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# Space Policy

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**14 January 2016**

Volume 604

 12.09 pm

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

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I beg to move,

That this House notes the scientific, cultural and technological opportunities arising from exploration of outer space and the significant contribution the space industry makes to the UK economy; further notes the increased public interest in space exploration resulting from Major Tim Peake's mission to the International Space Station (ISS); welcomes the global co-operation that has led to the development of the ISS over the last forty years; takes note of the shortlist of airports and aerodromes that could host a UK spaceport published by the UK Government in March 2015; and calls on the Government to bring forward further advice and support for organisations considering developing such facilities so that they might be operational by the Government's target date of 2018.

If hon. Members read the motion, they will see that it covers the incredible breadth and depth of the space industry and its amazing potential. I hope that that will be covered during the debate by Members from different parts of the United Kingdom. Some people are likely to stoop to using some fairly poor puns. At this point I would like to register the fact that I accept no responsibility for that. I lay the blame at the feet of the Prime Minister, who has stooped to using some pretty shocking puns at Question Time recently, something for which he needs to be penitent.

Some people who follow the media will be aware that our former First Minister, my right hon. Friend the Member for Gordon (Alex Salmond), has used as a travelling pseudonym the name of that famous captain of the USS Enterprise, but for a debate as important as this, I felt we should contact the real McCoy. I therefore have a message to the House of Commons from William Shatner:

“Space is one of the last known frontiers, mostly untouched by mankind and his politics. In opening a debate on this subject my hope is you take the tenets of Star Trek’s prime directive to universally and peacefully share in the exploration of it. I wish you all a wonderful debate. My best, Bill”.

As some people will have seen, we have also had a message on Twitter from George Takei—otherwise known as Mr Sulu—wishing us luck as we venture to the stars.

This is not a debate about fictional astronauts. We tried to get the debate on this day to honour a real astronaut, Major Tim Peake, who is currently in the international space station. We sought it today because tomorrow he will be making a spacewalk. Contrary to some slightly sloppy journalism, he is not actually the first British astronaut. That honour fell to Dr Helen Sharman from Yorkshire a quarter of a century ago, in 1991. I find it incredibly appropriate that, prior to that, she was a research chemist for Mars. *[Laughter.]* It’ll get worse.

However, Major Tim Peake is our first astronaut through an increased engagement with the European Space Agency. While Helen Sharman was on the Mir station, he is in the international space station, and tomorrow he will certainly be taking part in the very first British spacewalk. It will start, hopefully, at 11.30 GMT tomorrow morning. I would encourage all schools, children and youngsters of all ages to log on to principia.org or NASA TV on the internet, where it will be shown, as it truly is an historic moment. He has been tasked with changing regulators on the solar panels. As they are high-voltage regulators, the walk has to be carried out entirely on the dark side.

I am a member of the parliamentary space committee. We had the great opportunity to have a private tour of the “Cosmonauts” exhibition in the Science Museum, which I would recommend to anyone. The museum spent four years negotiating with Russia to bring incredible artefacts to this country—the space capsule of Tereshkova, uniforms of Gagarin and all sorts of pieces of hardware that even people in Russia did not know existed. What struck me as we went round the museum was the fact that, during points of incredible friction between Russia and the US and across the world, back channels always remained open. Co-operation always continued on the international space station. We have seen that in these few years of setting up the exhibition, during which we have had the Ukrainian crisis, Crimea and friction over Syria. If we can work so well together in space, it would be great if we could work a little bit better here on earth.

Any Members who were in the Chamber when I made my maiden speech will remember that I referred to Prestwick in my constituency as being on the shortlist for consideration as a space port. I remember that whenever I talked to anyone about that during the election, they would always just laugh, because in this country we think that space is for other people—the big boys: north America, Russia and maybe even China, but not us. That is something we have to change. We need to believe in what we can do, and I think Major Tim Peake’s mission will achieve that. We see the interest of school children and the Science Museum was packed on the day of the launch,

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and we had Members in this place watching it live on screen. We hope it will lead to an interest in STEM subjects—science, technology, engineering and maths—and an absolute belief in the space industry here in the United Kingdom.

The space industry is new, but the UK has a proud aviation history, which includes Rolls-Royce and supersonic flight. We need to take the next step and grasp that opportunity. The industry has changed over the past five years, and I applaud the decisions taken in 2010 that led to the formation of the UK Space Agency. It is now an industry with a turnover of £11.5 billion. It employs 35,000 people, three quarters of them in graduate jobs, and a third of its production is exports, but the vision of the Department for Business, Innovation and Skills is that it should grow to become a £40 billion industry. For that, we really need to take action.

If it was not a political decision, there should not really be any great doubt that the choice should be Prestwick. We already have almost everything that is needed. We have a runway that is touching 3 km. We are in a coastal position, to allow start-off over the sea. We have the northern air traffic control centre in our campus, which allows the planning of what will be some pretty clever management of airspace, and obviously we have relatively empty airspace. We are close to Glasgow University and Strathclyde technology catapults and we have, uniquely, an aerospace cluster on the airport campus. It contains BAE Systems, Spirit AeroSystems and many others, all of whom are interested in the idea of a space port.

Up the road from us is Clyde Space, which makes small CubeSats that are only a litre in size. Early communication satellites were weighed in tonnes and were the size of a double-decker bus, but the UK, through Surrey Satellite Technology, has led since the '80s in producing satellites that are about the size of a fridge. That is a step change. It has been shown that if the cost of getting a satellite into space gets down to the tens of thousands, everyone is going to want one. We will have to look at regulating that, otherwise space will be full of junk, but it enables all sorts of possibilities. However, we do not have a domestic launch site. That is why the aim is to have a UK space port by 2018.

As well as all the physical attributes of Prestwick, 20 years of Met Office data show that, despite preconceptions, it has the clearest weather, compared with Newquay, which people would presume is the closest contender. Low cloud is suffered by Newquay 31% of the time and only 11% of the time at Prestwick. Less than 5 km visibility is suffered by Newquay 15% of the time and only 4% of the time at Prestwick. I live in Troon, which is next door, and I can vouch for the fact that we have a weird little weather system, locally known as the Prestwick hole. People can fly into it, drive into it or walk into it. They can be surrounded by thick cloud, but they will look up and see a large hole of pure blue sky. That is what has made Prestwick the clear weather airport for the United Kingdom for decades.

I call on the Minister to look not just at having one space port. I think this is an industry that will mushroom. We need to accept that all sorts of sectors will develop that we have not even thought about. It will diversify. This is a real industry. It is not about saying, “Beam me up, Scotty,” or



fretting about the dilithium crystals that we see on the telly; it is a multi-billion pound industry. I call on the Minister to be imaginative, to be brave and to be boldly going where no Minister has gone before. [Hon. Members: "Ooh!"] Nearly done.

## The Parliamentary Under-Secretary of State for Life Sciences (George Freeman)

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More!

## Dr Whitford

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Oh, I am sure the Minister will have about two hours more.

Prestwick was Scotland's first ever passenger airport and it was founded by Group Captain David McIntyre, the first man to fly over Everest. That is the kind of imagination and drive we need. I call on the Minister to please be imaginative and to support the industry across the entire UK so that it can live long and prosper.

🕒 12.20 pm

## Dr Phillip Lee (Bracknell) (Con)

Share

It is a privilege to follow the hon. Member for Central Ayrshire (Dr Whitford). In fact, I am beginning to question why we are not in the same party, because every time she speaks I find myself agreeing wholeheartedly with her on a variety of different issues.

The hon. Lady will not know that, in my maiden speech in 2010, to some colleagues' surprise I spoke about the UK space industry. In fact, I was advised by some wise owls in these parts that I should not speak about the space industry, because I would be ridiculed as the spaceman of the House of Commons.

A year or so later, I secured an Adjournment debate in this Chamber, in which I discussed the rather esoteric subject of microgravity. During my speech, I spoke about the value of protein crystal investigation, the potential for doing a variety of biotechnological and medical experiments in space, and how that could advance our knowledge base. Major Tim Peake is doing all those experiments now. I like to think that that Adjournment debate led in part to the Government's decision to invest in the European Space Agency's European Programme for Life and Physical Sciences. That investment led to Tim Peake, whose field of expertise is microgravity, travelling on the rocket to the international space station.

The space industry has hardly any presence in my constituency, so why did I decide to talk about it in my maiden speech in 2010, and why did I subsequently take up the House's time to talk about microgravity in an Adjournment debate? It was because, as the hon. Member for Central Ayrshire has already eloquently pointed out, there is something about space and the exploration thereof, particularly manned exploration and flights, that is truly inspirational to everybody. Whenever I visit schools during their science, technology, engineering and maths week, invariably I see

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pictures there of planets and rockets. There is something about space and the exploration of it that inspires young people. When engineers were asked why they had done an engineering degree at university, up to 40% of them said that they had done so because of the exploration of space and that their interest had first been stimulated by images from space.

I made my maiden speech in an Opposition day debate on industry. I thought it was important to talk about the space industry, not only because I think that the future of this great country is wedded to the success of science and technology and that that will increasingly become the case, but because the space industry is, in and of itself, so inspirational and such a great success that it needs as much support as possible from Governments, of whichever colour. The previous Labour Government did some very good work and UK space policy made some significant advances as a result. I hope and expect that this Government will follow suit.

When I made my maiden speech, the estimated size of the space industry was £6.8 billion, but the figure now is £11.6 billion. That increase has happened in five or six years. The space industry has grown so successfully during that time that we would struggle without the tangible value it provides.

I have been vice-chairman of the parliamentary space committee pretty much ever since I made my maiden speech, and I have often experienced pushback when I talk about the value of manned space flights. As the hon. Lady has said, there is a sense that somehow space is for others, not for Britain, that the exploration of space is very expensive and that we should be concentrating on other things. However, let us remember that for every dollar the US Government spent on the Apollo space programme, there was a remarkable \$13 dollar return on their investment.

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The returns were not just financial. In December 1968, a very famous photograph was taken by Bill Anders on Apollo 8—the so-called “Earthrise” photograph. The value of that photograph cannot be calculated in financial terms alone. Imagine where the environmental lobby would be if it did not have a photograph of the earth as seen from the moon. Imagine how those astronauts felt when they put up a hand and hid the earth with their thumb. Our perception of this wonderful planet was changed by that investment by the US Government. Of course, it was driven by a race with the Soviet Union, but the return was not just financial. We recognised the fragility of this planet and how fortunate we are.

I would argue that, in the process of the achievement of putting the first man on the moon in July 1969, man rediscovered the value of exploration. Now we face the next challenge, which is to place a person on the surface of Mars—perhaps it should be a woman. Increasingly, women are deployed in fighter jets because of their ability to withstand G-force, so perhaps it will be a woman who first stands on Mars. I think that Britain should be part of that. The cost may seem large, but we should consider it in proportion to the rest of the money we spend as a nation and,

indeed, as a world. If we are not prepared to explore space, push back our boundaries of knowledge and discover things that we did not realise we were going to discover, then what on earth are we about as a species?

Space is an exciting subject and I cannot think of another subject that is so truly inspirational. British Governments, of whichever colour, should play a greater part in it and recognise that they have a role to play in mitigating risk and that private investment alone will not bring it about. If we do that, this country will have a very bright future indeed.

🕒 12.27 pm

### **Patrick Grady (Glasgow North) (SNP)**

Share

I think this is the first time I have been called to speak in the Chamber without there being a formal time limit on speeches, but I will do my best not to go to infinity and beyond. I thank my co-sponsors of the motion, and the Backbench Business Committee for giving us the time to have this debate at relatively short notice. As my hon. Friend the Member for Central Ayrshire (Dr Whitford) has said, the debate has come at an opportune moment, the day before Major Tim Peake makes his spacewalk.

