News story: UK and USA join forces to launch ‘space weather’ service

The UK will develop a new instrument for use on space weather monitoring spacecraft to observe the solar wind, in order to protect astronauts, satellites and ground infrastructure.

The Sun is always emitting magnetised plasma called the ‘solar wind’. While conditions are often benign, strong solar wind can produce disruptive space weather by disturbing the Earth’s magnetic field.

More severe space weather can occur when the Sun occasionally discharges large bubbles of magnetised plasma known as coronal mass ejections. Extreme events can be hazardous to astronauts and impact electrical infrastructure, telecommunications systems, aviation and satellite navigation.

Thanks to €8 million (£7million) funding from the UK Space Agency, allocated through the European Space Agency (ESA), scientists at UCL’s Mullard Space Science Laboratory (MSSL) will develop a cutting edge ‘plasma analyser’ which, when placed in deep space, will give early warning of imminent, damaging space weather.

Space weather is a global concern, so the UK Space Agency and ESA will collaborate closely on science, space and ground systems technology with the National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) in the United States.

Dr Graham Turnock, CEO UK Space Agency said:

> Space weather has the potential to cause severe disruption to critical satellite and ground-based infrastructure, so it’s essential that we take steps to mitigate this threat through improving our ability to forecast extreme solar activity.
>
> The space weather mission projects our global influence by partnering with Europe and the USA, driving and protecting future UK knowledge and prosperity, and keeping Britain safe and secure from potential impacts of space weather.

Due to the potential for disruption and impact on industry, space weather appears on the UK National Risk Register.

In the next 5 years NOAA and ESA with support from the UK are planning to launch two complementary solar monitoring satellites. The UK’s ‘plasma analyser’ will fly on ESA’s L5 space weather monitoring mission to observe solar wind. The UK Space Agency is working cooperatively with ESA and the United States’ NOAA on their complementary L1 space weather monitoring spacecraft. RAL Space in the UK are also working on optical instruments for

space weather missions under the current ESA programme.

Director of UCL's Mullard Space Science Laboratory, Professor Andrew Fazakerley, said:

> UCL has many years of research experience in the science of space weather and in building instruments with which to study it, most recently through roles in providing both solar and space plasma instruments for ESA's upcoming Solar Orbiter mission.
>
> I am very pleased that UCL will be able to build on that experience to provide a solar wind plasma analyser designed to meet the special requirements of dedicated operational space weather monitoring missions.

The solar wind data generated by this instrument, and others at L1, are vital to enable the Met Office Space Weather Operations Centre (MOSWOC) to issue timely space weather alerts and warnings to assist Critical National Infrastructure operators to effectively mitigate the risk posed by space weather.

Head of Space Weather at the Met Office Mark Gibbs said:

> The Met Office Space Weather Operations Centre (MOSWOC) is one of three space weather prediction centres around the globe. It provides vital information to help build the resilience of UK infrastructure and industries to space weather, thereby supporting continued economic growth.
>
> Due to the potential for disruption and impact on industry, space weather appears on the UK National Risk Register. The solar wind data generated by this instrument, and others at L1, are vital to enable MOSWOC to issue timely space weather alerts and warnings. This assists Critical National Infrastructure operators to effectively mitigate the risk posed by space weather.

Understanding our Sun is critical to ensuring space safety. Due to launch in 2020, the UK built ESA Solar Orbiter, which also includes significant cooperation with NASA, will be the first science spacecraft to provide close-up views of the Sun's polar regions, helping us to understand how solar storms develop.

A report by PricewaterhouseCoopers estimates that cost savings for Europe arising from disruption and damage mitigation due to accurate space weather forecasting could be up to €2.6 billion, predicting a return of €6.25 for every Euro of public spending on space weather technology.

The UK Space Agency is driving the growth of the space sector as part of the Government's Industrial Strategy and continues to be a leading member of

European Space Agency, which is independent of the EU. The UK is also playing a major role in space exploration and science, with a British built rover going to Mars in 2020.

Speech: Defence Secretary keynote speech at the Land Warfare Conference 2019

D-DAY

In a few days' time the nation will pay tribute to those who fought on D-Day. From Portsmouth's Southsea Common to Bayeaux Cathedral…we will stand in silence recalling the incredible operations off the coast, in the air and on the beaches of Normandy.

When we commemorate those events this week what will be in our thoughts? Will it be the landing craft, or the reconnaissance planes, or the supply ships. No. Our focus will be on the veterans, and all who made that immense endeavour possible.

