player. The income for the industry in 2014-15 was reported at £13.7 billion, which is equivalent to 6.5% of the global space economy. As has been said, it is a rapidly growing industry. It is growing much faster than the economy as a whole. This is something we do well and can do still better, but only if Government play their part.

So what is that part? It is definitely about creating the legal framework necessary to build certainty. Investors will not spend money in the UK space industry, or will not continue to do so, unless they know that the legal framework to provide appropriate protections is in place. Secondly, it is about facilitating and encouraging the co-operation that is at the heart of the industry. I refer to the co-operation between the world of academia, industry and Government. That is what Reaction Engines, for example, embodies; it is an example of such co-operation, and others are too. Thirdly, it is about trying to anticipate those future changes, although not to stipulate them and certainly not to constrain any of the organisations involved in the sector, because, as I have said, there will be secondary legislation. This is just the beginning of a journey—a journey into space, one might say—which is certainly not definitive. It could not be so, because of the nature and the character of the technology with which we are dealing.

There are, though, some challenges with the Bill. I acknowledged them as Minister and know that the current Minister will do so too. There are certainly challenges in respect of liability. I would be surprised if, in our scrutiny of the Bill, we did not face up to that and ensure that the sector feels no doubt about the effect on the wider public of any changes that follow the advent of launch facilities in the UK.

This is not a lesson to the current Minister, because he is already experienced, but it is a lesson to newer Ministers. It is true that some—they may even be civil servants—will say, “But what about state aid, Minister?” There are those who will say, “But what about the Treasury, Minister?” These are always the stock lines. The first is, “The Secretary of State doesn’t agree with you,” to which one says, “I’ve cleared it with the Secretary of State.” They then say, “Downing Street’s not happy,” and one says, “I have been to Downing Street.” They then say, “The Treasury will never wear it,” and finally state aid gets pulled out—“It won’t pass the test of state aid.” I take the simple view that the purpose of a Government is to aid those whom they serve. We should support British industry and the British people. I have never been entirely convinced by the arguments about state aid; what is the purpose of a state if it does not aid the circumstances of the people it serves?

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I urge caution—I put it no more strongly than that—that in our consideration of liability we do not allow ourselves to do less than we should. We must leave no third party worse off as a result of anything that occurs in this industry and which follows the Bill. We must leave no one feeling vulnerable and no business feeling that anything that results from the Bill might lead to a vulnerability that might prevent further development of or investment in a technology. The liability issue must be settled.

The second challenge is that of skills. It is known that I take a profound interest in the development of skills and we have made great progress in recalibrating our estimation of the importance of technical, vocational and practical skills. I have long believed that it is those skills, aptitudes, tastes and talents that will allow us to make the best of the opportunities that will grow as we increasingly develop as a high-tech, high-skilled nation. Our future lies in that direction, but we must have the people to make that future a reality.

### **Stephen Kerr (Stirling) (Con)**

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I add my praise of my right hon. Friend to that already expressed. I served on the Automated and Electric Vehicles Bill Committee—one of my first—for which he was the Minister. It was an illuminating and inspiring experience to be on the same Bill Committee as him and my right hon. Friend the Member for West Dorset (Sir Oliver Letwin). Space has an inspirational value—there is something inspiring about it that really will turn on the younger generation to the study of the technical subjects that my right hon. Friend is describing.

### **Mr Hayes**

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Yes, it is true—I think the shadow Minister made this point, and perhaps the Minister did, too—that there is a particular allure to this kind of technology. It is exciting. We are reminded of that first space race when, as I said, Kennedy spoke of the new frontier. There is something wonderful and marvellous about looking to the heavens as men and women have looked to the heavens since men and women began, when God made Adam and Eve. It is certainly true that young people will be attracted to the industry, but if we are to take advantage of this opportunity, we need them in significant numbers indeed. It is still true that we underestimate the value of technical and vocational competencies.

Let me cite some figures. According to the OECD, fewer than 10% of the UK adult population aged between 20 and 45 have professional education and training qualifications, compared with more than 15% in the United States and Australia and almost 20% in Germany. It is the mid-range technical qualifications, which lead to higher technical learning, that require greater attention and further progress. As I say, we have made strides, but we can do still more. To satisfy the needs of companies such as Reaction Engines and many others, we will need to do more, and that requires the collaboration that I described. That is the second challenge.

The final challenge is to continue the spirit in which this debate began. We must understand that across the House and throughout the nation there is a willingness to make this work; to make it happen. If we can maintain that kind of enthusiasm—if we can make this glitter and sparkle—we will retain, maintain and grow that spirit. This is a British success story, but we must not rest on our laurels. The Bill is indeed far-sighted, and if it passes Second Reading, receives the scrutiny that it deserves and becomes an Act, it will send a signal to the space industry that not only the Government but more still this House understands the industry's potential and what can be achieved.

In the end, it will be about changing lives by changing life chances. It is easy for us to define all such matters in technological terms, but really these are distinctly, profoundly human matters. How can space and space travel make lives richer? All that we do with the Bill in this House must be founded on the principle that our duty, indeed our mission, is to promote the common good and the national interest. This Bill does just that.

🕒 6.26 pm

### **Dr Philippa Whitford (Central Ayrshire) (SNP)**

Share

It is an honour to follow the right hon. Member for South Holland and The Deepings (Mr Hayes). I, too, enjoyed a little glass of sherry in his office before Christmas, as we had assumed that he would be taking this Bill through the House. When the Hayes manual for the autonomous and electric vehicle becomes available, I am sure that he will have further cause to celebrate.

It is today two years exactly since Tim Peake did his spacewalk. Those who were Members then and active on space issues will remember that the day before that walk we had a Back-Bench debate in the Chamber to celebrate the UK space industry. I had the honour of opening that debate with a statement that I had been sent by William Shatner. I hope that in this debate we will have slightly fewer cheesy puns, but I tie no one down and make no promises. That debate highlighted the growth potential of the industry, which has increased massively in the past 10 to 15 years.

There is growing recognition that space is no longer, as I mentioned in that debate, something that the Americans and Russians do and nothing to do with anybody else. As the Minister said, nor is it about big, expensive expeditions to the moon or to Mars, much as they may go ahead. It is about the commercial potential of things such as space tourism, microgravity research and, eventually, hyperbolic flight over distance. The Reaction Engines air-breathing rocket engine has been mentioned. That company's aspiration is the Skylon space plane that could see us flying to Japan or Australia in literally a few hours, simply by using that technique of going up to touch the edge of space and coming back down.

One of the main industries in which the UK already leads is satellites. We have two types of satellite. Geostationary satellites sit 36,000 km up from the equator, which means that it takes them exactly 24 hours to go around, so they stay above the same part of the Earth. These are the


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big guys, used for GPS, telecoms and television. We also have polar satellites, which orbit perpendicular to that orbit. They are much lower down—basically, 100 km to 200 km up—they are often smaller, and the Earth turns underneath them. They are looking at the Earth, so they give us information about weather and can monitor things such as trafficking. They can monitor fishing in marine protected areas by observing the transponders in fishing fleets. They are used for all sorts of things, including flooding, natural disasters, town planning and so on. That is where there is a huge growth going forward.

The UK has expertise in satellite production. Galileo, which has been mentioned, will eventually be a civil replacement for the military GPS, which is American. The first UK manufacturer of smaller satellites was Surrey Satellite Technology, which reduced a satellite from the size of a double-decker bus to that of a fridge. The satellite was eventually reduced to the size of a microwave, and now we are talking about something the size of a carton of milk. We have CubeSats and even micro-satellites, such as Unicorn. Glasgow, near where I live, has produced more satellites than any other city in Europe. We have Spire, Clyde Space and Alba Orbital. We are also lucky enough to have two universities in Glasgow and Strathclyde with major space research units, which obviously feed that development.

In these innovative industries, it is this combination of people who are adventurous and willing to try things and academics with their enabling abilities that brings about an ability to launch. At the moment, all launching is from overseas, most of it from Kazakhstan. Once a satellite has been made, it has to wait until there is a space—excuse the pun, I did not mean that one—where there is room for it to get into space. The problem is that that is keeping the cost high. I was told that if we get the launch of a satellite to below £50,000, the industry will literally burgeon. That is what we are looking to do with the smaller satellites. They are lower orbit, and they will eventually decay—they do not last forever. That is where the comment about space debris comes in. The smaller the satellite, the more that it will burn itself up when the time comes and its orbit starts to decay.

We have seen 71% growth in the industry since the UK Space Agency was set up in 2010. The turnover now is £14 billion and, as has been said, the aspiration is for it to be £40 billion by 2030, so essentially we want it to be three times bigger. Scotland punches above its weight. We have 18% of the UK space industry, but we need a launch site in the UK. When we debated this matter two years ago, we thought that moving to a launch site was imminent, but here we are, two years later, and, actually, we still do not have one. Unfortunately, that has created a bit of planning blight. There was a time back then when it was a competition. Part of what we did in that debate was to make the case that it should not be; that there should be a licensing system, because then it would not nail it down to only one site.

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**Liz Saville Roberts (Dwyfor Meirionnydd) (PC)**

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I am honoured to represent a constituency where one of the shortlisted potential spaceport sites is located in Llanbedr. I am sure that the hon. Lady agrees that the space industry offers the potential to bring science, technology, engineering and maths jobs and STEM salaries to all UK nations and that the Westminster Government should play their part in enabling that through licensing and facilitating future projects.

### **Dr Whitford**

Share

I agree with everything the hon. Lady says. As I said, we will have tourism, hyperbolic flights and satellites. Different spaceports might develop different specialisms, so we should not be trying to shut down this industry. Although there will be a first—I am incredibly delighted that the site in my constituency in Prestwick has moved from being a rank outsider to one of the leading contenders—we should not have any sense of “there can be only one”. Prestwick was the first passenger airport in Scotland. We could not imagine Scotland now with only one airport. We do not know where this industry will be in 2030—perhaps hyperbolic flights for long distance will be the norm. Therefore, we do not want to shut down any site.

Of course, as the only place that Elvis put his feet down, Prestwick is already famous. From the point of view of being the first—I mean the first—UK spaceport, it is known for already having a long runway. It is particularly known for its clear weather, which is why it is the back-up airport for the whole UK. It has better visibility and less low cloud even than Newquay, which is hundreds of miles further south.

### **Mrs Sheryll Murray (South East Cornwall) (Con)**

Share

Will the hon. Lady confirm that Prestwick has clear airspace and that there is not another commercial airport within the vicinity that shares that airspace, because that is quite important.

### **Dr Whitford**

Share

We actually have quite a lot of airspace in that we take off right across the Atlantic. National Air Traffic Services has its air traffic control centre based in our airport. It has already been consulted and has explained that there is no significant issue from the point of view of airspace and launching. Our airport has very good transport, with road and rail links. Having both the air traffic centre and an aerospace cluster onsite strengthens it. Although we talk a lot about the spaceport, what we do not yet have is the routine development of the launch vehicles, and they will evolve hugely in the next decade. Therefore, the more we have the ability to bring expertise together to do that, the stronger and the quicker we will achieve it.

Obviously, the aim of the Bill is to do with licensing, which I welcome because it allows any site to aim to become a spaceport, but it is also to create, as was mentioned, a regulatory framework for sub-orbital and outer space, or orbital spaceflight activities. It amends the Outer Space Act

 **Column 660**  
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1986 to make it simply apply outside the UK and be replaced by this Bill within the UK. The regulator is likely to be the Civil Aviation Authority for horizontal take-off and sub-orbital, and the UK Space Agency for vertical take-off and orbital or outer space missions.


Looking at the Bill itself, some issues have already been highlighted, but the biggest one is that of liability, which is causing real concern among the industry. It is the Government who compensate someone who is affected—either their property or their person—by a UK launch or satellite and the company must indemnify the Government. The cap is something that protects that company. What the company has to do is find insurance. At the moment, the cap is set at €60 million per satellite launch under the Outer Space Act. It is important that a figure is arrived at, but we are talking about launches that will have quite a broad range of risk depending on the scale of the satellite.

There is discussion in the Bill and the explanatory notes about using red, amber and green to describe the types of missions, so there might well be slightly different caps. It will also be important that we no longer say “per satellite” because the micro-satellites, such as Unicorn or CubeSats, go up in clusters. If the figure were €60 million for every one of them, that would be prohibitive, but to get insurance for unlimited liability is not really possible, which is why, in the Deregulation Act 2015, this limit was introduced. Other states such as America, Australia and France have a cap on liability. I understand from the Minister that that matter will be discussed, but a cap will need to be set or people will still to choose launch from elsewhere.