Adjournment debates secured by the hon. Member for Bracknell (Dr Lee) notwithstanding, I understand that this is the first time since a 2005 Westminster Hall debate that the House as a whole has considered space policy, so this debate is very timely indeed. It is great to hear that today's important deliberations have been recognised by good wishes from Captain Kirk and Mr Sulu themselves. Indeed, our very own chief Trekkie, my right hon. Friend the Member for Gordon (Alex Salmond), who usually occupies the spot on which I am standing, has sent us his best wishes as well. On space issues, there is a close link between the inspiration provided by both science fiction and science fact. Perhaps I will come back to that later.

It is also appropriate to finish the week in which the English votes for English laws procedures were used for the first time by discussing matters about which there can be no question but that Scottish National party Members have a mandate to speak and vote on. Later today we will discuss the House of Lords, which is reserved. Schedule 5, part II, section L6 of the Scotland Act 1998 proudly and clearly reserves to the Parliament of the United Kingdom,

“Regulation of activities in outer space.”

If a Starman waiting in the sky read that, he might think it was quite a claim or question whether Parliament really has the power to regulate the infinite majesty of all creation, although I am sure some Members think that it does. However, the explanatory notes to the legislation make it clear that the reservation applies specifically to matters regulated by the Outer Space Act 1986.

The 1986 Act gave effect to a number of international treaties on the exploration and, for want of a better word, the exploitation—I will touch on that later—of outer space. The principles behind the treaties are hugely important, particularly those in the 1967 United Nations outer space

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treaty:

“The exploration and use of outer space...shall be carried out for the benefit and in the interests of all countries...and shall be the province of all mankind”,

and:

“Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”

My hon. Friend the Member for Central Ayrshire spoke powerfully about the role played throughout the cold war by the development of the international space station, which demonstrated that global co-operation was possible even at a time of significant political tension. The ISS has been described as the most complex international scientific and engineering project in history. It is the largest structure that humans have ever put into space. It can be seen on a clear night if not quite with the naked eye, except perhaps through the Prestwick hole, then certainly through binoculars or a home telescope. It was the result of collaboration between five different space agencies, representing 15 countries. It has been permanently occupied since 2 November 2000, or just over 15 years, which is a truly remarkable achievement.

It will be interesting to hear whether the Minister will recommit the Government to such principles of space law today. In particular, will he offer any reflections on the possible impact of recent legislation passed in the United States recognising the right of US citizens to own any resources they obtain from asteroids? A number of academics and observers have expressed concern about that, especially if other countries begin to follow suit. Indeed, Gbenga Oduntan, a senior lecturer in international commercial law at the University of Kent, has said that the US Space Act 2015 represents

“a full-frontal attack on settled principles of space law”,

and is

“nothing but a classic rendition of the ‘he who dares wins’ philosophy of the Wild West.”

Space should be for exploration, not for exploitation in any sense that excludes anyone from the benefits it can provide, or what the motion calls

“scientific, cultural and technological opportunities”.

In drafting the motion, we were very careful to list those aspects of space exploration and opportunity before mentioning the economic impact of the space industry. Indeed, UKspace, the trade association, has said that the Government must

“ensure its positioning maintains the balance between economic growth, excellent science and the inspiration of young people”.

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As we have heard, we have certainly lived through an inspiring era of space exploration. In recent years, there has been huge interest in the Philae lander and the Rosetta mission, the evidence of water on Mars and the New Horizons fly-by of Pluto. I was particularly struck by NASA's use of the "children will never know" hashtag when images were first beamed back from Pluto. The new generation of children will never know a day when they could not see images of Pluto in such great detail. Sadly, children born today will also never know the thrill of the space shuttle, which certainly inspired me when I was growing up. I remember watching the final launch of Atlantis back in 2011, and thinking about all the other things then going on in the world.

**Dr Lee**

Share

I apologise for being a bit of a pedant, but the first British-born astronaut to walk in space was Michael Foale when he was on the US space shuttle.

**Patrick Grady**

Share

That is a fair point. It is important to recognise the huge achievement of all the astronauts of various heritages and from various parts of the United Kingdom. There is certainly no intention to play trumps.

**Dr Philippa Whitford**

Share

Did not that gentleman change his nationality? He had dual nationality, and did not fly with the Union flag on his suit, as Helen Sharman did.

**Patrick Grady**

Share

My hon. Friend was absolutely correct to pay tribute to Helen Sharman. I remember that as well. I was particularly young at the time, but I will leave Members to work that out for themselves, if they want to look up my biography.

The shuttle programme was a huge inspiration to many people. It is a very sad loss, but if its end several years ago was a low, we are now going through something of a renaissance. There have certainly been a number of highs recently, as I have mentioned. The fact that 15,000 people attended events to watch the launch of the Principia mission just before Christmas, including those of us in the Jubilee Room and later in Portcullis House, demonstrates how the international space station continues to serve as an inspiration.

Many of us who watched the amazing opening ceremony of the Glasgow Commonwealth Games will remember that, just when we thought it could not get any more exhilarating, a live broadcast was beamed down from the ISS. I was not at the ceremony, but with thousands of other people on Glasgow Green on that great day of celebration. There was a real coming together, with exactly the kind of inspiration that the hon. Member for Bracknell spoke about. It was humanity at its finest: people coming together from all over the world to take part in sporting endeavour and

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being supported by their fellow human beings hundreds of miles above the ground. It was particularly appropriate because, as we have heard and will continue to hear, Glasgow—and indeed Scotland—plays a significant role in the modern space industry and in space science.

In December 2015, my old university, Strathclyde, hosted the annual Canada-UK colloquium on the future of the space industry, which was attended by the Scottish Cabinet Secretary for Culture, Europe and External Affairs. Delegates visited two companies in the city, Clyde Space and Spire, which specialise in cube satellites technology and data. In the margins of that event, the First Minister strongly backed the calls that we have heard and will no doubt continue to hear for a spaceport to be located in Scotland. She pledged that the Scottish Government will do whatever they can to ensure that one of the bids is successful.

In my constituency, the University of Glasgow has one of the leading centres for space science and research in the UK, or indeed in the world. Space Glasgow brings together more than 20 academics from a range of disciplines to co-ordinate research, especially under the key themes of exploring and understanding space, mission analysis, risk and technology.

One recent achievement has been the university's involvement in the launch of the European Space Agency's LISA—laser interferometer space antenna—Pathfinder spacecraft. The launch in December marked the end of a decade of work for a team from the university's institute for gravitational research, which helped to develop the craft's sensitive optical bench. The bench is a hugely complex and important technology. It has a laser interferometer. *[Interruption.]* My hon. Friend the Member for Glasgow North West (Carol Monaghan) congratulates me on my pronunciation. It was developed, built and tested by the university's team, and is capable of detecting changes in distance between test masses of as small as 10 picometres. It is an outstanding scientific achievement in its own right, and the images and knowledge that the Pathfinder will produce will no doubt help to inspire generations to come.

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

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Can my hon. Friend explain to the House what a picometre is?

### **Patrick Grady**

Share

A measurement of picos—*[Laughter.]* My hon. Friend may be able to enlighten us later, if she catches your eye, Madam Deputy Speaker.

Like any academic discipline, research in space science and technology costs money and requires certainty. I am happy to back calls from researchers for greater transparency in the relationship between the UK Space Agency and research councils on funding decisions. It would be useful to hear from the Minister how the Government are engaging with research departments at the cutting edge of this important technology. Much of this technology has an impact on our daily lives, especially in the west, where we rely on satellite technology for everything from weather forecasting to our mobile phones.



We have spoken of the inspiration that space exploration can provide, so it is important that Governments in the UK and Scotland continue to support science and technological education, as well as initiatives such as dark sky parks. In boasting of our satellite technology industries, we must also remain vigilant about the risk of space debris, as my hon. Friend the Member for Central Ayrshire mentioned. Too many of our oceans and geological ecosystems are poisoned by the unthinking results of attempts at technological progress, and the same must not be allowed to happen in near or outer space.

Those of us on social media will have seen the internet activity about NASA's recruitment of a planetary defence officer recently. That is not as outlandish or as "outspacious" as it might sound. It is not simply about the risk of asteroids—I know that former Members who are no longer with us used to champion that issue—but about the risk of near-Earth objects too. If the satellites we put into space are not properly managed and regulated, there is a risk that they will crash into population centres.

### **Dr Lee**

Share

Does the hon. Gentleman know that a piece of British technology has been developed that can be put into space to capture space debris and bring it back to Earth?

### **Patrick Grady**

Share

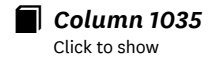
That is a helpful contribution that demonstrates the point that we are making about the importance of the space industry, not only to the economy but to the greater collective good.

I spoke of the relation between science fiction and science fact. NASA recently collaborated successfully in the production of the movie, "The Martian", which is about a man stranded on the planet after a mission goes wrong. It is based on a realistic understanding of the technologies and science that would be involved in a mission to the red planet.

I have spent the little free time I have had over the past 18 months reading through Kim Stanley Robinson's Mars trilogy, which is rightly described as a "future history". It was written in the 1990s with exceptional clarity and foresight. It was forensically researched, to the extent that after reading it for several hours, one can easily look out of the window and expect to see a Martian landscape unfolding. The trilogy is also a well-observed study of human societies and the possibilities open to mankind in building an economy and polity from scratch. There is much to commend in, and much to learn from, how science fiction authors have used the inspiration of space exploration to reflect on our current earthbound condition.

This is a valuable opportunity for debate, and I look forward to hearing further contributions from Members and a response from the Minister, particularly on the questions of ensuring the neutrality of and common access to space, support for education and science, the preservation of dark skies and the minimisation of space debris. We have talked about nationalities and laying claims. Scotland lays claim to one astronaut so far—Brian Binnie, who was brought up in

Aberdeen and Stirling, and has test piloted a number of private space flights. Let us hope that the inspiration from the many space missions, which are growing in number, and not least Major Tim Peake's, will encourage more young people to pursue careers in the sector and that, before long, we will see more astronauts from Scotland and across the UK who will have the opportunity to contribute to the good of humanity, to explore strange new worlds and, if *Hansard* will allow a split infinitive, to boldly go where no one has gone before.



🕒 12.41 pm

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

Share

I rise to put the case for Cornwall. We have heard a lot about Scotland, but we did hear some references to Newquay in the opening speech.

I want to put it on the record and make Members aware that Cornwall is already the home of the Aerohub. Newquay has a runway that can accommodate the fastest and largest civilian and military planes. Formerly the home of RAF St Mawgan, Newquay is an ideal location for the new space hub.

Cornwall more widely has a lot of knowledge and history relating to space. Goonhilly downs had the first dish, Antenna 1, nicknamed Arthur, which started operating in 1962 and linked with Telstar. That led the way in UK communications. My constituency has the Caradon observatory, which Ken and Muriel Bennett funded themselves. It is in an ideal location. It takes fantastic photographs, thanks to the dark skies over Bodmin moor, that are published in space magazines.

I did not intend to make a contribution today, but I felt that I should point out that Cornwall has an extremely good case. It is one of eight locations that is being considered. I just wanted to make the case, as a Cornish Member of Parliament, and to say that we are still there. Being successful in this bid would not only be good for Newquay, but superb for the county that I call home.

🕒 12.44 pm

### **Jim Shannon (Strangford) (DUP)**

Share

It is a pleasure to speak in this debate and to hear the other contributions.

It is always a pleasure to hear the hon. Member for Central Ayrshire (Dr Whitford). I look forward to hearing her speak about health issues, because she brings her wealth of knowledge to the House. Her contributions are always well worth listening to because we learn from them. That is why I enjoy them and I want to thank her. We have found out today that her knowledge goes beyond health issues: it extends to space policy and to places where no man has gone before.

Here we are in the Chamber with the chance to speak about this issue. It is always very nice to see the Minister in his place. I think that I can honestly say, without fear of contradiction, that if the Minister is in the House, I will be on the other side ready to ask him a question, and vice versa.

It is always good to consider this important and too often overlooked issue. Although it is not pertinent to Northern Ireland at the moment, I want to make sure that the Province is part of the Government's strategy for the space sector. That is why I wanted to make a contribution. I want to put down a marker for Northern Ireland and to ensure that we have the chance to be part of the strategy.