From the civilians who came together at a moment's notice to build the Mulberry Harbours… wrap up small arms components and sew ID badges…

…to the merchant sailors that swelled our naval force…and enabled the critical transport of men and supplies….

…to the mighty endeavour of that 62,000-strong British element of the 21st Army Group who charged up the beaches

…and those who made the ultimate sacrifice in those dark days.

It was, according to Churchill, "the most difficult and complicated operation that has ever taken place". It was so called ordinary people doing extraordinary things. It is the testimony of those who were there that will captivate us in the coming days. People like Bill Fitzgerald, just eighteen years old, as he along with his comrades stormed those beaches. Then as now it is the people who made the difference. And in defence, if we do not put our people first we will fail to generate and maintain the capability that we need. And we will have broken that covenant between the state and our communities and those who step up to protect them.

As I speak the men and women of our armed forces are working across the globe …combatting terrorism …working with allies and partners to build up the resilience of fragile states… …delivering humanitarian aid to those most in need… …standing up for our values of democracy, tolerance and justice and

achieving great things.

I want to put on record my congratulations to Brigadier Celia Harvey who was selected today to be the Deputy Commander Field Army as a Major General. The third Female Army Major General 2* and the first female reserve 2*. My congratulations to her.

LIVING WAGE FOR OUR ARMED FORCES

We often say what an amazing job they do, because they continually provide us with opportunities to say so. We must take care of them. While they are serving and after they have served.

That is why we will shortly consult on protecting against repeated investigations and litigations against our veterans and AF personnel into historic operations outside the UK. Actions which are not motivated or serve justice, and also consult on paying higher levels of compensation for those injured on combat operations, or to the families for those who have been killed.

Nor should any solider, sailor, airman or women be asked to serve our country and not be sufficiently rewarded. The armed forces are exempt from the living wage, as they are in effect, on call 365 days a year, but I am determined to ensure the lowest paid members of the armed forces are lifted to ensure that none of them are below an acceptable salary to live well on. We are undertaking work to determine what a living wage looks like for those who can be called on day or night.

They should get a living wage.

That is what I will be arguing for in the decisions on this year’s pay review, and it will be a spending priority for me. It is the right thing to do, but I also recognise that the decision to serve is not motivated by money.

People are motivated by what they will be doing and what that achieves in the world and the values that underpin it: protecting, serving, doing your duty for your country.

Central to that is to understand what the Army is for.

That sounds a simple question, but it is one that I am often asked, including by members of the British Army themselves. How can we build connections with our communities, how can we have a strong narrative to recruit if we cannot say what our purpose is.

The reality is, the world is changing and the threats increasing from a diverse range of sources. As earlier speakers have said, Cyber attack is now the new normal. Between 2016 and 2017 NATO saw such attacks on its infrastructure increasing by 60 percent. Whether the origin is Russia, China or North Korea…or from hacktivists, criminals or extremists…the cyber threat can bring down our national infrastructure and undermine our democracy.

All the while, we're having to deal with the hybrid dangers as nations increasingly employ proxy actors to carry out aggression and intimidation at arms-length but now below the threshold of armed combat.

Whatever the correct response to these new forms of aggression, in many cases their deterrence relies on a credible threat of hard power. And the reality is wars are still won or lost on land. We need to seize and hold territory endures and yes, the future may look very different in years to come, but meantime, while armour is relevant it must be capable, and we must be competitive.

We have not been.

Challenger 2, has been in service without a major upgrade since 1998. During this time the United States, Germany and Denmark have completed two major upgrades, whilst Russia has fielded five new variants with a sixth pending.

Warrior, is even more obsolete, and is twenty years older than those operated by our key allies. Since Warrior's introduction in 1988 the United States and Germany have conducted four major upgrades and Russia has invested in three new variants.

So we must invest in our warfighting division, and it is critical we honour the commitments we made in the SDSR 2015 to maintain a world-class divisional war fighting capability, through upgrades and new vehicles, equipped to win wars in the information age…with advanced sensors and automated search, tracking and detection systems.

At the same time, I am keen that we shouldn't overlook the advantages of more joint ways of working. Look at the successes of the Joint Helicopter Force which brings all battlefield helicopters under a single command.

Why can't we do something similar with robotics and unmanned vehicles across all the services…by building a hub overseen by Joint Force Command? Not only will we be able to work better with industry and have a more integrated approach, but we will also be able to plug into what the rest of government is doing too.

At DFID in my previous job I did a huge amount of work on drones, new designs able to lift heavy payloads, and get medicine and supplies into conflict zones and solve many headaches that humanitarians were facing. We boosted creativity through challenge funds and setting up an innovation hub. I think we should be doing more of this in Defence and supporting growth.