It is also really important that we look at the regulations themselves. It is very disappointing that we have no draft regulations to scrutinise; we have instead this absolute burgeoning of delegated powers. I understand the need for flexibility, but the original target was launching in 2020, and there was mention in the Lords that the regulations might not be ready until two years after Royal Assent—the middle of 2020. How do we expect a spaceport to design itself to meet regulations that are not available? How do we expect people to invest in that? How do we expect people in the industry to raise money on the basis of regulations that, suddenly when they come out, might completely rule out a company, a project or even a spaceport site? It is really important that the decision on regulations gets a bit of rocket fuel under its bahookie and starts moving forward.

In general terms, there is the slippage of the timeline. We had a long time of planning blight when it was described as a competition, with all five—it was eight at the time—sites sitting waiting to see who would win, and so nothing happened for a year and a half. Now another year and a half has passed, with things moving forward slowly. We need a little bit of speed.

At the moment, the Government are supporting spaceport sites and launch companies with grants. It is crucial that domestic launch companies should be considered within that—and that includes Reaction Engines—to ensure that they get the funding to take forward the air-breathing rocket engine.

 **Column 661**  
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In my area, there is also the issue of orbital access. If our spaceports are just to be three-kilometre slabs of tarmac used by someone from the States once or twice a year, they will not stimulate the industry as we want them to. We need a domestic capability that can launch the satellites when the satellite companies want them to be launched. It is imperative that, in providing the seed money, we are not just sitting back and waiting for Virgin or XCOR to come in; we must invest in our domestic launch companies. We also want the manufacturing—the supply chain all the way through. We do not want just to be providing a piece of land to be used on one day.

As other Members have mentioned, we want the Bill to stimulate the whole industry and to be the key of innovation as well as the stimulus and inspiration for the next generation to take on the STEM subjects and see their future in a burgeoning space industry.

🕒 6.41 pm

### **Steve Double (St Austell and Newquay) (Con)**


Share

It is a pleasure to speak about this important Bill and to follow the hon. Member for Central Ayrshire (Dr Whitford), who shares my keen interest in this matter.

I greatly welcome the Bill, which will set out the framework for the growth and development of this exciting sector. If we are to maintain and improve our national position as a global economic power, it is vital that we should participate fully in the expected growth of the space industry. It is absolutely right that the Government should be ambitious and that they are putting in place the necessary measures to ensure that our country benefits from the rise in demand for commercial satellites and the emerging sub-orbital spaceflights.

As we have heard, there is the potential for people to fly from this country to Australia in about four hours. I add something for the consideration of the Under-Secretary of State for Transport, my hon. Friend the Member for Hereford and South Herefordshire (Jesse Norman): that is quicker than it takes me to get from London to my constituency in Cornwall by train. Will my hon. Friend look favourably on the Peninsula Rail Task Force report on reducing train travel times to the west country so that I can get home as quickly as I hope to be able to get to Australia one day?

If the Government had not taken the opportunity to draw up the Bill and put the regulation and licensing framework in place, it would have been a dereliction of duty: the missing of a golden opportunity for the future of our nation. That is why I greatly welcome the Bill and am delighted to support it. We have to be ready to move quickly. We live in a fast-changing world in which we are surrounded by new and emerging technologies. We have already heard about the potential of autonomous vehicles, and I put the space sector alongside that technology—we are going to see rapid change and growth in the space sector, and we as a country need to be ready and to have the regulations in place. We need to support our businesses and industry so that we can make the most of the coming opportunities.

 **Column 662**  
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My one concern about the Bill, also mentioned by other Members, is about limited liability for operators. I have met a number of potential operators and all have raised the desperate need for clarity about the limit of liability. They cannot currently get insurance and that could be a brake on investment in this emerging industry. Will the Minister consider that quickly as the Bill progresses so that we can provide certainty to the industry and so that it can know the limits and get insurance cover? That would give it the confidence to develop further.

As many Members will be aware, I have a particular interest in this matter. Cornwall Airport Newquay is in the constituency that I have the honour of representing, and it is one of the potential sites for the UK's first spaceport. I was not going to go into detail about why I think Newquay should be the first spaceport, but as the hon. Member for Central Ayrshire promoted Prestwick, I feel duty bound to do the same for Newquay.

### **Mrs Sheryll Murray**

Share

Will my hon. Friend clarify what I think was misunderstood by the hon. Member for Central Ayrshire (Dr Whitford)? Unlike Prestwick, which is near Glasgow airport, Newquay is not competing with another airport for airspace. Is that my hon. Friend's understanding as well?

### **Steve Double**

Share

Absolutely. Newquay has several things in its favour. It has a very large runway and easy access to uncongested airspace over the Atlantic. There are literally hundreds of acres of development land in an enterprise zone ready for developing the necessary business and manufacturing that would support a spaceport. Uniquely, I believe, we also have the space enterprise zone through our partnership with Goonhilly satellite station. That makes us in Newquay very well placed to be the first UK spaceport.

Although Newquay should be the first spaceport, it should not be the only one. As the hon. Member for Central Ayrshire said so well, there will be a need for further spaceports as the industry grows in our country. I believe that we will want to be launching satellites, putting people into space and operating sub-orbital flights from across the country, not just one location, much as I would love Newquay to be that location.

### **Mr Nigel Evans**

Share

My hon. Friend will be pleased to learn that I am not about to make a bid for the Ribble Valley. Particularly if we get more than one spaceport, that will be a great boost to industries and SMEs that are interested in space. Some may be involved in contracts with the European Space Agency, to which we gave £1.4 billion in additional funding from 2016 for five years. Does my hon. Friend agree that, irrespective of what we do domestically and of our leaving the European Union, we should continue our investment in that agency? That is not a European Union issue.

**Steve Double**Share  **Column 663**  
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I am grateful to my hon. Friend, who makes his point well. Another concern of the UK sector is our continued involvement in the European Space Agency post-Brexit. I join him in urging the Government to continue to play an active part and to participate in that agency, as that will be essential for the industry in this country.

**Vicky Ford**

Share

Does my hon. Friend agree that it is absolutely vital that we continue to take part not just in the European Space Agency but in its downstream operations? I am thinking about data sharing and the ability to bid on downstream contracts.

**Steve Double**

Share

I agree. We need to continue to participate in the industry on a global scale; probably more than any other, it cannot be restricted to just one country. It is essential for us to continue to participate in the global sector, whether in the EU or in other parts of the world.

If the spaceport came to Cornwall, it would give a huge economic benefit to one of the most deprived and lowest paid parts of the country. Cornwall is well known for its tourism and food and drink sectors, which are absolutely vital for our local economy. Who knows? One day, Cornwall could also be sending tourists into space. Generally, however, those sectors are regarded as low paid and providing limited career opportunities for people. We are trying to change that perception, but that is often how they are regarded.

Cornwall has an illustrious history when it comes to engineering and innovation. Let us remember that the steam engine, which brought about the industrial revolution, was invented there. The first ever transatlantic telegram—the forerunner of the modern communication revolution—was sent from Cornish soil. Now, Cornwall is ready to play its part at the heart of the space industry of the future. Newquay's bid is backed right across Cornwall by the business sector, the chamber of commerce, the local enterprise partnership and Cornwall Council. We are ambitious and we want to play our part to the full.

The LEP has estimated that bringing the spaceport to Cornwall would create some 1,000 new, well-paid jobs, which could be vital to our future economy. In addition, I believe that it would do something that is beyond economic measure, namely to inspire Cornish young people and provide them with the opportunities that they desperately need. For far too long, our Cornish young people have faced the choice of staying in Cornwall and lowering their aspirations, or leaving to fulfil their potential and pursue a career. Bringing such jobs to Cornwall would give our brightest and best the opportunity to have a well-paid job and a good career in an exciting sector in Cornwall, rather than having to leave.

**Dr Whitford**

Share

Regardless of where the spaceport is, I would hope that the future space industry in the UK will be diffuse, just as we have Surrey satellites and Glasgow satellites. The idea is not for the whole industry to be where the spaceport is. I hope that that aspiration will remain, whether Cornwall is No. 1, is No. 2 or takes a bit longer to get a spaceport.

## Steve Double

The hon. Lady makes a good point, and I agree with her. We cannot put a value on the inspiration that would be provided for our young people by having a spaceport, which they could see and interact with, on Cornish soil. As has been mentioned, we saw the inspiration that Tim Peake brought to schools across the country. We recently had the Bloodhound at Newquay airport, and 4,000 Cornish schoolchildren had the inspirational opportunity of going on a day out to see the rocket car going down the runway. That gave them an incredible sense of what was possible, and it inspired them to engage with science and engineering and pursue STEM subjects. Putting the spaceport in Cornwall would have a similar, ongoing effect on Cornish schoolchildren. We have lacked such ways of inspiring our young people for far too long.

I will bring my thoughts to a conclusion. I am happy to support the Bill, whether or not there is a vote this evening. I am delighted that the Government have introduced it at this point, and I believe we need to get on with it. I am absolutely delighted that the Government are backing the industry by giving it the confidence and framework that it needs to move forward, and that they are ambitious for our country to be a world leader in this sector. Cornwall is ambitious about playing its part to the full.

## Several hon. Members rose—

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## Madam Deputy Speaker (Mrs Eleanor Laing)

Share

I call Carol Monaghan.


🕒 6.52 pm

## Carol Monaghan (Glasgow North West) (SNP)

Share

Thank you, Madam Deputy Speaker, for making such a good choice. I welcome the new Under-Secretary of State for Transport, the hon. Member for Hereford and South Herefordshire (Jesse Norman), to his place. He has moved seamlessly from his previous role as a Minister with responsibility for science. When he held that role, we had many interactions about space and space legislation.

The SNP welcomes the Bill and supports its aim of ensuring that the UK and Scotland can take advantage of new markets, overcome our dependence on foreign launch sites and benefit from the development of new spaceports and supply chains. The space industry has the potential to be

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worth billions of pounds to the UK economy, but proper investment must be made and work undertaken by all sides to ensure that it is a success.

As a number of Members have mentioned, space is an inspiration. I suppose the first big space development that people are aware of—if we disregard Sputnik, which is possibly not fair—is the Apollo missions to the moon. They were slightly before my time, but I understand their impact. The 1980s were the era of the space shuttle, and I remember as a child the great excitement around a space shuttle launch. An event in 1983 probably shaped my future career as a physics teacher. The space shuttle took part in a European tour, piggybacked on a jumbo jet, and—I do not know how many Members remember this—it flew over Glasgow. On that day in 1983, we heard the jumbo jet from our primary school classroom and ran outside to the playground, where we saw the most spectacular sight. It was quite incredible to see the size of the jumbo jet with this tiny thing stuck on the back, and even more incredible to think that that tiny thing was able to go into space.

The next big development, which happened when I was a young teacher, was the Cassini-Huygens mission to Saturn. It was launched just over 20 years ago, in 1997, to investigate Saturn and its moons. The mission was supposed to be quite short, but it was extended several times because of the discoveries that were made and the volume of data. One of the big discoveries concerned the moon Enceladus. Until that point, Enceladus had been seen as a tiny, icy and fairly nondescript rock in space, but the mission discovered that jets of water vapour were firing from the surface of the moon into space. Liquid water is incredibly important, as we all know; liquid water is the foundation of life. Suddenly, this icy and seemingly irrelevant moon became very important in our consideration of the potential for life in other places.

Finally, I want to mention Tim Peake. I was already a Member of this place when Tim Peake was launched into space, and his mission has inspired a new generation of young people to consider STEM careers and careers in the space industry. Over the years of the space race, we have moved from looking out the way and trying to see what is out there to looking in the way and providing data for us here on Earth. Increasingly, satellites—several Members have mentioned them—provide just such information, and they have become fundamental to our way of life. From maps and navigation systems to up-to-date weather forecasting, those satellites offer us information that we could not previously get.

Despite some embarrassing comments—I am sorry to bring the tone down slightly—last summer from a member of the Scottish Conservative party who described the industry as “science fiction”, the space industry in Scotland is flourishing. The first company was Clyde Space, which was founded in 2005 by Craig Clark. It was named after the River Clyde, on the banks of which it sits. Craig Clark had the ambition that it took to set up Clyde Space. He knew that there was the talent required in Glasgow, and that the universities—Strathclyde, Glasgow and the West of Scotland—had space-facing courses. They have been adapted to work with the satellite industries in Glasgow, and that has been a huge success.

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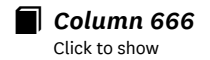
Clyde Space has a vision. At one point, 25% of all ships were built in Glasgow, and the company has a similar vision for spacecraft—a vision that we in Glasgow are well placed to fulfil. When Clyde Space came to Glasgow, it had a multiplier effect. Alba Orbital, only a mile and a half away from Clyde Space, makes pocketcube satellites, which are tiny satellites that weigh about half a kilogram. Unicorn-1, the first pocketcube satellite, was developed in partnership with the European Space Agency and is due for launch this year.