Northern Ireland has one of the youngest workforces in the United Kingdom of Great Britain and Northern Ireland, as the Minister will know. We have a lot of well-educated young people with high skill sets who would benefit from jobs in the space sector. I believe that that would go some way to addressing the brain drain in Northern Ireland. Although that is declining, it is something that we need to get to grips with.

Perhaps in his response, the Minister will tell us how the space policy can interact with Northern Ireland. How can we get some of the benefits and spin-offs of it? How can we be part of the strategy of the United Kingdom of Great Britain and Northern Ireland? We are better together, as he would say. It is good to see all the Members who are in the Chamber, united within the United Kingdom of Great Britain and Northern Ireland.

 **Column 1036**

### **Mr Angus Brendan MacNeil (Na h-Eileanan an Iar) (SNP)**

Share

Will the hon. Gentleman give way?

### **Jim Shannon**

Share

I am very happy to give way, although I will probably regret it.

### **Mr MacNeil**

Share

The hon. Gentleman will be aware of the press stories today mentioning Stornoway. Indeed, the name David Bowie is linked with it as well. Just a little bit north of Malin Head, the hon. Gentleman will see the Outer Hebrides. It is a fantastic place—near Northern Ireland—for such space adventures.

### **Jim Shannon**

Share

Earlier, the hon. Gentleman was waxing lyrical about black puddings; now he is doing the same about Stornoway in a different way. It is always good to hear from him.

### **Mr MacNeil**

Share

Black puddings in space!

### **Jim Shannon**

Share

Absolutely.

Ensuring that the space sector has a place in Northern Ireland and is aware of what we have to offer will go some way towards addressing the brain drain issue of too many of our young people emigrating. I would like to hear from the Minister how the space policy can better connect with Northern Ireland.

Northern Ireland has a proud history of air flight, although it is not linked directly to space policy. Henry George Ferguson, who was better known as Harry, a brother Orangeman, was a Northern Ireland engineer and inventor who was noted for his role in the development of the agricultural tractor. He was also the first Ulsterman and Irishman to build and fly his own aeroplane. The first ever airport in Northern Ireland was in my constituency of Strangford, in Newtownards, and was built in about 1910.

Northern Ireland has a fantastic aerospace industry with Magellan and Bombardier, which has been established for many years. I believe that there is a role for those aircraft companies to play in space policy and development. They can and should be part of it.

The space sector is fundamental to the future UK economy. I welcome the Government's civil space strategy and the goal that the space sector will contribute £40 billion a year to the UK economy by 2030.

## Dr Philippa Whitford

Share

The point that I was trying to make in my opening speech was that the bid talks about a UK spaceport, whereas I think there will be different sectors. One sector that will come in the not-too-distant future is hyperbolic sub-orbital flight. Once we get past the Virgin Galactic model of a plane and a wee rocket, we will have the combination of jet and rocket engines, such as SABRE—the synergistic air-breathing rocket engine—which will go from standstill to orbit and back down. We will be able to fly to Japan in a short period of time. Different sites around the UK may therefore follow totally different routes. That should be enabled, not blocked.

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## Jim Shannon

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I thank the hon. Lady for that significant and important intervention. She shows the vision that all of us in this House should have. There are no barriers to what we can do. Some of the things that are in “Star Trek” are not impossible, so let us look forward to those developments. I look forward to being able to travel from A to Z—from Belfast City to Heathrow—in a matter of seconds. If that is ever possible, we will be able to get here and back a couple of times and to do business at home and here, all in the same hour. Is that possible? I do not know, but I hope it will happen.

Thinking back on how space has been discovered, I am always mindful of the first time man stepped on the moon. It was one small step for man, one giant leap for mankind. For me, and I think for many others, that showed us the immensity and size of the universe that God created, and it focused our minds on God's power and the fact that it was not for us as children, and that he is in total control of the universe.

**Mr MacNeil**

Share

The hon. Gentleman quoted the historic phrase, “One small step for man, one giant leap for mankind”, but what about the seriousness with which the space industry considered the Isle of Man a number of years ago? Those in the know in the space industry said that only the United States, Russia, China and India were ranked above the Isle of Man for the likelihood of getting the next person on the moon. That shows that if the political will is there, a lot can be achieved.

**Jim Shannon**

Share

I thank the hon. Gentleman for his intervention. We should believe in what we want to achieve, and that goal is achievable if we are determined to make it happen.

The Deregulation Act 2015 is an encouraging development that will allow the UK to be more competitive globally in this future industry. It is important to consider that and to ensure that we are world leaders in offering somewhere for the space industry to do business. We want to be part of that business across the United Kingdom of Great Britain and Northern Ireland. The 2010 space innovation and growth strategy is another welcome development that seeks to create a partnership between industry, Government and academia to develop, grow and make use of new space-related opportunities.

This debate is important because of the possibilities of what can be achieved, which enthuse us all. Although there were encouraging developments during the last Parliament, it is disappointing that space did not receive a mention in the Government’s 2015 manifesto. I am sure that the Minister will correct that when he responds, and clearly set out Government policy and strategy. I hope this is not a sign of the Government taking their eye off the ball.

 **Column 1038**

The Government are hoping that the new regulatory framework enabled by the Deregulation Act will allow the creation of a commercial spaceport in the UK by 2018—again, a marvellous vision of what can happen in future. That is a welcome development because commercial space travel is an industry in which we can, quite literally, reach for the stars. In “It’s a Wonderful Life”, James Stewart talked about lassoing the moon. We are not going to lasso the moon; we are going to reach it and beyond, and it is important that we have that possibility.

The value of the space sector in the UK has grown from £6.5 billion in 2007 to £11.8 billion in 2014—it has almost doubled, and there is the potential for it to double again. With Tim Peake’s recent mission sure to rekindle interest in the space industry, that trend is sure to continue, and the ability to offer commercial space travel will make us world leaders in the space industry.

**Dr Lee**

Share

I do not know whether the hon. Gentleman remembers this, but he was one of the few Members of the House who attended my Adjournment debate on microgravity. Prior to that I had been contacted primarily from America by Boeing and various other companies on the subject. They pointed out that the microgravity research industry had a potential \$100 billion of growth. The hon. Gentleman is right to point out the future potential for the space industry.

### **Jim Shannon**


Share

I do remember that. It was one of those Adjournment debates that I am known to attend, and I remember intervening along those lines. It was three or four years ago.

Something else that I enjoyed, and that I think was positive, took place last week when Tim Peake was able to make radio contact with young people in a school. The inspiration that that gave to those young people was fantastic, as was the fact that it happened. Those young people were inspired, and they had a photograph and a TV show that showed him in their school making direct contact. I know it was a bit rehearsed, but it was exciting for us to watch. How much more exciting must it have been for the children, both male and female, to have that ambition and inspirational drive to try to be the next Tim Peake in space? As we seek to obtain secure jobs for the future, we need more such encouraging developments, and this has been a welcome opportunity to contribute to a debate on an issue of great importance to the future of our country and its economy.

In conclusion, the new national space policy, the Deregulation Act, and the space innovation and growth strategy are all signs that we are heading in the right direction. The positivity that comes through this debate will be noted not just in this Chamber by MPs, but outside the House and further afield. We can play our part in space travel and policy in future, and I hope that off the back of this debate we can maintain momentum and ensure that those plans turn into real delivery for the “better together” space industry and future economy of the United Kingdom of Great Britain and Northern Ireland.

 **Column 1039**  
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 12.54 pm

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

Share

I thank my hon. Friends the Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) for securing this debate.

Tim Peake’s six-hour adventure tomorrow, as part of a team of two Tims, to replace a solar power connection unit in space will be watched with awe by children and adults alike—hon. Members will be glad to hear that I removed from that paragraph a cliché that has already been used.

Tim’s iconic voyage into space, living and working on the international space station, is beamed into our lives tweet by tweet, which is fascinating. He has paid tribute to David Bowie’s “Starman”, and he sends us extraordinary aerial views of the planet, alongside spacesuit selfies.

He really gives a feeling of life on the space station, as well as those iconic visions and views, and he raises our aspirations to the farthest frontiers. Let us make the most of this chance to spark young people's interest in the careers of the future.

The spirit in which this motion is presented is to be greatly appreciated, and there is perhaps potential for not just a single spaceport site, but for a number of sites across the UK. Members with vested local interests in a possible spaceport site in their constituency will inevitably take the opportunity to set out their individual stalls—that is our representative duty. However, the proposal to ensure that fantastic scientific, cultural and technological opportunities arise from UK spaceport development must benefit the United Kingdom as a whole.

With that semi-apology, I will turn to the possible spaceport site at the former RAF camp near Llanbedr. It is in a coastal location surrounded by sand dunes between Cardigan bay and the hinterland of Snowdonia. The site has a 50-year track record of airspace management and operations. It comprises three main runways, the longest of which is oriented in such a way that flights pass over sparsely populated areas. Unique among all the candidate sites, Llanbedr already has access to 2,000 square miles of segregated airspace over Cardigan bay. The airfield was bought by the Welsh Government in 2004 as a strategic asset, and since 2008 it has been leased by Llanbedr Airfield Estates on a long-term lease.

So far the site has mostly been used for testing, evaluating and developing remotely piloted air systems and unmanned aerial vehicles, commonly known as drones. Its most recent initiative relates to the use of drones for protecting fisheries. The site is included in the Snowdonia enterprise zone, which has facilitated improvements including a £1.5 million spend to upgrade its facilities and infrastructure. The Civil Aviation Authority has rightly identified safety as the overriding operational principle for a spaceport. That applies not only to any members of the public and workers using that port, but also to the “uninvolved public”. That would imply that the combination of relative isolation, coastal location and segregated airspace satisfies those requirements as fully as possible.

It is safe to say—others have already made an excellent case for this—that the economic potential for a spaceport, both in the immediate locality and further afield, is immense. The county of Gwynedd is to a great degree dependent on public sector employment and the leisure industry. The constituency of Dwyfor Meirionnydd suffers from seasonal and minimum wage employment, and although official unemployment figures are low, chronic economic inactivity is a very real issue. The demographics of the area indicate a steadily ageing population, as young people move away for higher education and employment. That is the price we pay for dependency on the seasonal tourism industry, a shrinking public sector, and scant Government investment in well paid employment.

Of course, this is in no way simply a local investment in a far western corner of the United Kingdom. Llanbedr has the potential to benefit the whole of north Wales, with its educational powerhouses in the University of Bangor, Wrexham's Glyndwr University, Grwp Llandrillo Menai,

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and Coleg Cambria. Indeed, it goes much further than that, because the northern powerhouse would have that development within easy reach, and it is the nearest site to the international travel hubs of Manchester, Liverpool, Birmingham, Cardiff and London. It is also the closest candidate site to the UK space gateway at Harwell in Oxford.

This has the potential to make a real difference to Gwynedd, and indeed to the economy of the wider area and the UK as a whole, yet we are still waiting for the Government to bring us out of the limbo of expectation by providing the operational criteria for the UK spaceport. It is impossible to move ahead, as we do not yet know what we are bidding for. It is difficult even to quantify, in terms of jobs both locally and further afield, until we know the operational criteria. We need them as a matter of urgency. The uncertainty impacts locally, as caravan sites in the area tell me their customers are reluctant to commit to new contracts until a definite decision is made about the future one way or another.

I spoke to a student at my local sixth-form college, Coleg Meirion-Dwyfor, who happens to live in the next village to Llanbedr. He told me that his fellow students think this is a cloud cuckoo project that will never happen. How could it ever happen in somewhere like Meirionnydd? But then I could see a flash of hope and a realisation that yes, this could happen, this could happen here and I could be part of it. Like Buzz Lightyear, we can turn falling with style into infinity and beyond.

🕒 1.00 pm

### Mr Iain Wright (Hartlepool) (Lab)

Share

It is a pleasure to contribute to this debate. I congratulate the hon. Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) on securing it and I thank the Backbench Business Committee for agreeing to it. There have been far too many references to “Star Trek” at the expense of “Star Wars”, so let me try to even it up a bit. Space policy has not been debated as much as it should have been in this House given how important it is, but I am pleased that, as a result of the tenacious attitude of the hon. Members for Central Ayrshire and for Glasgow North, the force has awakened. *[Laughter.]* That’s the only thing you’re going to get.