In that way to we can create a common mission with the country that is wider than defence: The security and prosperity of the UK, that is what we are for. That is how we will serve our country. And those who put themselves forward to serve are special people.

MAKING THE MOST OF TALENT

There is more that we need to do to avoid people dropping out of the recruitment and training pipeline. Currently, for every eight applicants one

soldier enters training. Just last year that figure was 12 applicants for every soldier. So we've made some good progress but we must do better.

I am challenging the army to reduce that ratio to six to one. It's also worth reflecting that, once a candidate passes the assessment centre we still lose up to seven per cent of applicants before they commence training. I want us to re-engage with these individuals that have dropped out. Individuals who felt a call to serve. Why did they leave? Was the army not for them? Have they considered another service? Have they considered a career on the civilian side?

If we are serious about bringing up all our forces to the required strength then we must pursue every register of interest.

And we also need to do more to encourage our people to remain in the forces –when they're thinking of leaving or have reached the end of their current contracts. We already allow people to transfer between different services…offering quicker recruitment and rapid promotion to those with unique talents. But to say we haven't really sold this is an understatement. We need to make sure that is not just feasible but positively encouraged.

It makes sense when the British taxpayer has invested so heavily in a person that we make best use of that person in the service of their country.

FULL VALUE OF DEFENCE

We have to maximise every efficiency.

But in making our pitch to the treasury we also need to talk about the full value of Defence. And that's not just about jobs in industry, supply chain and services , or export sales, or inventions, or defence engagement which we often mention. It's also about social mobility, and the fabric of our society.

The Army is a place of great opportunity. You take people from all walks of life. You give them a sense of purpose, belonging and family. Indeed, you give them a home away from home and imbue them with those precious values of courage, discipline, integrity, respect for others, loyalty and selfless commitment. As Army Gunner and drummer Hussein Sadiq put it: "I ended up finding that the Army's core values reflected my own."

But the Army does something even more than that. It fires ambition. The British Army has a long and proud history of discovering exceptional character and talent in people which nobody else could see or be bothered to look for.

Rebecca Smith from Grimsby was at rock bottom and sleeping rough. She took a decision to walk into an Army careers office. She became a vehicle mechanic within the (REME) and rose rapidly through the ranks to corporal as a Challenger 2 expert. Having been recognised for her exceptional leadership talent she was recently commissioned from Sandhurst and is now on her young officers' training course…returning to the REME as a second lieutenant. Her previous hard times are now a distant memory.

The British Army has taught many to read and write, academic and practical skills, enabling huge numbers of people to have the tools they need to be active citizens.

And just as I want defence to do more on the UK prosperity agenda I want us to do more on social mobility agenda too. At a time of rising knife crime and prevalent gang culture in some parts of the UK, the Army's ethos can make a real difference to young people. It can offer hope.

Defence has so much to offer, in our armed forces and our cadet units, but also in the fantastic organisations that sit in our communities alongside us. I have been so struck in particular how Military Preparation colleges have enthused those who other education establishments fail to inspire. They have encouraged study and physical fitness, self-confidence and self-worth, a sense of duty and service. And they have given some youngsters options where they had none.

I believe it is time to use the skills and lesson learned at these colleges and elsewhere in the Army to address this national blight of gangs and weapons on our streets.

Today I wish to announce, in support of the Ministerial Taskforce on Serious Violence, that my Department will be holding a summit involving Military Preparation Colleges and those working to divert young people away from gangs and violence. We will bring all that we have to offer to this issue.

Courage is inspirational.

We will never forget what the Army accomplished on D-Day seventy-five years ago. It still inspires us still today. An achievement which founded not on having the most powerful weapons but on having people equipped with extraordinary courage, ingenuity and determination.

Today's Army shares those qualities and our people are going out of their way across to globe to make a difference…protecting innocents…lifting people out of poverty…and providing hope for others from Estonia to Afghanistan, from Iraq to South Sudan.

Yet, as we look into the future, an age in which the dangers are changing and growing, we will depend on our people more than ever.

So we must look after them, like never before.

That is my priority.

Press release: Leading the new space age: government backs ambitious plans for the UK in space

UK will play a leading role in the new space age, with new support for domestic satellite launch capability, space weather forecasting, and a National Space Council.

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- Up to £20 million could be made available from national and local government, subject to business case, for Spaceport Cornwall and Virgin Orbit as part of the Industrial Strategy spaceflight programme – LaunchUK
- UK Space Agency to work with the United States to enhance space weather forecasting, with £7 million for UCL scientists to build key instruments.
- National Space Council to be established as part of upgrade to UK space strategy and governance

The government is ensuring the UK plays a leading role in the new space age as part of its modern Industrial Strategy, with new support for domestic satellite launch capability and space weather forecasting, as well as a new

National Space Council to improve UK space strategy.