Another company, Spire Global, is coincidentally located in the same building in the centre of Glasgow as Clyde Space. Spire's headquarters are actually in San Francisco, but it was looking to expand and chose Glasgow for some very good reasons. The chief executive talked about the high quality research taking place in Glasgow, and the skilled technicians. Spire develops its own satellites and, unlike the other satellite manufacturers, launches them and sells on the data, including data about weather and tracking ships at sea. It does something different. These three companies together have ensured that Glasgow is now a European hub for CubeSats, and is now building more than any other place in Europe.

All hon. Members will, of course, champion their own constituencies as the potential location of the spaceport. But, just like the ambition of Clyde Space and Craig Clark, we should look further; we should look into having a number of spaceports. Scotland is absolutely spoilt for choice. Machrihanish in the Kintyre peninsula, and Stornoway airport in Na h-Eileanan Iar have potential. The A'Mhoine peninsula in Sutherland is another entrant to the spaceport race. More recently, it has been suggested that Unst in Shetland offers the opportunity of launching north straight into orbit, without passing over any centres of population. And, of course, as my hon. Friend the Member for Central Ayrshire (Dr Whitford) has already mentioned, Prestwick airport has an extra-long runway and fog-free facilities, which give it a huge advantage.

The educational opportunities of having a spaceport cannot be underestimated. As a teacher, I had the real privilege of working with the Scottish Space School at the University of Strathclyde, which sent students from Scotland to Houston in Texas for a week-long programme of activities about space; in fact, those trips still happen. If we get this legislation right, we have the potential to do that again here in the UK—in Scotland.

The regulation must support the work that companies are doing. A number of Members have mentioned launch sites. Manufacturers will always launch from the most economically viable location. The difficulty with the UK just now is that it is considered to be far more stringent in its jurisdiction than other locations. The third party liability cap has also been mentioned. The cap must be in place and it must be realistic in order for operators to get the insurance. Without it, CubeSats currently manufactured in Glasgow will continue to be transported to other locations, even when we have a spaceport. The difficulty for the UK space industry is that some countries will require the satellites to be manufactured there in order for them to get the licences to launch.



Although that is not currently a big issue, it could be an issue for future investment. If restricted regulation causes the developers to invest elsewhere, we will lose out on future business, regardless of the attractiveness of locations such as Glasgow.

I wrote to the Secretary of State for Business, Energy and Industrial Strategy in August last year, and I got a reply from the then Science Minister, who is in his place today. He said that

“some small satellites can represent an increased risk over larger satellites as they often operate in the most congested regions of space, they rarely have any means of propulsion and can be difficult to track”.

Now, that is the case regardless of where we launch from, so we must get the legislation right to ensure that we can launch from the UK. The Minister went on to say:


“The UK Space Agency is also reviewing the UK’s approach to third party liability insurance, in particular with regard to small satellites and large constellations.”

I hope that this will ensure that a reasonable cap is placed on the liability for operators. Without it, they cannot get insurance; and without insurance, there will be no launches.

The Government have a duty to support this industry. Reaction Engines has been mentioned a number of times. The Minister has already mentioned the £65 million investment that I believe Reaction Engines finally received in 2016, but it was promised that money in 2013, so the company was trying to develop for three years without getting funding. We need to be realistic about the funding.

Brexit poses some threats to the space industry, to which collaborations and people are key. These people need assurances, not the ongoing uncertainty of the current situation. I found myself in the strange position a few moments ago of agreeing with the hon. Member for Ribble Valley (Mr Evans) when he raised concerns about the Galileo project. We must ensure that we protect UK industries in that project. If suppliers for Galileo must be part of an EU state, our suppliers are under threat. There must be protections in place for them. The Galileo and Copernicus programmes were both designed by the European Space Agency, but they have been built with EU funds. This money is funnelled through member states of the single market only. The UK currently receives about 15% of inward investment from the European space budget, but its contributions account for only 12%. The UK Government must make up the difference to ensure that there is continued financial support for space-related activities.

There is a great potential in space, and great potential for us to get the legislation right. Let us hope that we can work together to ensure that the UK space industry gets what it needs. This is one area of UK Government policy that has the potential to be frictionless.

 7.07 pm

**Mrs Sheryll Murray (South East Cornwall) (Con)**

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 **Column 667**  
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It is an absolute delight to follow the hon. Member for Glasgow North West (Carol Monaghan). At least Scottish National Members are here taking an interest. It is really strange that there is now only one MP—who has just come into the Chamber—on the Back Benches from the official Opposition, and that is the Opposition Whip. Obviously, the Labour party has no interest in the future prosperity of the country.

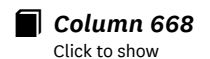
I thank the Department for Transport for having the foresight and ambition for the country to bring forward this important Bill. There are many small steps and, indeed, giant leaps that need to be taken as we, as beings, explore the frontier that lies beyond the atmosphere.

I am proud to be Cornish, and I am very proud of the fact that Cornwall has always been at the forefront of new innovation. As my hon. Friend the Member for St Austell and Newquay (Steve Double) has already said—I do not apologise for repeating it—Cornwall has done that throughout its history, with inventors and engineers such as Richard Trevithick, who built the first steam locomotive; Jonathan Hornblower, who invented the compound engine and the steam valve; and Arthur Woolf, who invented the high pressure compound steam engine. Cornwall has a history of innovators when it comes to engines.

Cornwall has also been at the cutting edge of communications. Porthcurno, before it was used as a location for “Poldark”, was the point at which many submarine telegraph cables—transatlantic and to other locations—came ashore, and was at the centre of UK-international communications. Cornwall was the home of the world’s first parabolic satellite communications antenna at Goonhilly—at one time, the largest satellite earth station in the world. More recently, Cornwall has seen great steps forward as the Bloodhound team attempts to create the fastest car. I was fortunate enough to meet the team in Parliament and have a go in their simulator. I have to confess that I was not very good, and I am sure they would not employ me as a driver, but I wish them well with their goals.

In this light, I want to see Cornwall at the forefront of moving forward as we reach into space. Cornwall would be the perfect location for a spaceport. Newquay airport shares its airspace with no one else—the nearest other commercial airport is Exeter, and beyond that, Bristol. Therefore, Newquay airport, with its very large runway, has an ideal opportunity to be the location for the first spaceport. I thank Cornwall Council and the local enterprise partnership for all the fantastic work they have done in putting forward the case that Cornwall should host the spaceport and making sure it has the capacity to do so. The potential for any such facility is great. We have seen an ever-increasing demand in satellites, and that is expected to grow by over 10% over the next decade. However, the true growth will come as we undertake more research. We have already seen massive growth in research, which is, in itself, a growing sector. I want Cornwall to be at the centre of that. This research is where the true advances and the real value will come from.

I look forward to the future and the advances that we are yet to know about. I believe the future is bright—unlike, obviously, the Opposition. It is becoming clear that a lot of this future development will come as we go boldly beyond our atmosphere into the next stage of our



progression as human beings. I look forward to this transformation and want to see Cornwall at the centre of it.

🕒 7.12 pm

### **Justin Tomlinson (North Swindon) (Con)**

Share

It is an absolute pleasure to follow my hon. Friend the Member for South East Cornwall (Mrs Murray), who has put a very strong case for why her constituency should benefit—

### **Mrs Murray**

Share

Cornwall!

### **Justin Tomlinson**


Share

She has put a very strong case for why the whole of Cornwall should benefit from this very exciting Bill.

I very much welcome the Bill. It is an interstellar element of our modern industrial strategy setting out how the UK will become a leading player in the commercial space age. This is really exciting. I am delighted to hear all the MPs, right across the House, pitching for why their constituencies should host future spaceports. *[Interruption.]* My right hon. Friend the Member for Wantage (Mr Vaizey) suggests that I am pitching for North Swindon. I am delighted to say that Swindon proudly hosts the UK Space Agency head office. We have the power; we are the strategic decision makers. I can assure hon. Members that all the key bodies at the head office will be listening to this debate eagerly as each MP pitches for their constituency to be at the forefront of this fantastic advancement in our modern industrial strategy.

I was very excited to visit the UK Space Agency again very recently, meeting the chief executive, Graham Turnock. It was one of my favourite visits. He was incredibly passionate, and patient with the 8 million questions that I had, including where we had got to in finding aliens. There are 120 employees at the head office. I was struck by how passionate they were, from the chief executive right down to the apprentices, who had fought for that unique, truly exciting and inspirational opportunity that they wanted to seize and have a career connected with space. It was a really memorable visit. As a constituency MP, I am very proud that we are at the heart of that head office. I was fascinated as they set out how this industry impacts not just on the obvious areas but on the energy sector, the finance sector, the health sector, defence, telecoms and transport. It is cutting edge in terms of climate change and dealing with natural disasters. It is right back on our streets with local authorities, helping with bin collections, planning applications and planning development. It is amazing how diverse the impact can be.

There is huge potential, with 8% growth year on year in the past decade. The Government are rightly committed to getting a 10% share of the global space economy by 2030, worth £40 billion. I suspect that that is why there is so much cross-party support for this very important Bill,

 **Column 669**  
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which will benefit the UK. The UK's aerospace supply chain, manufacturers and service providers will benefit from opportunities to participate in the new market for small satellite launch and sub-orbital flight. Local jobs and economies will benefit from the creation of spaceport sites and the businesses needed to support them, such as tourism, hospitality and construction. There will be a real boost to UK science and innovation, with cutting-edge research. North Swindon hosts all the research councils that help determine where research grants should be spent, so yet again my constituency will help to influence this. Young people seeking careers in science, technology, engineering and maths will gain new opportunities, and entrepreneurs will benefit from increased opportunities to build innovative commercial enterprises—no doubt helped by Innovate UK, also hosted by North Swindon. In effect, I am making a pitch for the Minister to visit. It is just one hour away on the train—as he, a Transport Minister, will be very much aware.

Finally, I want to concentrate on a point flagged up by the hon. Member for Glasgow North West (Carol Monaghan), who spoke of her former role as a physics teacher, and how space inspires young people through their learning, as it genuinely does. It catches their imagination. That is why there are so many films, books and TV shows connected with space. Initially, my knowledge of space was based on that very good, popular TV programme “The Big Bang Theory”, but having had that very exciting and interesting visit to the UK Space Agency, I am now far more knowledgeable.


The focus of young people's recent inspiration has been on Tim Peake's six months on the international space station. For example, 600,000 children took part in the seed experiment organised by the UK Space Agency, with Tim Peake's help, comparing seed growth in space with that back on earth. It is a good job that I did not participate—with my gardening skills, I might have messed up their results. The Tim Peake primary project uses space to increase primary-age children's engagement with science, numeracy and literacy. When I visit my local schools and talk to teachers about the work that the UK Space Agency does with its school visits and helping to inspire children, they are all really keen to take advantage of those resources. I urge the Minister to talk to his colleagues in the Department for Education to try to use this further, because it is genuinely inspirational. Tim Peake himself sets individual challenges. Young people from Swindon Academy, a secondary school in my constituency, pedalled and ran a combined 400 km, which is the altitude of the international space station as it orbits around the earth. That was a really good way to connect space with a way of learning.

This is a truly exciting Bill. It has huge potential financially for the UK in creating jobs and growth, inspiring the next generation, and uniting all political parties across the House. Together with all colleagues, I look forward to supporting the Bill as it progresses through the House.

🕒 7.18 pm

**Sir Paul Beresford (Mole Valley) (Con)**

Share

 **Column 670**  
Click to show

I certainly agree with the parting shot that I heard from my hon. Friend the Member for North Swindon (Justin Tomlinson).

I am tiptoeing into this debate from a position of enthusiasm but not very much knowledge. I am learning quietly and quickly, and have been for some weeks. I am very aware of the Bill's importance, but also, as others have said, of having a spaceport—or two. The thought of the All Blacks flying on an A380 for two or three hours to Australia and for four hours from Australia to this country, and then landing in Devon or Cornwall and tiptoeing on to a train to take another four hours to reach London is an exciting one. However, from the knowledge I have been learning, it seems to me that we need more than one site—and, because the Bill is going through, we need this urgently—and they should have facilities for vertical launch, horizontal launch or both.

Space and the space industry have been of considerable interest to me ever since I was a lad in New Zealand. I hasten to add that, as I have already said, my interest is not matched by knowledge. My knowledge has been further stimulated, however, by discovering and visiting on several occasions not just the Surrey satellite business that was mentioned, but—closer to home for me—the Mullard Space Science Laboratory in my constituency. It is part of University College London, and has been working on that site in Holmbury St Mary for over 70 years. I would be delighted to take the Minister, and even the Secretary of State, for a visit—if we can find it; it is hidden away.

Mullard is in an old manor house with beautiful grounds in the hills above and beyond Dorking. As one enters through the archway with its double doors into the foyer, one sees standing—alongside the ancient chandelier, and heading up into the wooden stairwell—two rockets from a bygone day. One only has to be there a wee while, however, to feel the pulse of the IQ of the scientific intelligence, which is quite staggering, of the people all around the site. There are modern buildings at the back, including a fantastic laboratory, and room for a little bit more building.