As has been mentioned, Tim Peake’s mission on the international space station is a fantastic achievement. I think the whole House and the whole country wish him well as he embarks on his spacewalk tomorrow. His mission is important for a number of reasons. First, he is undertaking practical experiments and research that will have positive applications back on earth, a point to which I will return in a moment. Secondly, as has already been mentioned, Major Peake’s space mission is undoubtedly inspiring and motivating a whole new generation, rather like a previous generation was inspired by the Apollo programme. I remember the inspirational words of President Kennedy:

“We choose to go to the moon...and do the other things, not because they are easy, but because they are hard”.

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That inspiration and ambition are incredibly important.

The young people looking at what Major Peake is doing—following his journey and progress on Twitter, Facebook and so on, and perhaps even interacting with him as he conducts experiments in space—will have their eyes opened to the enormous and often unlimited potential available to them in their lives and careers. They might not necessarily want to become astronauts—I still have a wish to be an astronaut; I think everyone in this debate does—but they will see the dizzying potential and scope of science, technology and engineering. I hope that the impact of Tim Peake’s mission into space will last for decades, as young people are inspired to go on to have an impact on science and research throughout the 21st century.

The third reason why Major Peake’s mission is so important is that it showcases a true British industrial success: the UK space industry, and that is what I want to focus on. Most people walking the streets today will not be aware, as the hon. Member for Central Ayrshire said, that Britain has a space sector. People will perhaps automatically think of NASA and, possibly, Russia. They might consider a space industry linked with putting people regularly into space or, as the hon. Member for Glasgow North said, with missions such as New Horizons and the exploration of Pluto and the Kuiper Belt. Major Peake’s journey gives us the opportunity to celebrate a great British economic success and highlight what I hope is a shared ambition—it certainly is in today’s debate—to see the sector grow.

I think the Minister would agree that the UK space sector is the very model of the type of modern, successful sector that Britain should be focused on: innovative and high value, and providing well-paid and highly rewarding—in every sense—careers. It taps into Britain’s strengths, based on the very best of science, engineering and world-class British research, but with a very clear nod to British excellence in professional services, such as legal, financial and regulatory work. It is a rapidly growing sector throughout the world—perhaps it is best to say above the world—and the British comparative advantage should be used to capture even more wealth and value for this country in the future.

We have been quite canny in this country in identifying precisely where in the space sector, and throughout its value chain, Britain excels. We have skills in upstream activities, such as satellite construction. I visited Airbus in Stevenage and saw the great work that goes on there. I saw satellites being built and walked on the surface of “Mars”, which was absolutely fantastic. Our real strength and potential, however, lie in the industry’s downstream activities, such as user equipment, applications, services and data. Our strengths in professional services such as legal, regulatory and financial services allow Britain to lead the world in raising capital to finance space technologies, as well as the expertise to provide licensing arrangements. It is these downstream activities that will increase demand in the future so that Britain is well placed for future growth.

 **Column 1042**  
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The hon. Member for Central Ayrshire and others have already mentioned the figures, but it is important to reiterate just how successful the UK space sector has been in recent years. It generates almost £12 billion for the UK economy, which is almost double the value of the sector just a short time ago in 2007. The industry directly employs 37,000 people in this country. That figure rises to 115,000 when one considers the supply chain, and supported and indirect jobs. UK space has seen an annual growth rate of 8.6% since 2008-09.

Madam Deputy Speaker, I think you were in the Chair yesterday when we discussed, in an Opposition day debate secured by the Scottish National party, some of the structural weaknesses in our productivity and trade positions. Frankly, if all other sectors in the British economy were performing at the same rate as the UK space industry, this country would be doing well. Productivity is three times the national average, with a value added of £140,000 per employee in the sector. Exports are twice the national average, representing about a third of the sector's turnover. That success bodes well for the future. The global space industry is set to grow even further to about £400 billion by 2030. The UK space sector's ambitions are challenging but achievable; the national space policy's objectives are for Britain to have a 10% market share in the global space industry, provide £40 billion of value to the British economy and employ an additional 100,000 workers by 2030.

I hope there is a real consensus across the House, regardless of party affiliation, for that ambition, and for backing the Government and building on the back of previous support for UK space, regardless of which party is in government. Tribute must be paid to Paul Drayson, who launched, as it were, much of the Government's interest in UK space. To be fair, David Willetts continued that policy in an excellent way throughout the coalition Government, providing all-important policy continuity and certainty that transcended Parliaments, and allowed confidence in the sector to grow and gave potential investors the reassurance that has provided much of the success for British space.

Given the characteristics of the UK space sector—a high-value, innovative, productive, export-focused industry that has identified our specific key strengths within the sector and built on that comparative advantage to secure more global market share in the future, assisted by a strong and long-standing partnership between industry, Government and research to provide policy certainty—it is surprising that the Government do not want to shout more about the virtues of an industrial strategy. An industrial strategy has been part of the success of the UK space industry. The Secretary of State seems to have abandoned such aspirations, with the possible exceptions of the aerospace and automotive industries. That seems wrong. I am pleased that the Minister on the Treasury Bench is the Parliamentary Under-Secretary of State for Life Sciences. I would single out life sciences as another great skill for Britain. It is a marvellous sector, so why is it not also classed as strategically important? That approach is very important.

 **Column 1043**  
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In his autumn statement, the Chancellor announced a movement of research funding away from grants to loans, with the exception of the aerospace and automotive sectors. That runs the risk, as mentioned yesterday, of investment not being attracted to Britain. For such a successful and promising sector as space, that is worrying. Will the Minister consider expanding the definition of the aerospace sector to include space so that it can take advantage of the security of research funding and grants?

## Jim Shannon

Share

In seeking to advance the space industry, is it not important to involve universities and their expertise and knowledge? Is partnership with universities not also part of this?


## Mr Wright

Share


That is incredibly important. Britain's unique blend of strong leadership and partnership between industry and Government, through things such as the UK Space Agency and the Space Leadership Council, and our world-class research expertise and strong university base, means we are well positioned to capture as much market value as possible.

Will the Minister accept—I believe he personally believes it—that industrial strategy works and commit to ensuring that the Government embrace such an approach so that sectors such as space and the life sciences can be exploited as much as possible for the benefit of Britain? I mentioned that the national space policy set out an ambition for 100,000 additional jobs in the space industry in the next 15 years—I think we would all sign up to that—but given the skills shortages in engineering and science-based industries throughout the economy, and the difficulty of encouraging girls and young women to consider science, technology, engineering and maths subjects in school, college and university and then as a career, what is he doing to address barriers to growth in the UK space sector? What further assistance, in terms of outreach activities, internships and apprenticeship opportunities, will be provided to motivate and inspire girls and young women to think about a career in space?

In criticising the space industry, it is often said that interest and investment in space is a luxurious folly and that, at a time of austerity and crisis in public services, we cannot afford a space industry: why are we sending a man into space, when patients are lying in hospital corridors? This is a false argument. To a vast extent, the UK space industry is driven by private sector investment—Government investment in the past 15 years has averaged 0.015% of total investment—and the value it creates grows the economy, employs people on good wages and increases tax revenues, thereby helping to fund public services. Research in space or in the space industry has positive applications on earth—for example, satellite technology and food crops or experiments into materials and how they react. Major Peake, while on the international space station, is carrying out experiments to measure pressure in the brain that could have important applications in serious trauma care. Investment in space results in tangible benefits for society on earth.

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I am not just talking about the cost-benefit analysis. I was struck by the comments of the hon. Member for Bracknell (Dr Lee). Industry is important, and the bottom line is crucial, but as he said, exploration and imagination are fundamental to the human spirit, and it is difficult to think of anything comparable to space when it comes to letting our imaginations run riot. It is vital that we ensure an interest in space by showing what space can provide. The UK space industry is a huge success story, and has the potential to grow still further and inspire a whole generation, but that requires an ongoing partnership between industry, the Government and research. This debate shows that there is great consensus and that many people support the Government in ensuring that the UK space industry realises its potential.

 1.14 pm

### **Drew Hendry (Inverness, Nairn, Badenoch and Strathspey) (SNP)**

Share

I have much to thank my hon. Friends the Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) for. Anyone observing me in the Chamber today will have seen me smiling broadly all the way through this debate. It is an incredibly exciting opportunity. I remember, as a young child, playing with my Airfix kit of the Apollo 11, with its detachable parts and so on, seeing how it all worked, so it is exciting to be in the Chamber today discussing the future of space policy—there it is, up on the annunciator; what an opportunity! It is just a shame there is so much space on the Benches—but I will try to avoid the puns and conduct myself with gravity.

I want to talk about the exciting opportunities out there. Yesterday in the Chamber, we discussed trade and industry and innovation, and again I want to talk most today about innovation and the skills required. There are so many wonders in space and so many things we can learn that we cannot comprehend at the moment. Without the investment that hon. Members, including the hon. Member for Hartlepool (Mr Wright), have talked about, and without making sure we can learn those things, how can we hope to take full advantage of the opportunities to develop ourselves as a race? There are stars out there 1,500 times bigger than our sun, and how much do we know about them? 3c303 is a galaxy with a black hole in the middle of it that has the biggest electrical current ever detected in the universe. There are fantastic opportunities to find out how that happens. What can we learn from that about how we conduct our lives and protect our planet into the future? I was stunned to find out there was a gigantic raincloud out there, floating in space, that is not just the size of the Pacific ocean, but 100,000 times larger than the sun. It is an amazing thing to comprehend, but we do not know enough about these things. We have to invest.

The Scottish Government see huge potential for the space industry in Scotland, and we are pleased that the UK Government and the Civil Aviation Authority do too. We should be exploring these opportunities jointly. The Scottish Government have committed to supporting science and technological development in education and industry, having recognised science's contribution

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to a sustainable economy. The hon. Member for Hartlepool talked about opportunities. The space industry, 16% of whose employees are in Scotland, is growing by 7.5% a year. These are encouraging figures, but we must do more. There is a recruitment exercise to ensure that there are members to join the Scottish Science Advisory Council. The Scottish Government have engaged with the world-leading science sector on the post of chief scientific adviser for Scotland and are currently advertising for the post, which is the right thing to do just now. They are continuing to invest in four science centres and to support science festivals in Scotland. They continue to promote the value of science as a career for young people.

In my previous career as a councillor in the highlands, I was passionate about getting our young people interested and encouraging them to lift their sights and see the opportunities available, not just to us as a set of countries on these isles but to them. There are rewarding and meaningful careers and they can build something important for themselves. As a new councillor eight years ago, I saw an advert put out by the European Space Agency calling for the next generation of recruits to come forward. As an enthusiastic councillor, I thought I would put out a press release across the highlands saying, "Young highlanders should come forward." I was disappointed that it was met with scepticism from my colleagues on the council. They thought it was a mad idea to encourage highland children to get involved in the space industry. I was desperately disappointed by their attitude, but it highlighted to me the need to change people's attitudes to these opportunities and how they could take advantage of them.

I am pleased to say that one development from that is the science skills academy, which is starting up in the highlands. It is a collaborative enterprise that brings together organisations such as Highlands and Islands Enterprise, the Highland Council and a range of private businesses and engineering firms, as well as other non-governmental operatives in the highlands. It aims to encourage young people from pre-school, throughout their education and beyond, to take advantage of the opportunity of gaining these skills, which directly transfer not just into the aerospace industry but to and from oil and gas, renewables and so forth. These are similar skill sets that can be transferred across. Embracing this into the future provides enormous opportunities. I hope that future attitudes in the highlands will be changed, but there is a job of work to be done in this Chamber, in the Holyrood Chamber and in all the devolved Administrations to make sure that we get the word out to our young people to raise their sights and look for an opportunity.