Mullard supports the Bill. At present, anything developed by the Mullard centre or other commercial or research organisations—this has been mentioned—is taken away from the UK to be launched. As the Mullard people have explained to me, this often means a loss of control. With the Bill and the development of our launch sites, which must go hand in hand and promptly, we will now be able to utilise British research and expertise in Britain to the benefit of Britain.

To give a feel of the importance of that, I wish to dwell for a few moments on the broad spectrum of the research going on. Just at this centre, there are 180 people—academics, engineers, post-doctoral researchers, postgraduate students and support staff. The research areas are staggering: they are doing astrophysics, solar physics, space plasma physics and planetary science, and researching climate extremes on earth, space medicine, space imaging analysis and detection systems. They are world-renowned experts in manufacturing scientific space instruments, although those instruments go not into our satellites but elsewhere.

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Those at the centre have contributed equipment and expertise to projects such as Euclid, which is studying dark matter, the ExoMars rover, the solar orbiter—a large spacecraft mission that includes three Mullard-built plasma instruments—and the ESA solar wind electronic instrument. Additionally, they are partners in the team building an instrument containing three extreme ultraviolet telescopes. The Mullard team are building the electronics that will make them work. Perhaps most interestingly at the moment—this has been mentioned—they are building miniature instruments on QB50 CubeSats, which are small satellites of 30 cm by 10 cm by 10 cm. They are being deployed from the international space station, not from the United Kingdom. With the Bill and the development of the launch sites, I hope that UK firms will soon be able to directly operate the satellites they build and the instruments within them. Reaction Engines has been touched on, and it is vital that such British inventions remain in our hands.

I want to mention a few other points, some of which have also been touched on. Anyone with any knowledge, even if it is as limited as mine, can see there is a huge future in space technology. Alongside the Bill, we need to establish the structure for launching spacecraft from the United Kingdom, whether those launches are vertical or horizontal. This will enable the development of commercial applications, of which the most talked about—it has been mentioned several times today—is of course space tourism. However, other considerable commercial prospects are being developed. The most understandable is the launching worldwide of constellations of satellites, particularly those to provide worldwide broadband facilities. I understand this is commercially in the offing, and it should be helped in the United Kingdom both by the Bill and—if I may repeat myself—by the provision of at least one site and possibly two or more sites. The Minister will be aware of that, and we have clearly rubbed it in throughout this debate.

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In looking at the Bill, we must make sure that the new legislation does not hold back commercial and scientific development and research. The way in which the Opposition spokesman, the hon. Member for Middlesbrough (Andy McDonald), talked made me feel gloomy, because regulation can cripple just such developments. For example, a huge effort is now being put into developing nano-satellites and constellations of satellites, and there is a realistic prospect of the world benefiting from constellations of satellites across the world.

We must, however, be careful for two reasons. First, there has been some mention of space debris and its generation, and the dangers of collisions are obvious. All the equipment shot into space has an end to its operational life, which may be a considerable number of years; indeed, some of the Mullard equipment is still running extremely successfully 15 years after its launch. I understand that this is under discussion and that the Minister may feel it is not appropriate to pass legislation at this time. However, if he is going to do something, I hope he does so with a certain freedom and looks at making the equipment disintegrate by design, so that it burns up as it returns towards the earth.

The second point, which has also been mentioned several times, is indemnifying insurance, a subject in which I have a little interest. We of course need it in case of accidents, which may happen, but we should recognise that we need not be stringent in the level of protection applied. I believe that the negative effect on any firm or research organisation of something going wrong would be far more damaging and would create a bigger hole than the actual financial one. At the moment, because of the cost, the prospect is that the Mullard laboratory will have to transfer the ownership of its developments to countries that have more appropriate arrangements to avert insurance costs and will therefore lose control of the project. That would be disastrous: if we provided the sites and took through the Bill, but then crippled such organisations with insurance liabilities, we would have wasted our time.

I note that, in certain circumstances, the Secretary of State will provide at least part of the indemnity. I am keen for the Government to recognise that they could consider providing more, if not total, cover for research organisations, such as Mullard, developing this equipment—nano-satellites, CubeSats—in carefully selected research projects. In many ways, the UK leads the world in space research and technology, but this problem of indemnity is threatening that position.

I was reminded by a very elderly gentleman that before the second world war rockets were banned in the UK and, I believe, in America, so there was no progress, but they were not banned in Germany, and Germany produced the V2. We need to think and move ahead positively, and I most certainly support the Bill.

 7.28 pm

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### **Mr Edward Vaizey (Wantage) (Con)**

Share

I am grateful to you, Madam Deputy Speaker, for the chance to speak in this important debate, and indeed to follow my hon. Friend the Member for Mole Valley (Sir Paul Beresford). He started his speech by saying that he knew very little about the subject, but I must say that I would hate to hear a speech of his when he knows a lot about the subject. I thought his speech was very thoughtful and insightful, particularly in raising the two topics of space debris and insurance. His speech indicated that the space industry is very sophisticated. When we think about space, all of us—well, me; I would not presume to extend my failings to my hon. Friends and other hon. Members—think about men landing on the moon, but the space industry, like any other, is now on earth. It is very sophisticated, and may be very lucrative and beneficial to countries specialising in it.

I pay tribute to the Minister for introducing this important Bill. Of course, we have to thank George Osborne, who focused on the space industry and many other pioneering industries in his time as Chancellor of the Exchequer. How we miss his forward thinking and sophisticated approach to our economy. Luckily, we have part of his legacy before the House tonight. The Bill builds on previous legislation. It was a Conservative Government who passed the Outer Space Act

1986, and it is a Conservative Government who have brought forward this forward-thinking Bill on the future. That is why the Government Benches are full of people wanting to speak and the Opposition Benches are completely empty.

At first, I wondered why we needed legislation, but anyone who looks at the Bill will see that, through it, we are creating the regulatory framework that will allow the space industry to flourish in the UK, in particular by allowing us to build spaceports and have our own launch sites for satellites. At present, too many UK companies that build satellites rely on finding slots in other jurisdictions, so this will be a big change that helps the micro-satellite industry, as well as emerging industries such as commercial spaceflight and microgravity science. The Bill will create the framework that will help to realise the Government's ambition for the UK to be one of the world's leading space economy countries, and help the value of the space economy to quadruple in the next couple of decades.

I remember when many years ago, as a young man, I said I thought I should become a lawyer, and my godfather advised me to become a space lawyer. He was ahead of his time, but the Bill will give opportunities in the growing discipline of space law. I was interested to see in the Bill, for example, the application of criminal law to spacecraft. If that does not herald spaceflight soon becoming mainstream, nothing will.

I wanted to speak in the debate because I represent the wonderful constituency of Wantage, which is 20 minutes closer to London than Swindon—an important point to make to my hon. Friend the Member for North Swindon (Justin Tomlinson). Although Swindon is, rightly, a centre for space industry, it is still 20 minutes too far away for the Minister, so I know that when he decides to head west, he will come to Harwell, where he has visited previously to see the extraordinary space industries that are burgeoning there.

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It is hard to believe, but none the less true, that 80 space organisations are based in the Harwell space cluster. They include start-ups, small and medium-sized enterprises, public sector organisations and major companies such as Airbus, Lockheed Martin and Thales. Some 800 people work on the Harwell campus, their number having grown by approximately 13% every year. The Harwell campus as a whole has benefited from extensive Government investment over many years, with more than £2 billion-worth of scientific facilities employing 5,500 highly skilled people in places such as the diamond synchrotron and neutron spallation source, which is managed by the Science and Technology Facilities Council. I will focus on a few of the organisations found on the campus.

RAL Space—Rutherford Appleton Laboratory's space arm—has built more than 220 space instruments and ground-based telescopes. In 2015, it opened its national assembly, integration and test facility, which enables satellites ranging in size from CubeSats, which are the size of a whiskey bottle, up to 3 metres in length to be tested and calibrated; they can then be used to

observe the Earth, carry satellite communications or help with navigation. I was delighted when the Government announced recently that the £99 million national satellite test facility, which will open in 2020, would be based at Harwell. I thank the Minister for that.

We also have the Satellite Applications Catapult, opened under the last Government as part of the Catapult programme, with more than 120 personnel. A useful organisation, it brings home to a range of companies that might not have thought that satellites were relevant to them ways in which satellite technology can help them. One of the most mundane examples I heard of—but fascinating because it is so random—was that supermarkets can use satellites to monitor their car parks to make more efficient use of the space. My point is that companies large and small that may think space has nothing to do with them beyond powering the satnav in their company cars can use satellite imagery in innovative ways, particularly firms working in agriculture and shipping navigation.

I am also delighted to have the European Space Agency's European centre for space applications and telecommunications at Harwell. You will be delighted to learn, Madam Deputy Speaker, that the ESA is not part of the European Union, so the Brexiteers cannot mess up the European Space Agency. It will survive the carnage of Brexit. It employs more than 100 people drawn from 17 countries; I hope they will be able to remain here. It also provides support for the development of new products and services: for example, the Pioneer programme supports the setting up of space mission providers, which will facilitate access to space by other developers. The first SMP is the Harwell-based UK company Open Cosmos. The ESA also has a highly successful business incubation centre.

The Space Industry Bill is vital to my constituency. It is an important step to enable spaceflight from the UK. No doubt spaceports will be self-selecting, and I have heard various people make a pitch for one. It would be political suicide for me to pitch my own constituency, where there is large piece of open land that is always the subject of great conflict. People have proposed building a garden town there; others proposed a reservoir, and some residents, in an attempt to stop the reservoir, proposed an airport. However, were their MP to propose a spaceport, I think he would be out on his ear, so I will not nominate my constituency to be the home of a spaceport. None the less, my constituency will benefit from the growth of the space industry enabled by the Bill.

I will make one final point—I see some of my hon. Friends yawning as I reach my peroration. At the end of last year, my good friend Rajeev Chand from Rutberg sent me a fascinating report produced by Morgan Stanley on space disruption. Space is now a thing—we talk about tech disruption and banking disruption, but now space is so well developed that we are getting space disruption. We talk about the UK economy and Government intervention, but it is interesting to see that there is a big private economy in space now, with \$2.5 billion invested in companies wholly devoted to space last year alone. Those companies include names we are all familiar with, such as Blue Origin, owned by Jeff Bezos, OneWeb, and SpaceX, which is Elon Musk's company.

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The report points out the different industries operating in space. Landing on the moon is just the sexy part—the tip of the iceberg. Space industries include satellite launches, satellite communications, deep space exploration and lunar landing as well as Earth observation, asteroid mining, space debris—mentioned by my hon. Friend the Member for Mole Valley—space tourism, space research, manufacturing in space, and so on. Countries all round the world have an interest. Morgan Stanley identifies 90 companies, mainly from the US but also from Israel, India, Korea, Finland and many other countries. There is only one British company on the list of 90 space companies to watch, but—happily confirming my thesis that Harwell is the home of UK space—it is Oxford Space Systems, which is based in Harwell and builds small satellites. It is run by an extraordinary man called Mike Lawton. The first time I met him, he was powering buses with vegetable oil; now, he is building small cube satellites to be launched as a light payload delivering extraordinary benefits.

It is exciting to be debating the Space Industry Bill in the Chamber tonight. I am glad to see that it will not be opposed—nor should it be. It is a pioneering Bill, which builds on work done by this Government over many years to put the UK at the heart of a growing and vital global industry, namely space.

🕒 7.39 pm

### **David Morris (Morecambe and Lunesdale) (Con)**

Share

This is quite a great day for me because I have been the chairman of the parliamentary space committee for nearly four years. When I was elected in 2010, it was the first all-party group I joined, so I have been watching with interest over the past few years how this Bill has proceeded from its embryonic stages—from being just an idea—through various stages of development, to the point we are at today.

I have mentioned the space sector many times before, and that has brought a smile to some people's faces because they do not realise just what the sector actually means for the UK economy. The space sector brings in £13.7 billion—nearly £14 billion—a year. It has outgrown every other sector by approximately 10% all the way through the recession and the austerity measures. The figure I think we heard tonight is that it has seen 6.5% continual growth over a period of about six years. It has therefore outperformed any other sector in the United Kingdom.

A lot has been said about Brexit issues and about how space will progress. ESA is actually separate from the Brexit issues and the EU, so I hope the projects we have already designed and agreed with ESA will carry on after the United Kingdom has embarked on its solo voyage away from the rest of the EU.

Having a spaceport is extremely important, because the space industry in the United Kingdom is very scattered, but very prolific. We have installations in the seat of my right hon. Friend the Member for Wantage (Mr Vaizey), who has just spoken, and in the Leicestershire area. We even

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have them in my constituency; in fact, there is one above my office, and I often joke that when the phones go off we know that the teleport system is being engaged upstairs.

This is a vast industry. The industries in my area are looking to put satellites into orbit to provide better navigation for ambulance services in the NHS. People do not realise just how big an industry space is and how our everyday lives are affected by it. Satellite navigation in cars, which is taken for granted, comes from the military applications that NASA first sent up back in the 1960s. These things are now trickling down and being used in our everyday lives.

What would I like to see in the future? I think—these are personal, not informed thoughts—that our first spaceport will more than likely be in the Cornwall area. That is purely and simply because of Virgin Galactic and our space industry being opened up on a tourism basis. However, it is important that we branch out to places such as Prestwick; we have to look towards having ballistic installations, so that we can capitalise on deep-space orbits and not just sub-orbital, as we would with space tourism. We have to look towards the future, and this Bill is facilitating our footsteps on the great journey that we are taking.

Kourou in French Guiana is where ESA has a spaceport, and even the former Soviet Union sends up its Soyuz from there. We can therefore see that space is not really a political industry; it is actually for the greater good of humanity.

### **Bob Stewart (Beckenham) (Con)**

Share

It may come as a surprise to the House that I have run a satellite business. We launched our satellites from French Guiana, and one reason why we as a company did that was its closeness to the equator, which is terribly important. That is a factor in where people put space launch sites. Near the equator is the best place to launch from.

### **David Morris**

Share

I thank my hon. Friend for that very knowledgeable interjection.

### **Dr Whitford**

Share

As I said in my speech—I think the hon. Member for Beckenham (Bob Stewart) was not in his place—we have both geostationary and polar satellites. Polar satellites are for earth observation, weather and so on, so you do not need to be near the equator; you want to be near the pole, as Prestwick is.

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### **David Morris**


Share

I thank the hon. Lady for that great intervention.



We are talking about £14 billion per annum going into our economy and about 38,000 people being employed in the sector, so it is huge, and it is expanding. Most of the technology that has been utilised, especially by American companies, has come from Great Britain—even in the early stages of space exploration—so we have a lot to offer. We are taking a huge leap into the future by putting this Bill forward. Over the next few years, the equivalent of £1 billion will go into these projects, and that will be welcomed by the space industry.

I thank you, Madam Deputy Speaker, for letting me speak in the debate. I urge that the Bill go forward in the best way it can and that Members on both sides vote for it.

 7.46 pm

## **Stephen Hammond (Wimbledon) (Con)**

Share


It is a great pleasure to follow my hon. Friend the Member for Morecambe and Lunesdale (David Morris), who is the chairman of the parliamentary space committee.

When I listened to the opening remarks of my right hon. Friend the Member for Wantage (Mr Vaizey), who said that my hon. Friend the Member for Mole Valley (Sir Paul Beresford) had tiptoed into the debate, I realised that I was about to do exactly what the Bill is not intended to do, which is to crash into the debate. There are moments when I think I know a little about transport, but listening to the erudite, learned and extensive speeches so far, I realise that I know almost nothing about the sector. However, I want to make three very basic points, if I may.

When doing some thinking about what I should say tonight, I looked at the industrial strategy. Its strapline is: “Building a Britain...for the future”. That is exactly what this Bill is all about, and that is why it deserves our support.

Quite rightly, there have been a lot of comments from Members tonight about the size and growth of the sector. Quite rightly, in his opening remarks the Minister set out the Government’s ambition that the UK should be at the forefront of the opportunities that arise from this technology, and our excellence in the small satellite market. Overall, however, the key thing is that not only the Government but the private sector will invest in this industry. Therefore, if we want to see that investment, it is key that certain things happen. One is that the Government are in favour of it and create the right environment for businesses to succeed. Part of that is about putting in place the legal certainty for investment, as mentioned previously.

Whichever way we look at the current regulatory environment, it is in need of updating, so the Bill is particularly appropriate. That brings me to my first substantive point, which is that many people in the House will know that, in fast-developing technologies and industries—particularly across the transport and infrastructure sector—not only is the regulatory environment lagging, as it is currently in the space sector, but the Government make no attempt to bring it up to date or to set in place a framework that will anticipate developments. One of the great advantages of this Bill is not just that it sets out a regulatory framework, but that it sets out one that is likely to

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future-proof the industry's development over the next few years. I commend that thinking because, in so many other areas of infrastructure and technology, we have seen regulatory environments that frustrate future development.

From my quite cursory look at the Bill, it seems that there are a couple of issues that the Minister will particularly want to look at. I should start by saying that I particularly commend clause 1(4), which makes the point I have just been making. Normally, Back Benchers say to Ministers, "The last thing we want is for sweeping and inclusive powers to be given to Ministers", but that is what we need in this sector. We need forward thinking and examples that can future-proof regulation. The demand for small satellites, the expansion of markets, the technology and global competition mean we need a relatively free and loose regulatory environment that can anticipate developments—within the context, of course, of ensuring safety and room for development. That said, there are issues with clause 1 that the Minister will want to explore later: for instance, some of the language, particularly some of the geographic restrictions, might prove to contain rather than allow development.

I also want to guide the Minister towards clause 8. There are two things there on which he will want to reassure the House if he really does want a forward-thinking regulatory environment and development in the sector. The phrase

"contrary to the national interest"

could easily be defined where an activity threatens either security or legal aspects, but he will want to ensure that activities are not regulated on the basis of prejudice. If one were to follow previous regulatory systems, there could be a whole proliferation of opportunities, in the area of economics, caught by the phrase. It must not stifle development.

The Minister will also want to reassure the House about the phrase in clause 8:

"the applicant has the financial and technical resources"

to undertake activities. The applicant should, of course, be able to fund its activities and must ensure that it is technically competent in this area, and it must ensure it has the right liability insurance and all aspects of safety in place, but—if I may guide the Minister to other regulatory systems, particularly in the financial services world—such statements elsewhere can be used to stifle small firms and initiative and prevent smaller companies from competing against larger companies. That sort of phraseology is often used to put in place relatively superfluous information requirements that prove to be overly exacting. I ask him to think carefully about that phrase when regulations are made so that his ambition and, I am sure, the whole House's ambition—that the industry might thrive and opportunities be made available to firms both large and small—might be achieved.

Secondly, many colleagues have spoken about the marvellous opportunities in their constituencies, and it would be foolish of me not to take the same opportunity. Many would perceive Wimbledon as a leafy suburb in south-west London, which indeed it is, but I also like to

think of it as tech suburb. Our small high-tech and biotech companies exemplify what is true of the opportunities in the Bill for all Members and their constituencies. Members might not have the space for a spaceport, but they will have the opportunity to bring forward and sponsor the inspiration that space brings to many and to create opportunities in the supply chain. That is what I will be doing in my constituency.

Many concentrate on spaceports and the large companies, but one forgets the opportunities for the small high-tech firms that will arise from the expansion of the satellite market and sub-orbital spaceflight. It is incumbent on us to ensure plenty of opportunities for the supply chain and small companies and to ensure that the skills required are given the appropriate boost. In the latter part of his speech, my right hon. Friend the Member for South Holland and The Deepings (Mr Hayes) talked about skills. It is clear that a greater emphasis needs to be placed, both at secondary school and university level, on the skills that will allow industries such as the space industry to develop.

Finally, as I have mentioned extensively already, it is often the smaller firms that produce the ideas that enable big leaps forward such as those we expect in the space sector. It is often those accelerator institutions that push the technology forward. I hope that the Minister and the Treasury will have due regard to ensuring that those institutions can prosper and succeed so that the developments in technology, some of which we cannot anticipate, can come forward and so that sub-orbital spaceflight and space activities can succeed in the future. The Bill will future-proof the regulatory environment and could make a significant difference to investment and innovation in transport over the next decade.

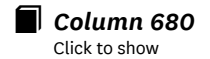
🕒 7.55 pm

### **Paul Masterton (East Renfrewshire) (Con)**

Share

I am pleased to see that in the Bill the Government are continuing to take the necessary steps to make this country a world leader in burgeoning industries. They have a great track record on getting Britain to the front of the race when it comes to science and technology, and the Bill maintains that record. Companies such as Virgin Galactic, SpaceX and Boeing are drawing closer and closer to running manned commercial spaceflights, which reportedly could start as early as this year. The industry has the potential to go far—in more ways than one—and Britain should be at the forefront of it. With our world-class universities, business-friendly environment and infrastructure, we have the capacity to become a world leader in this industry.

I will leave it to my hon. Friend the Member for Ayr, Carrick and Cumnock (Bill Grant) to add his voice to the case for a spaceport at Prestwick, but I will say as an MP from the west of Scotland, in anticipation of his remarks, that I associate myself wholly with them, and indeed those of the hon. Member for Central Ayrshire (Dr Whitford). I should also point to the strong industry



presence in Glasgow. Companies such as Clyde Space and Spire, with which some of my constituents are involved, are innovating at a remarkable pace, as the hon. Member for Glasgow North West (Carol Monaghan) mentioned earlier.

The commercial space industry, should we seize the opportunities it presents, could bring billions of pounds a year into the UK economy, and the Government are right to set the ambitious target of occupying 10% of the entire global sector. To achieve this, however, we need the right laws and regulations, and right now our laws and regulations are not ready. The current set-up dates from a time when commercial space travel was a laughable, virtually inconceivable idea, other than on television. On the eve of the advent of commercial space travel, our current legal and regulatory frameworks are just not fit for purpose. As there are no detailed international or EU regulations to adopt or copy into domestic law, it is our responsibility to make them. Indeed, it could be to our advantage to make them: Britain can and should be among the first, not the last, to institute proper regulations for the commercial space industry so that we can start benefiting from it as soon as possible, and as much as possible.

That is why the Bill is necessary. It will put in place the regulations we need to ensure that, when it develops in the coming years, the commercial space industry thrives in a safe and orderly manner. It will ensure, for instance, that a licence is needed for sub-orbital spaceflight activity, just as it is for flying an ordinary plane or driving a car. Likewise, it will provide for regulations relating to the area where spaceflight takes place in order to ensure that spaceflight is conducted safely. It will allow for the establishment of a whole raft of necessary safety and security regulations—regulations that will become more and more important as the industry grows. By giving effect to new offences such as hijacking, destroying, damaging or endangering a UK-launched spacecraft, it will ensure that nobody is put at risk. In recent years, we have rightly become scrupulous about regulating conventional air travel to ensure that people can fly as safely as possible and that people on the ground are as safe as possible from aircraft. It should go without saying that we must take the same careful approach to commercial space travel. The Bill will allow us to do so.

## Bob Stewart

Share


One problem is that there are 500,000 pieces of space junk running around, sometimes at very high speeds. My point is that we do not just need to regulate in this country; we need international regulations for how we approach space. For example, in 1996 the French satellite Cerise was destroyed by space junk from an Ariane rocket. We do not just require domestic legislation; we need to fit it into international legislation.

## Paul Masterton

Share

My hon. Friend is absolutely right. Space will be an international issue, and countries throughout the globe will seek to take advantage of the future opportunities. However, as he says, if we do not work together on an international basis, there may be trouble ahead.


In this quickly developing and highly technical industry, it is especially important to be flexible in how we regulate and how we amend regulations. What is right in one year could prove to be either irrelevant or imperfect in the next. We should avoid scenarios in which we make amending regulations a difficult or long-winded process. Circumstances are likely to change, and changes in the regulations are likely to have to happen. We should be able to deal with them smoothly rather than awkwardly.

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The Bill represents a positive step by a Government who are clearly not content to limit their vision to “global Britain”. Space presents us with an enormous opportunity in the coming years and decades, and, with manned commercial spaceflights possibly just months away, now is exactly the right time to pass this necessary legislation and pave the way for “interplanetary Britain”. That may sound a bit glib, but, as many other Members have pointed out, the Bill is about something quite special. It has the potential to help reshape the ambitions and broaden the horizons of young people throughout the country, so that being an astronaut may be transformed from a momentary childhood dream to a tangible possibility. It could bring about a whole new scope for involvement in technology, causing a new generation of women, in particular, to become excited about science, technology, engineering and mathematics. It really could constitute a step change.

My constituent Emily Clark attends Strathclyde University. Along with about 100 other students, she gained a place in the university’s space school—which was mentioned earlier by the hon. Member for Glasgow North West—where they were visited by NASA astronauts and scientists. She was one of only 10 who were then chosen to visit NASA in Houston. We exchanged correspondence, and her excitement and joy about her experience flew off the page. She told me all about meeting astronauts including Fred Haise from Apollo 13, and about her VIP tour of mission control and building 9, which is where the mock-up of the international space station and the moon rover are kept. Now Emily is off to become a vet, but she said that her experience had changed her life ambition ever so slightly. She said that her interest in space exploration simply as a Trekkie had developed, and she thought that she might like to be Britain’s own Richard Linnehan. I suspect that most people do not know who Richard Linnehan is, but he is actually NASA’s space veterinarian.

For me, the Bill is not just about rules and regulations. It is about putting the UK at the forefront of space exploration, making it an industry in which we lead, and, in doing so, open up new jobs and new possibilities for future generations. I am delighted to support it this evening.