I am grateful to my hon. Friend the Member for Central Ayrshire for telling us that Helen Sharman was the first astronaut from Britain in space. It is important to repeat that message because we need to encourage young girls and women to consider these opportunities. Tim Peake is a fantastic ambassador for space and I have great respect for what he has already done in a short period of time, but let us imagine the impact if he had been Tina Peake and that message had gone out to young girls and women about such opportunities. When it comes to encouraging

young girls and women into engineering just now, there are clear systemic problems in our culture that must be tackled. I call on the Government to join me and others to make sure that we change this attitude over the coming years.

Some 11% of engineers in the sector are women, but 21% of engineer graduates focused on the sector are women. This is the lowest percentage female employment rate in the sector in Europe, and we have the lowest retention rate in Europe. That is at a time when there are significant skills shortages at every level of the industry.

 **Column 1046**  
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We have heard that many people are not aware of the opportunities in the space or the aerospace sector. I was delighted yesterday to meet Bridget Day, the deputy programme director for the national aerospace technology exploitation programme. I crave your indulgence, Madam Deputy Speaker, because I would like to read something she sent to me, at my request. She said: “I have worked as an Engineer in the Aerospace industry for nearly 40 years. I worked for 30 years in the supply chain for a heat exchanger manufacturer in Wolverhampton, starting as a graduate apprentice and becoming Engineering Director. In my personal experience there has been little progress in encouraging women into engineering. I currently lead a team of engineers helping aerospace supply chain companies with new technology”—

within NATEP, as I have said. She continues:

“In a team of 24 there is only one other woman”,

That is a shocking figure. She continues:

“I know that engineering is considered difficult, dirty, and dying by the general public. This means that parents and teachers often encourage young people away from engineering, thinking that industry is something in the past and not for the future. The increasingly ‘green’ views of our youth are annoyed with industry building on green belt land and taking priority over wild life. So the reputation of industry publicly is not what my experience is. I have had a very varied working life, every day something different, everyday keeping me interested in solving problems with new ways of thinking, new materials, new possibilities. The amount of new possibilities is better than ever before and NOW”—

she capitalised it—

“is a great time to become an engineer. We are very short of engineers. As a woman in engineering I am often the only woman in the room, usually only 5% are women even at a large event. There is an assumption that I am the secretary and not that I am the boss. My reputation is never assumed, like a man’s often is, I always have to earn it.”

**Jim Shannon**

Share

If I had been allowed to ask two questions at Women and Equalities questions this morning I would have raised this issue. The Government need to target girls-only schools and introduce the STEM industries, including engineering, to those girls.

### Drew Hendry

Share

I thank the hon. Gentleman for his substantive point about engaging young girls and women with these industries, and I absolutely subscribe to that view. As I have said—I will continue to repeat it here until we get it right—this is an issue that we need to tackle together to ensure that girls are able to take advantage of these opportunities.

### Carol Monaghan

Share

Does my hon. Friend agree that one serious issue that has not been properly taken up is our major shortage of STEM-qualified teachers. Unless much more attractive and lucrative wages can be offered, this shortage will continue and it will impact on the number of girls coming through.

 **Column 1047**  
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### Drew Hendry

Share

My hon. Friend is absolutely right that education is the key. I mentioned the science skills academy, and the idea behind it is to influence children as they develop and give them these opportunities, but also to try to reach out to society in general and to say to parents and grandparents that they need to talk about this. It is also about saying to education professionals and to those who make the investments that lead to their recruitment that this issue has to be taken incredibly seriously.

Stakeholder activities going on at the moment are to be encouraged. For example, I congratulate *The Telegraph* on creating the women in space jobs resource, which includes educational resources encouraging women into STEM subjects. Another example is the Royal Society of Aviation, which established the women in aerospace and aviation committee in 2009.

On solutions, we need to increase public awareness of the UK space industry and its value to the economy. We need to increase engagement with young people through projects such as Scottish Space School. There will doubtless be others of which I am not aware, but we need to make sure that this sort of thing carries on. I support calls for the need to concentrate funding on research and development projects. We absolutely need to stop thinking about what is happening today and start thinking about the opportunities for tomorrow. We need to work to increase peer support to encourage female graduates to enter and remain in the sector.

Let me finish by citing Professor Alan Smith, head of the department of space and physics at University College London, who acted as rapporteur for an event hosted by the Scottish Government and the Civil Aviation Authority. He said:

“Scotland has embraced space. Space feels at home in Scotland.”



Let us make sure that all of us and all our children get the opportunity to feel at home in space, too.

🕒 1.27 pm

### **Alan Brown (Kilmarnock and Loudoun) (SNP)**

Share

It is a pleasure to follow my hon. Friend the Member for Inverness, Nairn, Badenoch and Strathspey (Drew Hendry). He made some excellent points about women and equality in the industry. As a civil engineer, that chimes with me. My profession has seen a lack of women over the years, although it is doing its best to try to remedy it by engaging with schools. My hon. Friend has shown, both yesterday and today, that he is a great advocate for technology, and his enthusiasm certainly shone through in his speech. I congratulate, too, my hon. Friends the Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) on bringing forward this timely debate. I welcome the chance to participate in it.

Let me start with a confession. Anyone who knows me personally will probably be somewhat surprised that I have chosen to speak in a space-related debate. Unlike the Members who have spoken previously, when I was growing up I never had the same fascination with space. Science fiction movies did not do it for me. Although I was born in 1970, I have still not watched the early “Star Wars” movies—[Hon. Members: “Shame!”] Now I have got that confession out of the road, I should have everybody on my side. At least it shows they were listening to me.

### **Carol Monaghan**

Share

 **Column 1048**  
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I am concerned that my hon. Friend has not watched the earlier “Star Wars” movies. Is he suggesting that he has watched the later ones?

### **Alan Brown**

Share

I have seen one or two, and I took the children along, so it was a family activity. I could not say what happened in them as I do not recall. The good news is that—in view of the earlier lack of interested nods—there will be no more puns in my speech.

I appreciate the importance of the science, technology and commercial aspects of the space industry, and I am right behind the United Kingdom Government’s proposal to focus on making the UK the European hub for commercial space flight and related space sector technologies. I also applaud the ambitious growth targets that have been set.

What other reasons have I for speaking in the debate? One of them was touched on by my hon. Friend the Member for Glasgow North (Patrick Grady): it is great to be able to make a speech that is not preceded by the words “From now on there will be a three-minute limit on Back-Bench speeches”—although some Members may wish that there was a three-minute limit on mine.

The main reason for my participation, however, is my wish to give an unashamed plug to Prestwick airport, which I would like to become the United Kingdom's first space port hub. It is in the neighbouring constituency rather than my own, but I can appreciate the benefits that it would bring to the surrounding area in general, and many of my constituents are already employed in the aerospace industry.

Unfortunately, my constituency is among the top 15% in the UK in terms of unemployment, and 200 skilled manufacturing jobs have recently been lost from a factory in Kilmarnock, so a jobs boost would be most welcome in my constituency and the wider area. However, despite the headline unemployment rate, Ayrshire in general has a great engineering pedigree, and there are still many successful engineering and manufacturing companies in my constituency and its neighbours. As we heard from my hon. Friend the Member for Central Ayrshire, there is already a cluster of aerospace-related firms around Prestwick, and I know that they could easily expand to service a new space port. We have also heard that nearby Glasgow already contains space technology companies, including Clyde Space and Spire. That would be another advantage of choosing Prestwick.

The UK Space Agency has made clear that its activities are about much more than direct space technology, covering climate change analysis and other beneficial research on such matters as health and ageing, as well as materials innovation and plasma physics. I realise that, given that ongoing work, successful partnerships will already be operating, but there is no doubt that if Prestwick were chosen to be a space port, it could form links with the Scottish universities, which are among the best in the world. That is another advantage. As for transport infrastructure, Ayr Harbour is nearby. Prestwick also has a railway halt, and close links with the motorway network. I believe that it is easily the most accessible location on the shortlist that the Government are considering.

Yesterday I attended a breakfast hosted by the all-party parliamentary group for aerospace. One of the discussion points, which was also raised today by my hon. Friend the Member for Inverness, Nairn, Badenoch and Strathspey, was education, and preparing kids for qualifications in STEM subjects—science, technology, engineering and mathematics—and technology design. The Scottish Government are making great strides with that in their curriculum for excellence, and the local authority of which I was a member before becoming an MP has produced a STEM programme for primary schools, as well as successfully running a business enterprise initiative for secondary schools.

In Scotland, the wider implementation of the Wood report has led to a recognition that school leavers must have a greater understanding of the working environment and what will be expected of them in that environment, and, crucially, of the fact that higher or full-time further education is not for everyone. Along with the Scottish Government's investment in modern apprenticeships, that has given Scotland—and Prestwick in particular—a head start when it comes to renewing interest in STEM subjects and technology design.

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Ayrshire is also home to the campus of Ayrshire college, which has recently won awards and, moreover, is willing to work in partnership with industry to develop tailor-made courses. An excellent example of that is the partnership that has been established to create courses for wind turbine technicians. That came about because the industry realised that, owing to the growth in renewables, there was not enough qualified expertise for the operation and maintenance of wind turbines. A new £53 million campus is due to open in Kilmarnock, which I expect to present fantastic opportunities for links with the space industry.


Prestwick has one of the longest runways in the UK, and it does not suffer from fog problems. It is often used when flights are diverted because of problems elsewhere. Unfortunately, there are not enough commercial flights from Prestwick to enable it to make a profit, but that does mean that there are no capacity or logistical issues that would prevent the creation of a space port there. In fact, if that mitigated some of the losses that are currently being covered by the Scottish Government, there would be benefits for Scottish taxpayers, and funds would be freed up for investment elsewhere in Scotland. Ayrshire and Dumfries and Galloway are also home to the Dark Sky project, which could provide more links and other benefits if the space port were located at Prestwick.

The Scottish Government are very supportive and positive about development in this sector, as was demonstrated by Fiona Hyslop's attendance at the annual UK-Canada colloquium in Glasgow just before Christmas. The conclusions reached at that event will be presented to both Governments, and I am confident that they will underline the strong case that I expect to be made for Scotland in general. I urge Ministers to pay due heed to those conclusions.

Let me now move slightly away from the subject of Prestwick, although I am reluctant to do so. I agree wholeheartedly with the motion: this seems to be one sector for which the UK Government are outlining a positive vision. Like many of my colleagues, I have often complained in the Chamber about the need for the Government to spend more money on social justice, rather than on projects that some people consider to be vanity projects. However, as was pointed out by the hon. Member for Hartlepool (Mr Wright), wider benefits, which could be long-lasting, accrue from this investment.

There is no doubt that Major Tim Peake's mission could inspire another generation of scientists, explorers, engineers and innovators. If the benefits are to continue, however, and if the proposed space port is to have any chance of being an operational venture by 2018—with no loss of momentum, or of the interest that is currently being generated—the Government must set clear guidelines for the submission of the final bids. The final decision-making process must be transparent and non-political, in order to ensure the best possible value for money and future success.

However, given that the Government like to cut red tape and bureaucracy, if they do not want to go down that route, they could simply award the space port location to Scotland in general or, more specifically, to Prestwick. Alternatively, in the light of the speeches that we have heard so

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far, we could have a show of hands in the Chamber today. That would solve any problems.

🕒 1.37 pm

## Gavin Newlands (Paisley and Renfrewshire North) (SNP)

Share

So far, this has been a very interesting debate, and I congratulate my hon. Friends the Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) on initiating it through the good auspices of the Backbench Business Committee.


The fact that I have had an interest in space from an early age has proved most useful since my election last May, as the Government's social and fiscal policy is from another planet and completely alien to me. However, we are here to debate a subject which need not be, and, in fact, should not be contentious, and which will hopefully generate a fair degree of unanimity throughout the House.

Like many youngsters, I grew up fascinated by the stars, learning about the different planets, the missions of astronauts, and the work of NASA and other space agencies. I am sure that I am not the only Member present who dreamt of becoming an astronaut. It was either that or a football player. You can be sure, Madam Deputy Speaker, that the one thing that no one in the Chamber grew up aspiring to be was a Member of Parliament, yet here we all are: astronaut, footballer, ballerina—rejects all. We may have lost out on our childhood dreams, but that does not mean that we cannot help the kids of today to fulfil theirs.