 8.02 pm

**Matt Warman (Boston and Skegness) (Con)**

Share

I shall speak briefly in support of the Bill.

In my constituency, we talk about space far more than people might think. That is not because there is a lot of it in the open fenland and marsh country, but because, as one might expect, we talk about foreign aid an awful lot, and the question that always arises is why we give money to certain countries. They have space programmes. That is, in a sense, the definition of a country that is a thriving great nation: an economy that is looking to the future and does not need the help of others to thrive and travel to infinity and beyond—to the final frontier. I think the very existence of the Bill demonstrates that Britain today is a nation that looks forward to the future with confidence. This is not just empty rhetoric; it is something that the Government are doing in real detail.

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Before the general election, I was privileged to serve on the Science and Technology Committee. We had a quick look at what was then a draft Bill; there was a limited amount of time for the full parliamentary process because of the impending election. We made a number of recommendations, most of which were prefaced by a declaration of our support for the Bill, for two reasons.


First, there is the huge economic potential that a thriving space industry brings to the country as a whole. We talk about artificial intelligence as an issue that will bring broad and widespread benefits throughout the growing new economy in this country, but we do not talk about space in the same way. It is a cliché to say that Teflon, which is now ubiquitous in every kitchen, was invented because of the American space programme. We should think of the forthcoming space industry in the United Kingdom in the same way. The Bill represents the beginning of a huge new economic element that will have huge tangential benefits, whether they are CubeSats or the satellites that will power a host of other industries. The point that the Committee sought to make at almost every opportunity was that the Bill was not simply about bringing the benefits of a spaceport to Newquay or Prestwick—or possibly to both areas, and to many more. Indeed, there is space in Lincolnshire, although it is very good agricultural land, so it would be a difficult decision to make.

There is not just the question of where we should put the individual assets that will be crucial to the development of an industry, but the vital question of how we should be trying to foster the benefits of an economy that is wrapped up in new technologies so that they can be extended beyond the technology that gets CubeSats up into space, and the research that will ensure that we do not end up with a space industry that pushes debris out into the ether, treating space as previous generations have treated parts of China, where we offloaded our own waste pretending that we could ignore the consequences for the planet. We must be mindful of what is going on, not only on this planet but beyond it, and I think that the Bill does that to some extent. We must begin to think of ourselves not only as global citizens, but as intergalactic citizens. We must consider the consequences of what we do as a human race, not only beyond our country's shores but beyond our atmosphere. That is what real global responsibility looks like.

The Committee's recommendations constitute an attempt to be genuinely mindful of the regulations that we need for an industry whose full scale does not yet exist. One of our aims was to come up with principles that would not be overtaken by events. For instance, we discussed drafting a memorandum of understanding between the two agencies that we expect to regulate the two principal types of spaceflight. I was pleased that the Government accepted a number of our recommendations, but the point of that particular recommendation was not that we thought it sensible to come up with hard and fast rules that should never be broken—as the Bill proposed at that point—but that we were asking the Government to be cognisant of the fact that the rules that we needed could not be made immediately. I think that the Bill tries to strike a balance between setting those valuable principles and identifying the baselines that will not allow us to imagine that it is sensible to clutter up the outer atmosphere with bits of kit that will be of little value in years to come.

What I must praise about the Government's approach to the Bill is that they sought to involve the industry, and sought to involve Select Committees. They also sought to make sure that we did not simply have a single principle that was so broad that it was almost meaningless—that we would also have principles embodied in legislation that were broad enough to allow industries to grow and flourish and did not constrain them too much.


I, like other Members across this House, support this Bill, but I do so specifically because it does not embody every single regulation in statute; it looks optimistically to the future and acknowledges that not only is this the industry that will in the first instance take affluent tourists a long way from home, or people very quickly from one part of the country or the world to another, but that it will foster an entire new industry that can be plugged into our existing economy and will bring many benefits that go way beyond the invention simply of technologies such as Teflon—although I hope this Bill has all the material benefits of Teflon and we do not allow ourselves to get stuck on the details and instead stick, in a non-stick Teflon kind of way, to the beautiful principles that will allow us to see more of space in the future. I am glad to support the Bill this evening.

 8.11 pm

### **Luke Graham (Ochil and South Perthshire) (Con)**

Share

As a lifelong devotee of “Star Trek” and an avowed Trekkie, I cannot communicate how delighted I am to speak in this debate. Growing up, I always imagined that by 2018 the United Kingdom would already have a well-established, even thriving, space industry, with regular trips to the moon, Mars, or even galaxies “far, far away.” Sadly, that is not the case and in the absence of Starfleet I have had to join the next best positive forward-looking organisation: the Conservative party. To have the opportunity to help make it so here tonight is very exciting for me and, I believe, for the entire United Kingdom.

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It should therefore come as no surprise to anyone that I rise to speak in support of the Space Industry Bill. The Bill aims to establish a new regulatory framework for UK-based spaceflight activities, including the operation of UK-based spaceports and the launch of new space vehicles.

The UK space industry already impacts on many sectors of the United Kingdom's economy, services and even everyday life. From weather reporting to, as has been said, satellite navigation, telecommunications and financial services, our space industry has positively impacted on all walks of life. In 2016 an assessment by London Economics to the UK Space Agency estimated that over £250 billion, or 13.8%, of non-financial UK industrial activities were supported by satellite services. More specifically, as recently as 2015, income from the UK space industry was estimated at £13.7 billion, the equivalent of 6.5% of the global space economy. With the ever-decreasing cost of small satellites and launches enabling increased usage of satellites, the already substantial economic impact of the UK space industry is only going to increase further.

Even as we speak, a number of potential spaceports and launch companies are developing plans to offer UK launch services, but they currently have no legal framework within which to plan future operations. With the Government aiming to grow the UK space industry to an annual turnover of £19 billion by 2020, and for it to be 10% of the global space market by 2030, the Space Industry Bill represents an opportunity to strike while the iron is hot.

Moving on to the contents of the Bill, as things currently stand neither international aviation law nor space law are suitable for commercial spaceflight in the UK, thus impeding the UK space industry's development. Indeed, following its review of UK commercial spaceplane operations in 2014, the Civil Aviation Authority recommended that the regulations for spaceflight activities be updated. Therefore, legislation is required to put in place this enabling regulatory framework.

The Bill seeks to address three areas of policy: the promotion of the UK space industry; ensuring the safety of all space-related activities; and ensuring the UK's international obligations are reflected in UK law. Towards these three objectives, the Bill proposes seven areas of legislative framework, which the Minister outlined earlier.

## Stephen Kerr


Share

My hon. Friend is about to describe frameworks that apply to the whole of the UK, and what lies ahead of us over the next two days is an outstanding example of why we often need UK frameworks.

## Luke Graham

Share

I could not agree more; frameworks are very important. As outlined in "Star Trek", the Federation represents a united principle with very little nationalism present, and I hope that is the future we will all strive for this evening.

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There is nothing in essence with which I disagree in this Bill, which is why I support its principles. However, that does not mean that there is not more that can be done. Pre-legislative scrutiny by the Science and Technology Committee, which largely welcomed the draft Bill, highlighted some areas in which the Government could provide more policy detail, particularly environmental protections, delegated powers and the licensing and insurance provisions in the Bill. It also recommended an updated impact assessment, as the previous assessment had not been updated since the Government decided to legislate for spaceflight separately in the modern transport Bill.

I shall therefore highlight two areas of concern which I would like to see addressed, and which hon. Members on both sides of the House have referred to; I hope the Minister will respond to the concerns raised in summing up. I note that the Government consider that existing environmental and planning laws provide sufficient protections, but that they were considering adding an amendment which would require licence applicants to submit a noise and emissions assessment during the licence application process. I ask for the amendment to be introduced and to address specifically the environmental concerns raised by the Committee and in this House, so that our national environment can continue to develop, live and prosper for many years to come.

The second area of concern is the lack of a liability cap, and I urge the Government to introduce one. This would bring our space industry into line with those of Australia, France and the USA, which, of course, is the world space industry leader. The purpose of the liability caps in clauses 33(5) and 11(2) is to allow spaceflight operators to obtain affordable insurance. Without it, the prohibitive cost of obtaining insurance for unlimited liability would undermine the growth of the space industry in the UK, which, for me, is the key point of this Bill.

I accept that there is a need for flexibility within the legislation to allow for future technological advancements and changes to the international legal landscape. None the less, I believe there is still scope for some middle ground to be found between the Bill in its current state and increased clarity around the issues I have raised, while still allowing for the flexibility which is required. I therefore ask the Minister to consider the concerns raised by industry and the Committee, and the clauses I have highlighted for further consideration.

I would like to make one final point: with no existing spaceport or launch site in the UK, there is a glaring gap in the UK space industry market. However, this Bill provides an opportunity for Scotland, which is well placed to support, and benefit from, the growth in the UK space industry. Scotland has a strong heritage in the space sector. Companies such as Clyde Space and Spire have helped Scotland to become a hub of space activity, with Glasgow building more satellites in the last two years than any other city in Europe. Furthermore, future space innovations are being created by institutions such as the national Astronomy Technology Centre in Edinburgh and Strathclyde University, while it should be noted that Scotland's geography is well suited to a

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number of different launch operations including vertical-launched rockets. The potential to launch satellites from traditional rockets has seen organisations across Scotland develop business cases for spaceports in their regions.

As a proud constituency MP, I highlight the burgeoning aerospace industry in the Kinross-shire area of Ochil and South Perthshire, which I also hope will benefit from investment through the upcoming Tay Cities Deal, making it ripe to maximise the future benefits we hope will come from this Bill.

This Bill is vital to establish the foundation for the British space industry. We have an opportunity to capitalise on our technological edge, leveraging investment from our financial powerhouses in London and Edinburgh to fund companies and infrastructure to bring the UK truly into the space age.

🕒 8.19 pm

### **Bill Grant (Ayr, Carrick and Cumnock) (Con)**

Share

📄 Column 686

It is my privilege to follow my hon. Friend the Member for Ochil and South Perthshire (Luke Graham). My early connection with space was before his, and it came from the *Eagle* comic's characters such as Flash Gordon and Dan Dare, who are probably known only to a few here in the Chamber today. It is my pleasure to speak in support of the Bill this evening. It will pave the way for the next steps in British innovation and engineering. The UK space industry is already thriving, as we have heard. It is worth somewhere in the region of £14 billion and directly contributes more than £5 billion to this country's economic output. It supports a staggering 40,000 jobs throughout the United Kingdom, and I was delighted to learn that our space sector accounts for around 6.5% of the global space economy.

This success is the perfect launch pad for our ambitions. It has long been the UK Government's goal to become one of the leading players in, and indeed out of, the world when it comes to the space industry. That is why I was delighted to see such strong support for the aerospace industry in the Government's recent industrial strategy White Paper. The aerospace growth partnership, the collaboration between the Government and industry, is rightly focused on growing the UK's aerospace capabilities, of which there are many. It instils the confidence necessary for future investment. We have already seen almost £4 billion committed to the industry between now and 2026, and I am sure that it will attract significantly more finance.

The passage of the Bill on to the statute book cannot come soon enough. The aerospace industry is currently regulated by, strangely enough, the Outer Space Act 1986, which was passed more than 30 years ago by a progressive and thoughtful Conservative Government. We are doing a similar thing today. In 1986, spaceports and commercial space journeys were the stuff of science fiction, not of legislation. If we are to take our position as a global leader in space technologies, as I am sure we will, we must ensure that the regulations are fit for now and for the future. Under the current regulations, for example, the development of spaceports in the UK is restricted, and

the only licences that have been granted were for launches outwith the UK. The current system is also woefully lacking when it comes to the safety and security of spacecraft, of space infrastructure and of the people involved in the industry. International and EU rules simply have not been able to keep pace, and there is no detailed regulation in this area.

The Bill will establish a new regulatory framework and allow us to close some of the gaps. The Science and Technology Committee, of which I am now a member, undertook an assessment of the Bill. That was before my time in the House, but I was delighted to note that the Committee gave its broad support to the Bill and also heard from several representatives of the space industry. Organisations such as the Royal Aeronautical Society and companies such as Virgin Galactic and Airbus welcomed the Bill and the positive impact that it will have on the UK space sector.

The Bill will allow for the operation of UK-based spaceports. This is extremely important for Ayrshire—and, I am sure, for Cornwall—where we are proud to be the home of the Prestwick international aerospace park, located in the constituency of the hon. Member for Central Ayrshire (Dr Whitford), which neighbours my own. Glasgow is fortunate to be a close neighbour to Ayrshire. As has been mentioned, Glasgow is a European centre of excellence for the construction and assembly of high-tech satellites, so there is a good partnership there.