This is a dream that many children have, both girls and boys. There is something about space that captures the imagination of youngsters from an early age, and while many will never quite reach their dream, thinking big will undoubtedly lead to a fulfilling career. During the summer recess, I visited Gallowhill primary school in my constituency. More than half the kids put their hands up when asked if they wanted to be an astronaut when they grew up. I am sure that other Members will have had similar experiences when visiting schools in their constituencies, and I expect the number to become even higher as children learn about, and are inspired by, the important work that astronaut Tim Peake is currently doing at the International Space Station.

Moving on to the economic benefits of the UK space industry, it will no doubt surprise many outside this Chamber that in 2012-13 the UK space industry contributed £5.1 billion to our economy, which is the same amount as the railways. The latest figure is over £11 billion, and across the UK the space industry supports 68,000 jobs. It is hoped that the industry's output will grow to £40 billion by 2030.

Locally, the space industry is worth around £16.5 million a year to the Scottish economy; more than 30 companies in Scotland operate in the market. When talking about the contribution that Scotland makes to space exploration, we have to mention the impact and work of Glasgow-based Clyde Space. Clyde Space produces a number of products used by NASA and the European Space Agency. In 2014, it secured £1.2 million in funding to produce power systems that will be used for two ESA satellites.

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One of the products of which Clyde Space is particularly proud is its UKube-1. This product was jointly funded by Clyde Space and the UK Space Agency and is the first satellite to be both designed and built in Scotland. The UKube-1 has been described as the most advanced nano-satellite ever made and Clyde is rightly proud of its innovation. I mention that as it underlines the point that there are companies throughout the UK who are producing high-quality products that aid the work not only of the UK Space Agency, but of the ESA and NASA as well.

It is important to note what we are doing to help nurture the astronauts, scientists and engineers of tomorrow, but first I want to make a wider societal point about dreams and ambition. I was struck by something Lord Empey said during a meeting with the aerospace industry yesterday. He was making the point that in Britain we tend to stifle ambition in the young, as opposed to fostering and positively supporting it. For too long a significant section of society—and I include myself in this—have had a play-it-safe, “walk before you can run”, “don’t get ideas above your station” mentality. It has changed, but changed far, far too slowly. I do not pretend to have the answers, but I think we would do well to acknowledge that fact and work towards an equality of ambition and opportunity across all our young regardless of their background. A good start would be for aspirational industries such as aerospace to formulate a collective strategy and a curriculum enhancement that would engage with children early on and throughout their school career. As I heard yesterday, there are many companies doing good work in this area, but there is an ad hoc approach and very much a postcode lottery for children.

The pupils in my local area of Renfrewshire have been lucky; we have been fortunate that the Mission Discovery programme has come to Renfrewshire for the last two years. It is an educational programme—launched and supported by Renfrewshire council, the University of the West of Scotland and the International Space School Educational Trust—and it provides an exciting opportunity to 15 participants from the first and second year to learn from astronauts and other experts in space and science, as well as recruiting 15 paid mentorship positions for those in the third or fourth year.

Mission Discovery recruits astronauts, astronaut trainers, scientists and NASA leaders to help train local people studying in the area. The programme involves students working alongside space experts to carry out a number of tasks, including formulating an idea for an experiment that can be done in space. Not only the students benefit and enjoy this programme; the experts also value the time working alongside the students. In fact, former NASA astronaut and president of the United Space Alliance, Mike McCulley, said:

“Mission Discovery was, by far, the most comprehensive, interesting, and educational endeavour I have been involved with.”

The Mission Discovery programme was a great success in Renfrewshire. The students gained practical knowledge which aided their studies, and the programme made a real addition to their CVs. Programmes such as Mission Discovery help equip students with the necessary skills to be


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able to gain a career in the space industry, and that is vitally important as we attempt to grow the industry. Mission Discovery is a fantastic programme and I would urge other local authorities to attempt to bring it to their areas.

The potential of the UK space industry is huge and I expect that, used correctly, Tim Peake's mission and spacewalk can act as a catalyst for fully realising that potential. To that end, I welcome the "National Space Policy" publication and hope that the Government can work with the sector to improve and increase the opportunities for the UK space industry. The growth of the space industry should not be viewed in a vacuum. If we achieve the goal of capturing 10% of the global market by 2030, that will create real opportunities for us, helping to create 100,000 new jobs for the youngsters I have spoken of and generating £40 billion for the economy.

I have some concerns about whether the Government will achieve the ambitious plans that they have set for themselves; they have not hit too many targets of late. To achieve the goals that the UK Government have set, they will have to commit more public funding to the sector. We have seen in other policy areas that the fixation with austerity has hindered investment, and I worry that this same economic mindset will prevent the Government from achieving the goals set out in the "National Space Policy".

The amount of public spending allocated to the UK space industry has to increase; in 2013, UK Government spending on civil space research and development ranked seventh among all OECD countries. However, contrary to my natural instincts, I will not end my contribution on a sour note. I wish the Government well as they work towards achieving the vision set out in the "National Space Policy". Having a vibrant and successful space industry is vital to growing our economy, creating jobs and contributing to our research output, and I hope that the Government can take advantage of the large amount of public interest and enthusiasm surrounding the UK space industry.

 1.45 pm

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

I want to start by paying tribute to the original spaceman. I am not talking about Yuri Gagarin; I am talking about the legend who was David Bowie, and I am sure the House will join me in sending our condolences to his family.

I grew up in the 1970s and '80s and there are three things I remember vividly from my childhood. The first was the excitement of the power cuts. That was maybe not so exciting for the industries, but, for me, as a child getting the candles out and wandering through the house in darkness always holds great memories. I remember Margaret Thatcher coming to power, too—probably the less said about that the better—and I remember space. I remember the space programme and the space shuttle programme, which started in 1981, with great excitement.

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That excitement took off for me when the space shuttle made a surprise visit to the Paris air show in 1983, and for it to get there it had to piggyback on a jumbo jet. I was at primary school in Glasgow at the time, and we knew the jumbo jet would be flying over at some point in the morning. We had been told that when we heard the jumbo jet we had to stand, quietly put our chairs under our desks, line up at the door and all go carefully outside. Of course all order was abandoned when the noise of the jumbo jet was heard. Chairs were thrown, people climbed across desks, people were knocked down in the rush—*[Interruption.]* It was the west end of Glasgow. Eventually, out we went to see the incredible sight of the space shuttle perched—precariously, it seemed—on the back of this jumbo.

It was that single event in my childhood that sparked a major interest in me both in science and technology and particularly in physics. It was how I ended up choosing to study physics at university and eventually becoming a physics teacher, so the inspiration offered by space stretches across all strands of society.

At this point, I want to mention another physicist. He is a far more famous physicist than I am and has done great work for space: Professor Brian Cox. It was a great treat for my pupils at school to see clips of Professor Brian Cox taken from his wonderful DVDs “Wonders of the Solar System” and “Wonders of the Universe”. It never surprised me that the academic students would be interested, but what was really surprising to me was that the less academic ones wanted to see him as well, and regularly would say to me, “Miss, are you going to stick on that professor guy?” They enjoyed that. I was lucky enough to be at the Science Museum on 15 December for Tim Peake’s launch. There were thousands of schoolchildren there, and their enthusiasm and excitement reminded me of the incident from my childhood with the jumbo jet.

One of my colleagues asked me a couple of days ago: “What is the point of this debate? Is it really that important? Why does space exploration matter?” Well, it is absolutely crucial that we have this debate and it is timeous to have it at this point. I want to talk about the three aspects of space exploration that I think are most important. First, there are only two industries that push innovation in great leaps and bounds: defence and space exploration. Space spin-offs have found their way into all aspects of our everyday lives, through materials such as Teflon, solar cells and robotic arms, which have led to the development of prosthetic limbs. The basic memory foam mattress was developed as a result of providing cushions for astronauts during take-off. There is also a story about the space pen that NASA spent a great deal of money developing, only for the cosmonauts of the time to decide that a pencil would work just as well in zero-gravity conditions.

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Space technology has wide-ranging applications. For example, the damping system on the launch pad has special fluid dampers to ensure that the launch can take place in a stable manner, and when the Millennium bridge just down the road developed vibration problems in the first couple of days after its opening, it was those same dampers, taken straight from the shuttle’s

launch pad, that provided the solution. Such applications happen throughout. Those spin-off technologies do not simply have an impact on our lives; they also have huge economic benefits, and it is important that we recognise that.

Secondly, the satellites that are in orbit have become fundamental to the way in which we live our lives. The largest satellite in orbit around the Earth is of course the Moon, which is of fundamental importance to our lives. It creates the tides, which create great benefits for life in the tidal areas. Artificial satellites that have been put into orbit provide us with television from around the world through satellite broadcasts that come to us via geostationary satellites in high Earth orbits more than 22,000 miles above the Earth.

### **Drew Hendry**

Share

Does my hon. Friend agree that micro-satellite technology is providing some really exciting opportunities to dramatically reduce the cost of putting satellites into space while still performing the functions previously carried out by larger machines? Does she also agree that, on that basis, there should be much more investment in innovation in order to take forward that work?

### **Carol Monaghan**

Share

Absolutely. It is often not understood that satellite launches take place regularly. The next such launch is in fact on Sunday, but we have not heard very much about it in the news. The micro-satellites that my hon. Friend has just mentioned are providing us with more and more great services.

### **Patrick Grady**

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Geostationary satellites were first conceptualised as science fiction by Arthur C. Clarke. This reinforces the point that I was making earlier about the inspiration that space provides to the creative and cultural scene, which has a knock-on effect in scientific applications.

### **Carol Monaghan**

Share

Absolutely. It is really important that science fiction writers continue to write, because they often provide ideas and encouragement for creativity and development.

Satellites are also important in other areas. I have mentioned television; I could also mention communications, and weather and climate monitoring. It was satellites up in space that first photographed the issues with the polar ice cap, and we have now been able to compare the photographs that were taken 30 years ago with those that are being taken now, which are showing the real impacts on the ice cap.

### **Dr Philippa Whitford**

 **Column 1055**



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The United Kingdom obviously has the potential to be part of a world network of satellites, in that the geostationaries are likely to be launched from America, the United Arab Emirates and Singapore, whereas Australia and the northern hemisphere will be launching satellites into polar and sun-synchronous orbits. Obviously, another blatant punt for Prestwick is that we are further north.

## Carol Monaghan

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I thank my hon. Friend for that intervention. Different areas can no doubt provide different services.

Possibly the most famous satellite is the Hubble space telescope. I have been asked why we should not simply view the stars from a dark area of the Earth, such as Chile or Hawaii. The answer is that the Earth's atmosphere is a fluid. Let us try to imagine viewing images through water in a swimming pool. That gives us an idea of what it is like trying to view space from the surface of the Earth. Getting out of that fluid and putting the Hubble space telescope up there have enabled us to get images that would never have been considered possible in the past.

The third really important, and really exciting, aspect of space exploration is the possibility of living in different environments. It was thought for a long time that two things were required for life to exist: an oxygen-rich atmosphere and liquid water. However, we have now seen evidence, even on Earth, of life existing in extreme areas—for example, at very deep pressures in the ocean and in very cold parts of the world. That gives us real hope that there might be life in other places, even within our own solar system. It also gives us the opportunity to think of living further afield beyond the constraints of the surface of the Earth.

We have mentioned astronauts already. I have counted seven British-born astronauts, although I might have got that number wrong. Two of them are space tourists, and a number of them moved to the United States in order to pursue their careers, but what was really exciting about Helen Sharman and Major Tim Peake is that they were both living here in the UK. That gives our youngsters great hope.

We must not forget, however, that space travel is extremely dangerous, particularly during take-off and landing. The Challenger disaster in 1986, in which seven astronauts were killed as a result of faulty seals in the solid rocket boosters, is an example of that danger. In describing the dangers of re-entering the atmosphere, I shall refer again to the fluid I mentioned earlier. Let us imagine skimming stones on the surface of a lake. That is what it is like trying to get a spaceship back into the Earth's atmosphere. It has to enter at a particular angle and at a particular speed. If it gets those things wrong, it will bounce off the atmosphere like a skimming stone. If the angle of entry is too steep, it will burn up very quickly. It is a very precise operation. We also remember the Columbia disaster in 2003.




When I was at the Science Museum just before Christmas with all those children, they cheered and shouted as the rocket was launched. I did not cheer and shout at that point, however, and the people in ground control at the European Space Agency also waited until the rocket had got into orbit proper before the celebrations really started. That is the point at which it is considered to have become a lot safer. We must pay tribute to the bravery of these astronauts. Theirs is a dangerous job, albeit a glamorous one.

As my hon. Friend the Member for Central Ayrshire (Dr Whitford) mentioned, Tim Peake is to do his spacewalk tomorrow. He will be outside the space station for more than six hours, which is no small task. It is highly technical and highly dangerous, and we wish him all the very best.

I have been pleased to hear so many Members talk about the importance of science, technology, engineering and maths and of getting girls involved in those STEM subjects. However, to do that, we need teachers in place, and a serious policy of recruitment and retention of teachers. We need to think about how we will attract people from other areas into teaching.

A few years ago, I was lucky enough to meet a NASA astronaut, who was talking to a group of my school children. He was asked by one, “What do I need to study in order to become an astronaut?” His answer was great. He said, “It doesn’t matter. You must follow what you are passionate about—be that material science, engineering, physics, chemistry, biology or medicine. Follow what you are passionate about and then other things will follow.” That is an important message for our young people.

Finally, I ask the Minister to commit to the space industry not just financially, but in terms of advertising and ambition. As my hon. Friend the Member for Paisley and Renfrewshire North (Gavin Newlands) said, we must have the ambition and we must say to our young people, “This is for you and it is available to everybody.” On the back of Tim Peake’s mission, which has been so inspirational to watch, we really need to get the message out there that space is open for business. I now call on the Minister to make it so.

 2.02 pm

### **Yvonne Fovargue (Makerfield) (Lab)**

Share

I congratulate the hon. Members for Central Ayrshire (Dr Whitford) and for Glasgow North (Patrick Grady) on securing this timely debate and the Backbench Business Committee on allowing it. I also congratulate all hon. Members who have made contributions today on showing such expertise and passion for the subject. I join everyone in paying tribute to Major Tim Peake. We all watched his take-off at the end of last year with fascination and awe, and I wish him every success over the course of his mission, and particularly with his spacewalk tomorrow.

I was particularly excited today to hear that there are ongoing discussions about a live link-up between Parliament and the international space station, not least because I would love to see in *Hansard* the phrase, “Ground Control to Major Tim”.

As the first UK astronaut to join the international space station, Tim Peake's journey is a significant milestone in this country's involvement in space exploration. I hope that this new interest in space exploration and travel inspires young people across the country and helps them to pursue careers in science and technology.

It is appropriate at this time, as the hon. Member for Glasgow North said, to pay tribute to those who lost their lives in the Challenger disaster, particularly Christa McAuliffe, a teacher, who went into space to inspire young people. On 28 January, it will be 30 years since that disaster, and we pay tribute to all those involved.

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Tim Peake's achievement bears testimony to human ingenuity and progress, and it highlights the potential for the successful collaboration between Government and industry. The UK's new national space policy, which aims to increase the UK's share of the global space economy to 10% by 2030, has been worked on by specialists from Government, academia and industry. Its commitment to supporting the growth of the commercial space sector, underpinned by our world-class academic research, is particularly welcome. We on the Labour Benches support that kind of partnership, and believe that the Government should be doing much more of the same in other sectors.

Continued support for the UK's space industry is vital, as many Members have told us. It contributes some £11.3 billion to the economy, and supports a number of vital public services, including medicine, disaster relief, defence and transport. Although we associate the industry with space travel, it also impacts on all our lives on a day-to-day basis. I am talking about things such as satellite television, smartphones and sat-navs—I would never leave the house without my sat-nav. We are benefiting from technology produced by the UK space industry.

The industry is important to all our lives, so we need a long-term strategic goal for the sector. It is disappointing that the space, innovation and growth strategy reports that the ad hoc nature of Government funding for space programmes has hindered strategic planning. Although the Government's direct investment in the space industry is welcome, it must be accompanied by a wider strategy for skilling up future generations, and ensuring that the UK is leading the way when it comes to research and development.

We have heard from many hon. Members about the importance of the next generation of scientists and engineers. We must equip them with the skills that will allow them to undertake those jobs of the future. Unfortunately, the widespread shortage of skills in science and technology, the Government freeze on 16-to-19 funding and in the adult skills sector, and the huge upheaval in colleges from area reviews will not be helping that aim. I have particular sympathy with those who talk about bringing more women into this sector. We need to encourage our young girls and women to see that this is not a dirty engineering sector, but an area of great opportunities. I am concerned that we do not do that early enough. When girls are around the age of eight to 10, they are absolutely enthused by science and technology, but by the time they reach 16, the enthusiasm has waned considerably. We need to keep the enthusiasm going. As the

hon. Member for Inverness, Nairn, Badenoch and Strathspey (Drew Hendry) said, we need to offer encouragement and to look at the careers advice that we give to young women from all backgrounds.

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

Share

May I just say that it is so encouraging to see the number of women pilots in the Royal Air Force, particularly women fighter pilots who are showing not just that they are the equal of men, but that, sometimes, they can beat them hands down?

### **Yvonne Fovargue**

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Obviously, as a female myself, I would say that, quite often in many professions, we have to be not just as good as men, but better than men to prove that we are their equal.

We cannot hope to achieve the Government's target of growing the number of jobs in the space industry if we are not equipping the next generation with the necessary skills. Will the Minister tell the House what assessment he has made of the impact that cuts to the skills budget will have on the future success of the UK space industry? Furthermore, what is he doing to encourage young women to enter the industry?

If our space industry is to prosper globally, we must be pioneers in the field of research and development, but our public investment in R&D has not kept pace with our international competitors. We spend less on research as a share of GDP than France, Germany, the US and China, all of which are increasing their commitment to science and technology. In 2013, UK Government expenditure on civil space research and development was only seventh amongst OECD countries, well behind some of our competitors.

Investment is vital to science, but so is regulation. It is also important that the Government's regulatory regime creates an environment that enables growth in the satellite and space sector. Will the Minister explain what is being done to enable new players, such as small and medium-sized enterprises and start-ups, to access the market? As in many UK industries, businesses' ability to access finance remains a concern. What is the Minister doing to improve access to finance for companies in the space industry?

Throughout the debate, we have heard much about the achievements of space travel and innovation, and the considerable benefits they bring to our economy. Tim Peake's journey to the international space station has the potential to inspire a new generation and reignite the passion for space exploration felt by my generation when we saw man first set foot on the moon. This Government have to capitalise on that in the coming months and years and continue to work in partnership with the sector, allowing us all to reach for the stars.

 2.11 pm

## The Parliamentary Under-Secretary of State for Life Sciences (George Freeman)

Share

I thank you, Madam Deputy Speaker, and the Speaker's Office for granting the debate, and congratulate the Backbench Business Committee on securing it. I think it shows the House at its very best, capturing the mood of the nation and setting out an inspiring and challenging vision of how in the years ahead this country can do so much more in this exciting field.

As many hon. Members have said, the debate is timely. Major Tim Peake floats in orbit above us, looking down, and tomorrow he will conduct the historic and serious spacewalk. He is the first British European Space Agency astronaut and the first British astronaut to enter the international space station. The debate is also timely because of the sad passing of the iconic David Bowie, whose lyrics in so many ways provided a backdrop to my generation's childhood and captured, at the time of the Apollo missions, the existential challenge and opportunity of pushing the boundaries of space, time and culture. That provides a rather extraordinary and unpredictable but moving backdrop to this moment in space.

### Bob Stewart

Share

I rise as the Member for the coolest constituency in the country. David Bowie lived and played in my constituency, and we are hoping that the bandstand where he played will be saved and restored properly. That is not happening at the moment.

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### George Freeman

Share

I am glad that my hon. Friend the Member for Beckenham (Bob Stewart), David Bowie's constituency, rose to speak at that moment.

This debate and story is about more than the space endeavour alone. It is about business—the UK space industry is an £11.8 billion industry, employing 35,000 highly skilled people. It is about extraordinary technology in optics, communications, rocketry and engineering. It is about an activist industrial policy and strategy, for which I am delighted to confirm our support, to encourage leading technologies and industry. I pay tribute to the work done by Paul Drayson and by my great friend and colleague David Willetts, now a Member of the other place, who in 2012 was instrumental with the Chancellor in securing the £80 million for the international space station, which was crucial to securing Tim Peake's role in it, and in securing the money for the reaction engines programme, on which this country is leading.

This debate is also about science, not just in space, but solar and earth science. Taking in rocketry, engineering, climatology, optics and communications, this is a deep science project to inspire all. It is about women in science, as others have said. Dr Helen Sharman was the first British woman in space, and the Italian Samantha Cristoforetti was the first European Space Agency woman astronaut; she did inspiring work and has become something of a legend and a

role model for girls and women in science. It is also about our perception and consciousness of our environment. The “Earth dawn” photo changed perceptions of the fragility of the Earth’s ecosystem.

The debate on space is also about geopolitics. Who, in the appallingly dark days of the cold war and intercontinental ballistic missile threats in which many of us grew up, could have imagined that we would now have an international space station in which Americans, Russians and people from across the world work together for the good of all? It is about defining a new common space for all and a new approach to our defence and security through common leadership. It is not a subject I get to speak much about at the Dispatch Box, but today’s debate makes it possible to talk about mankind’s destiny—the questing spirit deep in us all and in society to inquire, discover, imagine, explore and make possible whole new worlds and opportunities.

This debate is also about the power of ambitious, positive, global, purposive and internationalist leadership to inspire and unite to produce a better politics from us all. No one spoke better on that than JFK, in his inspiring inaugural address in 1960, when he famously said, on a frosty morning in Washington at the very height of the cold war,

“my fellow Americans: ask not what your country can do for you, ask what you can do for your country.”

He launched America on a mission of internationalism, and two years later, in his Apollo speech, announced that America chose to go to the moon not because it was easy, but because it was hard. He did so in the spirit of internationalism and of appeal to the best instincts of mankind. It is a beautiful thing, I think, that on the moon is left an inscription stating that mankind came to the moon in a spirit of freedom and peace. That mission captures so much that is best about our society and what we want to achieve.

It is for those reasons that the Prime Minister asked that we harness the inspirational power of Major Peake’s mission to inspire the next generation of scientists and engineers and to bring the country together. All of us found it difficult to avoid the excitement associated with the launch and arrival of the first British ESA astronaut at the international space station. We held celebration events in Edinburgh, London, Cardiff and Belfast, at discovery centres throughout the UK, and here in Parliament. The Science Museum in London attracted almost 11,000 visitors, and if the sheer exhilaration of the 5,000-plus primary schoolchildren at the museum translates into an increase in future sciences, Tim Peake’s mission will already have achieved its goal. In all, 35% of the viewing public watched the launch, and a further 3.8 million people watched the Soyuz spaceship dock with the international space station that evening.

Our Government are providing £3 million of support to the education and engagement programme associated with Tim Peake’s mission, and we have been lauded by the ESA as the country doing the most to invest in and promote educational outreach. We will measure whether the excitement inspires young people to take up STEM subjects—several Members rightly



commented on that—and increases public understanding of and engagement with science through an evaluation study being undertaken by York University. It is the first such research since the Apollo effect study in the 1970s.