Prestwick aerospace park is home to more than 3,000 employees and some of the UK's largest aerospace companies, such as BAE Systems and Spirit AeroSystems, to name but two. It is Scotland's only aerospace enterprise area, and it is noted as a centre of innovation and technical excellence in aviation, not only locally and throughout the UK but globally. There are, for example, 8,000 engineering graduates living within a 45-minute commute of Prestwick, including many who live in my own constituency. The airport at Prestwick is currently developing a plan to make it one of the first spaceports in the United Kingdom and Europe. I emphasise the word "first"; we do not mind who comes second. The large site is ideally suited for such a purpose, with a concrete base runway that stretches for almost 3,000 metres. It is one of the largest runways in the United Kingdom.

 **Column 687**

## **Luke Graham**

Share

My hon. Friend is making a fantastic speech, and Prestwick is a fantastic site. Does he agree that the benefits of locating a spaceport there would encourage wider infrastructure investment, including in high-speed rail, as well as more connectivity and improved investment into Scotland and the north of England? Would it not be great to have a more connected United Kingdom?

## **Bill Grant**

Share

Absolutely. We are well connected by rail and road, but any improvements would be most welcome. We are not an isolated part of the United Kingdom; we are very much connected. I thank my hon. Friend for his intervention.

We also have favourable weather 52 weeks a year, and there are no congestion issues. When we take off to the west, we are across the Firth of Clyde and into the open space of the north Atlantic. If we go east, we find open farmland and we are away across. Prestwick is a wonderful airport, but it could do with more traffic. I am sure that it will get that in time. Success in securing a spaceport operator's licence will lead to the creation of a further 2,000 jobs and generate an additional £320 million for the UK economy. It will place south Ayrshire—and Ayrshire and the west of Scotland as a whole—at the heart of the global space industry. More importantly, it will attract and retain some of the brightest and best minds in the world to Scotland, UK.

The Bill will benefit Prestwick, as well as other sites with similar ambitions all around the UK. We have heard mention of some of those tonight, and they are quite right to be ambitious, but we are equally ambitious for Prestwick, which is the best site in the United Kingdom. The Bill will allow us to take the next step and bring us closer to operating commercial spaceports. It will unlock untold opportunities and investment into Ayrshire and Scotland, and allow the UK to cement its place as a world leader in space technology. I am delighted to support the Bill's progress today.

🕒 8.26 pm

### **Stephen Kerr (Stirling) (Con)**

Share

I rise to make a short contribution to the debate, not on the basis of any kind of knowledge or technical insight but simply as an enthusiast. I was unsure whether I, as the Member of Parliament for Stirling, could stand here and speak with any authority about such matters as the European Space Agency, but such is the marvel of the days we live in that I have received a communication while I have been in the Chamber from a constituent, Mr Gordon Honeyman, who tells me that I have a constituent who works for the European Space Agency—it happens to be his wife—so I now feel flush with authority to address these subjects, perhaps with an even greater degree of enthusiasm.

I should like to speak in support of the Bill. I am reliably informed that to achieve escape velocity from the Earth, a vehicle must be travelling at 25,020 mph. That is quite fast. The need for speed in rocketry and space engineering is a well-documented fact. The vast distances of space and the physics of gravity make such speed a requirement.

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### **Carol Monaghan**

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That escape velocity applies if the vehicle is pinged from the surface of the Earth and no further propulsion is used. Actually, if we could continually move upwards at 1 metre per second, we would eventually get into space.

**Stephen Kerr**

Share

I am the better for that intervention, but I am now worried about what else I will say. I am grateful for the fact that the hon. Lady, who is a physics teacher, is in the Chamber today to provide that illuminating insight. I hope that we can agree that 25,020 mph is very fast, but such speeds are difficult for us to assess with our 70 mph motorways, which make it difficult to imagine a speed 357 times faster. Even the HS2 line, operating at 250 mph, pales into insignificance. I am obviously deploying parliamentary understatement when I say that we are dealing with something out of the ordinary as a means of transport.

It is the need for speed that necessitates this Bill, not in the physical sense that I have been discussing, but in the legislative sense. Prescriptive legislation that annotates all aspects of regulation is doomed to fail in the fast-moving and changing world in which we live, especially in this fast-moving industry. I made similar comments about the need to move quickly to keep up with the times in the context of the Automated and Electric Vehicles Bill and data protection legislation.

**Dr Whitford**

Share

I totally accept the point that we need flexibility to keep up with innovation, but do the hon. Gentleman and his colleagues recognise that the industry is anxious because it cannot see draft regulations a mere two years before the Government would like to see launches?


**Stephen Kerr**

Share

I thank the hon. Lady for her intervention, and I agree. It is important to establish a framework in which policy is laid out so that, as mentioned in her excellent speech, investors can have some view of the future and there can be certainty for investment decisions. Going back to what I was saying about the other Bills, it is important that legislation keeps up with the rate of change, and technological change in particular.

Several Members have mentioned the vital importance of spaceports and their location and the opportunity for this country to have satellite launch facilities within its borders instead of sending satellites abroad, and that issue has been well discussed throughout the debate. It is frequently pointed that the United Kingdom has some attractive geographic advantages when it comes to launch facilities. If someone is intent on launching satellites into polar orbit, launching them over an ocean at a good angle is what they are looking for, and Scotland has a good number of ideal locations for vertically launching satellites into polar orbit.

A space race is going on, but it is not the same as the space race of the past; this race is about establishing new spaceports. The competition is not just between locations in the United Kingdom—I totally subscribe to the view that there should be as many spaceports as demand requires—but between the United Kingdom and other northern European countries. This Bill allows the possibility of the UK getting into this game early, getting head and staying ahead.

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Madam Deputy Speaker, you will not be surprised to hear me say that Scotland is indeed the ideal location for spaceports, and its candidate locations are competing to become Britain's first spaceport. In a really good speech, my hon. Friend the Member for Ayr, Carrick and Cumnock (Bill Grant) spelled out the advantages of Prestwick, as did the hon. Member for Central Ayrshire (Dr Whitford), and one of the attractive features of the Prestwick proposal, apart from the geographic and meteorological advantages, is the community and cross-party unity on the matter. I cannot think of a more inspirational happening for the young people of the west of Scotland than the announcement of the building of a spaceport in Ayrshire—right on the doorstep of the vast majority of Scotland's population.

I belong to the generation where the word space immediately conjures up the three-word phrase “the final frontier”, which has been referred to several times, but we are talking about something far more real than the science fiction and television series of my boyhood. As an eight-year-old boy in 1969, I remember watching in wonder at the flickering black and white images on our family television as the astronauts of Apollo 11, Neil Armstrong and Buzz Aldrin—names that will live forever in the history of mankind—stepped out of the lunar module and on to the lunar surface, famously taking that

“one small step for a man, one giant leap for mankind.”

It was an exciting time and the possibilities of space exploration seemed limitless, and every young mind in the country was seized with the excitement of that possibility.


Sadly, before I had even reached my first year at secondary school, manned flight to the moon, which was such an exciting prospect, had lost the attention of the vast majority of people. It is sad to say that the only time in recent memory that the British public really embraced, in a popular way, the concept of space exploration was Christmas day 2003, when Colin Pillinger and his team attempted to land Beagle 2 on the surface of Mars, as I am sure we all remember. Perhaps in the best traditions of noble first endeavours, it did not quite come off. Colin sadly passed away without knowing that he had come very near to achieving the objective of the mission.

I am most excited about this Bill, this subject matter and what it does to fire the imaginations of our young people.

## Luke Graham

Share

My hon. Friend refers to the moon landings in the 1960s. It was a small step for a man, but does he agree that this Bill is a chance to invigorate everyone in our country and to show how much they can contribute not only to the future economy but to the future development of the entire globe?

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## Stephen Kerr

Share

Absolutely. This is about firing the imagination of all of us to the possibilities of space exploration.


I am mindful of the time, so I will press on. The fact is that we need this legislation, because without it we would create real risks for people. We have discussed the economic risk, but there is also the physical risk of injury. The risks of unlicensed or unregulated space activity happening in the skies above us are real. It is essential that we ensure the UK has a licensing regime that enables innovation and entrepreneurship but prohibits high-risk ventures that could do real damage.

With this Bill we are protecting not only the life and limb of our citizens but the communications and forecasting equipment that keep our country moving. There is no real difference between a major motorway that moves people around the country and a satellite that connects two different parts of a business with a high-speed link—they both need protection to ensure that we have functioning national infrastructure. The Bill envisages an uncomplicated process for doing that by allowing for schemes and ideas to be given an indicative rating as to whether they can be licensed simply, thereby allowing everyday activities to proceed quickly, or whether there is a need to alter the programme or plan. The way that will change and update with changes in technology means that what is a high-risk madcap stunt today becomes standard operating procedure tomorrow. We need a framework to allow for such change.

As I mentioned earlier, let us not forget the inspirational and uplifting elements of space travel, and we have heard quite a few references to space tourism and the possibilities it might bring. These are inspiring technologies, not only from the point of view of seeing a large rocket blast off into space but from the results and benefits we will get from such launches. Space radar that penetrates the atmosphere to scan the surface of Earth in huge detail, photographic data at different wavelengths that can tell how healthy crops are and satellites that connect communities around the world are all part of a picture that shows what humanity can do when it puts its mind to something.

We need to travel at great speed to escape the legislative atrophy that often grips us as a nation. We cannot rely on 18th-century legislative engineering to support 21st-century endeavour. We must allow our entrepreneurs and business people not only to see the sky as the limit but to look beyond even that. Our job is to give them the frameworks and the ability to do so, unconstrained by the surly bonds of outdated regulation.


I urge the House to support the Bill.

 8.38 pm

### **Vicky Ford (Chelmsford) (Con)**

Share

It is a great pleasure to be the last Back Bencher to be called to speak tonight on this enormously exciting part of our economy. The space industry is the fastest growing part of our economy, and it is key to jobs and growth. The sector has trebled in the UK since 2010, and the global industry is set to more than double. The jobs are high skilled, high value and highly productive, and that is

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not all. Investing in space boosts productivity, increases exports and ignites passion for science and technology. In this the Year of Engineering and the centenary of women first getting the vote, exciting that passion for engineering, especially among women, is key.

I remember that the science wall at school had a picture of the Earth, Archimedes and a lever, and the quote said, "Give me a lever and a place to stand and I will move the Earth." I contest that the satellites we have put up into space give us the ability to understand the movements in and on our Earth like never before. It is key that this is looking not only out to space, but at what is happening on our planet. This technology is changing all the time. I am a bit of a geek and just before Christmas I went to the annual meeting of the quantum technologies group. In my constituency, the company Teledyne e2v has invented a little box containing a gravity sensor which will go up in a satellite and from there, using quantum technology, will be able to understand what is happening inside and underneath the shell of our planet. We will be detecting earthquakes, understanding geology like never before and seeing what is happening in the heart of a volcano. This is not just cool—this is super cool; this is absolute zero being developed in Britain, in Chelmsford, for the future of our planet—it is great.

It is important that we think about not only the future of great big satellites, but about the development of the smaller satellites, the downstream applications and the state-of-the-art technology. In my previous job, I worked a lot with the European Space Agency. We have paid for the Galileo and Copernicus satellites, and we must make sure that British businesses benefit from being able to take part in the downstream applications and work on the data that we have. Space assets are also key to our modern communications, especially in security, but the UK is the only G7 economy that does not have its own Earth imagery assets. So it is important that we can continue to share data with other nations of the world.

We in Britain have a reputation for high-quality engineering. Another part of my local company Teledyne e2v is working in Leeds, where it is making the highlyengineered filters, switches and converters that are critical technology for the OneWeb group of satellites. If something goes wrong once we have set it up in the sky, we cannot bring it down to mend it, so the quality of the engineering is key. This type of small satellite will provide the global network coverage so that we will have internet coverage from space, not just from cables. Being able to launch those small satellites from the UK has great benefits. So I thank the Government for this Bill. Our businesses have carried a lot of business risk in trying to carry out those launches from other parts of the world.

I was delighted when all of the representatives of the British space sector came for a roundtable in Chelmsford to examine this Bill. They are really pleased with it. It is giving a proper legal framework for their development and it is making Britain the go-to destination for investment in the space sector. Yes, there are some issues to address. The unlimited liability regime makes it impossible for insurers to provide coverage. It is not that they do not want to; it is that it is often outside their modus operandi. So let us look again at that. There is also a huge amount of

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interest in using this Bill to develop a mergers and acquisitions culture and framework, so that once we have put the satellites in the sky, it might be that they can be sold on to other investors. That will mean not only that Britain is the place for investment on Earth for our space sector, but we also become the place to invest for the universe. So I say thank you for the Bill.

🕒 8.43 pm

### **Karl Turner (Kingston upon Hull East) (Lab)**

Share

This has been a good debate, with some good and knowledgeable contributions. Members rightly made strong bids for their constituencies as potential candidates for spaceports, and I commend them for that. Given the time allowed, I do not intend to refer to every speech, but it would be remiss if I did not mention at least the right hon. Member for South Holland and The Deepings (Mr Hayes), not least for his collegiate approach to this debate. Generally, as a Minister, his approach worked well. It certainly improved the ability to legislate in this place and I was grateful for that.

As my hon. Friend the shadow Secretary of State has said, the Opposition are broadly supportive of this Bill and welcome it. I must pay tribute to our colleagues in the other place, who have successfully secured crucial concessions from the Government that have ensured that this Bill is now in a much better place than it was at the start of its passage through the other place.

It is, though, a skeleton Bill, and the detail is not ready. It has only 71 clauses, yet it provides for 100 delegated powers. We accept that it is not possible to provide all the necessary regulations in primary legislation, but the Government could perhaps have dealt with some of the industry's concerns. This is yet another example of the Government introducing skeleton legislation while they flail around on Brexit.

The Opposition intend to support the Bill, but we may in Committee need to table amendments on issues on which we have concerns, one of which is the delegated powers that the Bill will give to the Secretary of State. That was one of the matters on which our colleagues in the other place forced the Government to back down, thereby removing the Henry VIII powers. Nevertheless, the catch-all regulation-making power could weaken judicial oversight and may render other delegated powers less meaningful, so we may need to revisit it in Committee.

As the Bill stands, clause 2 limits the environmental objectives that must be considered to those set by the Secretary of State. We intend to probe the Government on that in Committee. There is still a worry that the powers set out in clauses 38 and 40, which deal with powers in relation to land use, may encroach on devolved planning powers. We may need to make reference in the Bill to the devolved Administration giving their consent to the use of the powers.


Again as the Bill stands, there is currently a lack of judicial oversight for emergency orders. The Constitution Committee and the Delegated Powers and Regulatory Reform Committee in the other place have expressed concerns about enforcement authorisation, with the former describing the powers in clause 32 as "wide-ranging and potentially draconian". We may need to table an amendment in Committee to deal with that.

Industry stakeholders' main worry with the Bill is the absence of a mandatory liability cap for spaceflight operators—a point made time and again in the debate. We will definitely probe further into this matter in Committee and ask the Government to clarify their position. The Government have given an assurance that a specific regulator—either the Civil Aviation Authority or the UK Space Agency—will act as a single point of accountability for safety on each individual mission. However, there is no detail on how that would work in practice and what the relationship will be with the Health and Safety Executive. That is something else to investigate further in Committee.

 **Column 693**

The Opposition very much share the Government's ambition for the UK to be a leading player in the global space industry. To achieve the Government's aim to grow the UK space industry from its current 6.5% of the global space economy to 10% by 2030, it is important that the industry has a spaceport facility, which is why it is crucial that we get the regulatory framework right.

As I have said already, the Opposition broadly support the Bill, but I hope the Government will work with us to make this legislation the best we can make it, by supporting the very helpful amendments we table in Committee.

 8.48 pm

### **The Parliamentary Under-Secretary of State for Transport (Jesse Norman)**

Share

It is a great pleasure to be able to respond to this Second Reading debate. We have heard some wonderful speeches and a wide range of expertise, ranging from my hon. Friend the Member for Mole Valley (Sir Paul Beresford), who spoke of his enthusiasm but downplayed his knowledge, only to display a considerable amount of knowledge, to that bravura turn from my right hon. Friend the Member for South Holland and The Deepings (Mr Hayes), who spoke for what is for him, as the House knows, a mere canapé in the smorgasbord of oratory, a throat-clearing before the tenor really begins, a tiny 18 minutes—one felt that the poor man had barely got into his stride. I, along with my colleagues, pay tribute to him. In his relatively brief remarks, he was able to speak eloquently of the surely temporary interlude that he is planning to spend on the Back Benches of this House. In his poetic tone, he reminded me of Walt Whitman's poem, his famous centrepiece in "Leaves of Grass", which is entitled, as the House will know, "Song of Myself". It includes the famous sentence:

"I am large, I contain multitudes."

The multitudes raised by my right hon. Friend include President Kennedy and the cast of "Star Trek". It is fair to say that we all enjoyed what turned out to be a quite wide-ranging tour of his own achievements.

It has been a very positive debate today, and I thank all those who have taken part. I am also grateful to the Minister of State, my hon. Friend the Member for Orpington (Joseph Johnson), who opened this debate with such insight into the UK space sector and the opportunities that lie

ahead. His continued close involvement in this programme of work and the knowledge and experience that he brings are a great asset to this Bill and to the work going on outside this House to realise spaceflight and its true potential, which was so well spoken of by so many Members across the House today.

Today's debate has made it clear that this Bill is not politically charged or divisive and its ambition has not prompted serious disagreement or division, but invited reflection. In the best traditions of the House, it is reflection on the achievements of one of this country's largely unsung success stories, our thriving space industry, and reflection on how best to ensure that this success continues for generations to come. Indeed, in the best tradition of pioneering space missions, this Bill has inspired collaboration, not contest, at all stages of its development and debate, which is a testament to the bold, exciting and important ambition that lies beneath it. We must now honour that ambition with legislation that is fit for purpose in the modern commercial space age—legislation that will make the UK the most attractive destination in Europe to operate a profitable and responsible space business.

As many Members have noted, the UK space industry is not short of ambition. The global launch and servicing of small satellites, of which there may be thousands in the coming years, could exceed £10 billion in revenues over the next decade, with an untapped European regional market potentially worth around one third of that. Nowhere in the world is this market more fully exploited by a sustainable, commercial offering until now.



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## **Bob Stewart**

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Having run a satellite industry company, for me one of the worries is to do with the amount of launching that we are doing. That is great, but what we have to think about is how to get rid of the junk. There is so much junk up in space now that it is becoming incredibly dangerous. Internationally, we need regulations on how we destroy a satellite when its life is over. It should be brought down rather than left up, and the way to bring it down is to put it into the Pacific graveyard, which already exists. We bring the satellite down, and it either burns up or it goes into a very remote area of the ocean. We must think about that; otherwise, we are producing an environmental catastrophe in space, which is almost there now.

## **Jesse Norman**

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My hon. Friend speaks for all of us from a great base of experience. Everyone in this House feels that the issue of space debris is a serious one. It is not only a serious one, but one that the Government believe they will be operating in line with international best practice in addressing in the course of the implementation of this Bill.

The UK has a variety of factors that support it in this great ambition, including the right geography and the right environment in which to deliver new launch services. The Government's industrial strategy, published last year, will continue to help our successful, competitive, open economy to grow.

Finally, we have the right industry ready to support and exploit new launch opportunities. Our pioneering space and aerospace sectors are home to many thriving companies and capabilities, including small satellite technology companies and the most innovative advanced manufacturing capabilities.

Half a century ago, the British rocket programme was considered unviable, but as the last rocket had already been built it was given permission to launch. Prospero, the small satellite it successfully transported into space, was the first and only satellite so far to reach orbit on a British launch. No longer. As Prospero said,

"The hour's now come;

The very minute bids thee open thine ear".

Once more, we can reach for the stars and put an end to that lonely record—not at vast public expense or in a way that depends on the hospitality of others, but in the best spirit of British innovation: by enabling, attracting and empowering commercial markets for small satellite launch and sub-orbital flights from UK spaceports. In response to the vigorous pre-competition that has taken place, I should say that there may be more than one spaceport; they may be located in the north of this country and in the south-west. We welcome that open spirit of competition and possibility.

There will be many benefits. Entrepreneurs will benefit from new opportunities to build their enterprises. Local economies will benefit from the creation of spaceport sites with related jobs and opportunities in construction. Our small satellite industry will have direct access to domestic launch capacity. British space scientists will benefit. Young people seeking careers in science and technology, engineering and maths will gain new opportunities and—perhaps even more importantly—greater inspiration from an expanding UK spaceflight industry. How many of my colleagues have picked up on the importance of bringing the best and brightest young and old brains to work! The UK as a whole will benefit from access to a strategic small site launch capability, contributing to our understanding of the world, greater commercial and public services, national security and opportunities for new investment and export.

I could go into many other aspects, Madam Deputy Speaker, but let me turn to some of the comments made today. I am grateful for the points made by the Opposition. On issues environmental, the Government are committed to tabling environmental amendments in the Commons at Committee stage, and we look forward to working with the Labour party on that. Many Members mentioned a liability limit. There is no such limit in the Bill, and we expect that


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crucial point of discussion and debate to be addressed in Committee to the extent that it is necessary. The hon. Member for Kingston upon Hull East (Karl Turner) sought confirmation that there would be a single point of accountability for each spaceflight, and I can confirm that.

The House has focused on the importance of urgent regulation. As I mentioned, we are currently aiming to lay statutory instruments from summer 2019. That will allow time for more detailed policy development, consultation and drafting. My hon. Friend the Member for St Austell and Newquay (Steve Double) asked for reassurance that there would be continued involvement with the European Space Agency post-Brexit. Brexit will, of course, not affect the UK's membership of that agency at all; it is entirely independent and includes non-EU member states such as Norway and Switzerland. We expect to collaborate closely with it.

Will there be adequate protection? The hon. Member for Glasgow North West (Carol Monaghan) asked for Galileo and Copernicus. The answer is yes. The joint report issued by the negotiating teams was clear in December last year: UK entities will be able to continue to participate in all EU programmes, including those I have just mentioned. My hon. Friend the Member for Wimbledon (Stephen Hammond) raised concerns that certain terms in clause 8 might be used to constrain the space flight market. As many Members have mentioned, the whole point is that in this case regulation is enabling us and building markets—it is not constraining markets, but creating them. That creative idea lies behind the Bill and the commercial possibilities unleashed by it.

We have talked about inspiration, and about debris. Let me wind up relatively quickly. There will be three main statutory instruments, as I have discussed, covering sub-orbital activity, space activity, and spaceports and range. They will be subject to the affirmative procedure, and they will therefore allow full parliamentary scrutiny and debate. *[Interruption.]* I am being encouraged by colleagues to mention Wantage.

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## Mr Vaizey

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Harwell.

## Jesse Norman

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There are other places that one could mention very happily, but Harwell in the constituency of Wantage is particularly close to my right hon. Friend's heart. Therefore, I mention it with great delight.

Today we are taking forward a Bill that will pave the way for a modern, safe and supportive regulatory framework for small satellite launch and sub-orbital spaceflight from UK spaceports.

## Mr Vaizey

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Will the Minister give way?

**Jesse Norman**

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I can only salute my right hon. Friend's ambition. Spaceflight will provide new growth and employment opportunities across the UK. This is a fine and important piece of legislation. It has what Tom Wolfe referred to as "The Right Stuff", and I commend it to the House.

*Question put and agreed to.*

*Bill accordingly read a Second time.*

Space Industry Bill [Lords] (Programme)

*Motion made, and Question put forthwith (Standing Order No. 83A(7)),*

That the following shall apply to the provisions of the Space Industry Bill [Lords]:

*Committal*

(1) The Bill shall be committed to a Public Bill Committee.

*Proceedings in Public Bill Committee*

(2) Proceedings in the Public Bill Committee shall (so far as not previously concluded) be brought to a conclusion on Tuesday 30 January 2018.

(3) The Public Bill Committee shall have leave to sit twice on the first day on which it meets.

*Proceedings on Consideration and up to and including Third Reading*

(4) Proceedings on Consideration and any proceedings in legislative grand committee shall (so far as not previously concluded) be brought to a conclusion one hour before the moment of interruption on the day on which those proceedings are commenced.

(5) Proceedings on Third Reading shall (so far as not previously concluded) be brought to a conclusion at the moment of interruption that day.

(6) Standing Order No. 83B (programming sub-committees) shall not apply to proceedings on Consideration and Third Reading.

*Other proceedings*

(7) Any other proceedings on the Bill may be programmed.—(Chris Heaton-Harris.)

*Question agreed to.*

Space Industry Bill [Lords] (Money)

*Queen's recommendation signified.*

*Motion made, and Question put forthwith (Standing Order No. 52(1)(a)),*

That, for the purposes of any Act resulting from the Space Industry Bill [Lords], it is expedient to authorise the payment out of money provided by Parliament of:

(1) amounts paid by the Secretary of State by way of indemnity in respect of the liability of holders of licences under the Act for injury or damage,

(2) amounts paid by the Secretary of State under the terms of any insurance or reinsurance made available by the Secretary of State, and

(3) any other expenditure incurred by the Secretary of State under or by virtue of the Act.—(*Chris Heaton-Harris.*)

*Question agreed to.*

Space Industry Bill [Lords] (Ways and Means)

*Motion made, and Question put forthwith (Standing Order No. 52(1)(a)),*

That, for the purposes of any Act resulting from the Space Industry Bill [Lords], it is expedient to authorise:

(1) the making of charges in respect of the performance of functions under the Act or the Outer Space Act 1986, and

(2) the payment of sums into the Consolidated Fund.—(*Chris Heaton-Harris.*)

*Question agreed to.*