The Peake mission is possible because of a decision made at the 2012 European Space Agency Council of Ministers meeting by the then Science Minister, David Willetts, which resulted in the UK joining the international space station and the related European programme for life and physical sciences—ELIPS. The UK made a further investment at the Council of Ministers in 2014. The total investment, which exceeded £80 million, provides substantial value for money, giving UK scientists access to a laboratory that has cost others up to \$100 billion and is testament to international collaboration in science. The three man crew on the Soyuz, which launched on 15 December, comprised Tim Peake, the American Tim Kopra and the Russian commander Yuri Malenchenko. It is early days, and evaluation of UK involvement is ongoing, but the current results are incredibly exciting.

Experiments for the ELIPS and subsequent experiments undertaken on the space station are selected on the basis of science excellence, which plays to UK strengths. We sometimes forget that this is a massive international set of experiments up in space. In the most recent competition, the UK won more than 10% of awards for experiments, although UK involvement in the space station is at about 5% of costs, so we are punching above our weight. About 40 to 80 scientists across the UK are involved.

Space is not just about national exploration; it is about critical national infrastructure and services, such as weather forecasting, satellite navigation and satellite television. Space-based technologies are used for tackling many global challenges. Satellites can assist with tackling illegal fishing, efficient urban and rural land use, resource management, safe implementation of autonomous vehicles, and myriad further uses underpinning new technologies and new markets. For example, over half the essential climate variables needed to understand climate change derive from our satellite observations.

The UK space sector is undoubtedly a massive and growing success story. There are real prospects for the young people inspired by Tim Peake and the Rosetta mission to work in our very strong and vibrant space economy in the future. It is currently worth more than £11.8 billion to the UK economy. That is growing at about 8% a year, which is three times faster than the average non-finance sector. It is characterised by an incredibly highly skilled workforce of more than 37,000 people, half of whom hold at least a first degree. Those direct jobs each support more than two jobs in the wider economy. The sector has a general value added per job of £140,000, three times higher than the UK average.

To reflect the strategic and economic importance of the sector, my right hon. Friend the Secretary of State for Business, Innovation and Skills launched the national space policy on 13 December to coincide with the Peake mission. It showcases how deeply space now impacts on our daily lives, not least in the field of satellite data and information. It describes how the sector is a unique,

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strategic national capability which delivers science and innovation, national security, essential public services and prosperity. The policy spells out how the UK Space Agency has brought together the roles and responsibilities of 17 different Government organisations and other partners, such as research councils and Innovate UK which are involved with space.

Space-based activity is a long-term endeavour with international collaboration, industrial co-investment, skills development and considerable planning at its heart. Stability and certainty are important, and the national space policy is the Government's expression of our long-term commitment to seeing it through and to putting in place a policy landscape to support that investment.

The UK's involvement in space ranges from fundamental underpinning research into the origins of the universe, to understanding and protecting our planet, through to supporting the research that leads to UK companies launching entirely new multimillion-pound telecommunication satellites. Some 25% of the world's telecommunication satellites are substantially built here in the UK. Satellites operated under the disaster charter and earth observation data procured commercially were critical to effectively targeting the response efforts on the ground in the recent floods.

This is an exciting time for space. In 2016 the UK will be building the main experiment on the Plato mission that will search for new earths orbiting other stars, in pursuit of answers to the profound question about life elsewhere in the universe, and will precipitate key contracts for UK companies. We look forward to a major European Space Agency Council of Ministers meeting in November/December 2016, where we will negotiate to ensure that the UK continues to play an influential part and benefits fully from European Space Agency programmes. The programmes that we are looking forward to in particular include the UK-led biomass experiment that will calculate the capacity of the world's forests to store carbon. As well as improving our ability to control climate change, this offers a considerable opportunity as UK companies are poised to win contracts to provide the craft that will host the experiment in orbit.

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2017 will see the launch of the joint European-Japanese BepiColombo mission which will set out on a voyage to Mercury, using a very efficient ion drive electric propulsion engine manufactured by UK firm Qinetiq.

In the field of space flight, through companies such as Clyde Space and SSTL, the UK has become a leader in the manufacture of smaller satellites and has largely secured cost-effective launch by arranging "piggy-back" launches with larger satellites in a competitive launcher market which is not yet sustainable but is growing fast. This is connected to the growth of commercial constellations of tens or even hundreds of low-cost small mass-produced satellites that can provide ubiquitous communications across the globe or near real-time imagery from low earth orbits.



Indeed, we believe that commercial space flight is a market which, when combined with the emerging trend to use large constellations of small satellites, could provide a cumulative economic benefit to the UK of £20 billion by 2030. This will provide new and long-term manufacturing and service jobs and will stimulate high tech growth. This includes exciting developments such as single-stage to orbit launchers, the engines for which are being pioneered by Reaction Engines, a rapidly growing company in Oxfordshire.

This is the context for the UK to explore having a launch capability. We believe there is at least a two-stage process to achieving it. The first part of our ambition is for the UK to become the European hub for commercial space flight and related space sector technologies. The initial focus is on creating the necessary legislative and regulatory framework that will enable commercial suborbital space flights alongside existing civilian and military airspace operations. Alongside this, it is the Government's intention to select a preferred location for a UK spaceport that will be capable of operating horizontal commercial spaceplanes. We are closely examining what this process will look like, to ensure that it is fair, transparent and robust.

We will seek to draw on established Government approaches to appraisal and will ensure that the preferred location meets a number of key criteria—that it can deliver a spaceport technically capable of operating horizontal commercial spaceplanes, that it will be commercially viable, that it can ensure the safety of the uninvolved public, and that it takes into account the potential environmental impacts of the spaceport and will deliver local and national economic growth. These criteria are likely to form the core of any selection process, though we have not settled on the final criteria.

## Drew Hendry

Share

The Minister is outlining an exciting programme of opportunities and economic development. He has heard from a number of Members today about the need to encourage girls and young women to get involved in the industry. Will he take that message away to the Government and do something practical to promote that?

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## George Freeman

Share

Yes, I certainly will. There are a number of initiatives in place which I have not had time this afternoon to set out, but I will happily take that point on board. We are seized of the importance of promoting women in the sector.

Developing a UK spaceport and a commercial suborbital operation are crucial steps to building the capability and credibility for a UK launch capability, with the aim of launching small satellites from the UK.

I shall touch on some of the key points that hon. Members made. I congratulate the hon. Member for Central Ayrshire (Dr Whitford), whose introductory speech set the scene beautifully. I was delighted that she referred to me as a Minister prepared to boldly go where no Minister has gone before. I pay tribute to my hon. Friend the Member for Bracknell (Dr Lee) who, in his maiden speech, was quick on to this subject and has been a leading advocate and vice-chairman of the space committee. It is great to see the cross-party support for this project.

A number of colleagues, particularly from Scotland, spoke about the importance of the Scottish cluster. In this field as well as in other technology areas, Scotland has a powerful cluster. Despite a number of powerful bids being made from Scotland, Wales and Cornwall, hon. Members would not expect me today to pre-empt the process of selecting appropriate sites, but I can assure them that we will conduct that process fairly, openly and against proper criteria. All their bids have been heard clearly today.

Let me address some of the key questions that have been raised. There was a question about our priorities. I hope my comments setting out our commitment and the commitments set out in the recently launched space strategy go some way to clarifying that. I was asked about research funding. In the autumn statement the Chancellor announced the historic ring-fenced increased commitment to science capital and revenue, and the Government are in the process of working through with the research councils how that science funding will be allocated to various projects. We will shortly make announcements on how we see that being taken forward.

There were questions about growth and what we are doing to ensure a joined-up strategy for the sector. We are working widely with industry to identify the key markets that we see delivering the main growth. The Space Leadership Council, jointly chaired by my hon. Friend the Minister for Universities and Science and the president of the UK space trade association, is actively working to develop a set of policies, and the blueprint for growth which was set out in our recently published national space policy sets out the framework that we intend to follow.

On the timing of the announcement of the spaceport location, as hon. Members know, this is an entirely new market. It is moving quickly, but there are complex issues to be dealt with in relation to regulations and the legal basis for safe flights that we need to get right. That work is ongoing, and I hope that my comments today have reassured Members that it is being taken seriously. The Government expect to be able to announce how we proceed as soon as we can in 2016.

Important questions were asked about space debris and regulation. This area is governed by the Outer Space Act 1986. No licence is issued to operators of space assets unless they can show that they are compliant and safe, and minimising space debris is part of that process. Technical failures do occur, but we remain vigilant. The strategic defence and security review set up a cross-governmental committee, chaired by my hon. Friend the Minister for Universities and Science, to further ensure security in space, particularly in relation to space debris.

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A number of hon. Members asked about careers in STEM. We have allocated £3 million to support education programmes to help young people benefit from Tim Peake's mission, and reaching out to girls and women is an important part of that. The European Space Agency has acknowledged that the UK is doing more to support that work than any other nation in the project. We are providing practical tools for teachers and lecturers.

There was a question about the University of Glasgow and how the Government are engaging with cutting-edge research facilities. Through the work of the Engineering and Physical Sciences Research Council, the Natural Environment Research Council and the Science and Technology Facilities Council, we are actively looking at how we can use those research centres to support this project.

The hon. Member for Strangford (Jim Shannon)—on a previous occasion he described himself as a stalker of mine, because we appear to speak in all the same debates —made a powerful plug for Northern Ireland. The Government fully recognise the benefit that Northern Ireland's space industry and universities play in our space policy. That is why we were delighted to convene and take part in an event held in Belfast to mark Tim Peake's launch.

My hon. Friend the Member for a bit of Cornwall—the precise part escapes my memory right now. *[Interruption.]* My hon. Friend the Member for South East Cornwall (Mrs Murray) raised the important issue of Newquay airport. My right hon. Friend the Prime Minister has said previously from the Dispatch Box that he recognises the importance of Newquay in this and in the wider Cornish economy. As I have said, we will look at all bids in time.


We have heard a lot of quotes in today's debate—some more original than others—not least from David Bowie. I wanted to close with one that we have not heard. In “An Occasional Dream” he sang about

“tomorrows of rich surprise... Some things we could do”

He sang:

“We can be heroes, just for one day”.

I think that this debate, and indeed this whole topic, captures the sense in which good politics can bring people together to achieve the very highest goals. I am grateful to colleagues for raising it and pleased to be part of a Department that is committed to this sector and to achieving everything that this country can do in this very exciting race.

 2.32 pm

## Dr Philippa Whitford

Share

We called this debate to celebrate Major Tim Peake's spacewalk tomorrow, and obviously the incredible work he is doing to engage children and young people. Many Members have spoken about the need to engage girls, in particular. I do not think that there is really a clash between us on whether Tim Peake or Helen Sharman is the first British astronaut; they are people we should

be promoting together. There is no friction between them. Indeed, she has given him her copy of Yuri Gagarin's book to take there as a souvenir. Having spent 33 years in surgery, I know what it is like to be in a man's world. I remember being told formally during my third year at medical school that women could not do surgery. We have come a long way.

We have heard from Members from all UK nations bidding for their site, which I think is absolutely right. We have also heard about the incredible breadth of the industry, and there are many things that we have not even thought about today. I am grateful to hear from the Minister that the structure and licensing will be looked at, because I think that is really important. I look forward to the day when our hubs are called not aerospace, but aero-space—aero, hyphen, space—and I expect that we will have multiple clusters and hubs. A time may even come when we need more than one space port; perhaps one for tourism and suborbital parabolic flights to Japan or north America, and one for getting satellites up—satellites that will end up being the size of a packed lunch.

I am grateful to all Members who have taken part in what has been a fascinating debate. We want to encourage our young people simply to aim for the stars.

*Question put and agreed to.*

*Resolved,*

That this House notes the scientific, cultural and technological opportunities arising from exploration of outer space and the significant contribution the space industry makes to the UK economy; further notes the increased public interest in space exploration resulting from Major Tim Peake's mission to the International Space Station (ISS); welcomes the global co-operation that has led to the development of the ISS over the last forty years; takes note of the shortlist of airports and aerodromes that could host a UK spaceport published by the UK Government in March 2015; and calls on the Government to bring forward further advice and support for organisations considering developing such facilities so that they might be operational by the Government's target date of 2018.