There are significant opportunities for the growing UK space sector as commercial space activity increases globally and the United States leads international efforts to return humans to the Moon by 2024.

Spaceport Cornwall and Virgin Orbit

The UK Space Agency and Cornwall Council intend to make available up to £20 million for Spaceport Cornwall and US launch operator Virgin Orbit to develop facilities and operational capabilities that would enable small satellite launch from Cornwall in the early 2020s. This investment remains subject to business case approval processes, including from Cornwall Council later this year.

The funding would consist of up to £12 million from Cornwall Council and up to £7.85 million from the UK Space Agency, including a contribution of £0.5 million from the Cornwall and Isles of Scilly Local Enterprise Partnership.

Spaceport Cornwall could create 150 jobs and enable the UK to compete for a share of the global market for launching small satellites worth a potential £3.9 billion to 2030. Launch from the UK will be an opportunity to inspire children and young people to take up careers in science, engineering or even as space entrepreneurs.

UK Spaceports Animation

Business Secretary Greg Clark said:

> Space is not only about pushing the boundaries of human knowledge, it is a rapidly growing sector of our economy which plays a key role in our modern Industrial Strategy, promotes global Britain and ensures our national security.
>
> These exciting plans from Spaceport Cornwall and Virgin Orbit to make horizontal launch a reality from Cornwall will help further our position as a leader in the new space age.
>
> Alongside our commitment to the proposed vertical launch spaceport in Sutherland, this is making the UK the most attractive place in Europe for those looking to Earth’s orbit and beyond.

The UK government is working with the United States to establish the necessary technical and legal safeguards for US space launch vehicle operations from UK launch sites. The US State Department has already approved a Technical Assistance Agreement (TAA) allowing detailed technical discussions and strategic planning to commence. This would allow Virgin Orbit, which is also investing around £2.5 million in the project, to operate its LauncherOne system and Cosmic Girl carrier aircraft from Cornwall Airport Newquay. A maiden US launch is expected later this year.

Dan Hart, CEO of Virgin Orbit, said:

> We are very proud to play a role in bringing space launch back to Britain – with a revolutionary new level of flexibility and responsiveness. The Virgin Orbit team has now demonstrated every major assembly of our LauncherOne system and are within arm's reach of bringing to the UK. We're thankful for the leadership of Minister Skidmore, MP Steve Double, Cornwall Council, the LEP and the UK Space Agency in making this partnership a reality.

Last month Science Minister, Chris Skidmore, visited Cornwall Airport Newquay to meet some of those involved in Cornwall's thriving space sector and hear more about their ambitious plans for horizontal spaceflight.

Julian German, Leader of Cornwall Council, said:

> Cornwall is the birthplace of innovation and technology and space is at the heart of our 21st century economy. With assets like Spaceport Cornwall, world-class mission control facilities at Goonhilly Earth Station and superb digital connectivity, Cornwall will play a vital role in the growth of the global space economy.

Mark Duddridge, Chair of the Cornwall & Isles of Scilly Local Enterprise Partnership said:

> This announcement is the culmination of 5 years' hard work and will be transformative for Cornwall. It puts us and the UK at the heart of the international satellite launch market, offering affordable access to space, and will inspire a generation.
>
> I am excited to announce that today the LEP have committed a further £0.5 million to the funding package as a Growth Deal investment into Spaceport Infrastructure.

Aviation Minister Baroness Vere said:

> The development of Cornwall's horizontal launch spaceport is a fantastic example of the UK spaceflight industry's innovation and expertise.
>
> Government support and collaboration with operators like Virgin Orbit will help cement the UK's position as an aviation world leader, unlocking potential and creating jobs.

Space weather

As well as opportunities, space also presents threats. Space weather occurs when the Sun sporadically ejects material and radiation which can be hazardous to astronauts and disrupt electrical infrastructure, communications, aviation and satellite navigation.

The UK Space Agency is providing €8 (£7) million funding for leading scientists at UCL to develop a new instrument – a 'plasma analyser' – to monitor space weather. When placed in space between the Earth and the Sun, this would give early warnings to allow industry and space operators to take corrective action to protect assets such as power grids.

The UK Space Agency and European Space Agency (ESA) will collaborate closely on science, space and ground systems technology with NASA and the National Oceanic and Atmospheric Administration (NOAA) in the United States. In the next 5 years NOAA and ESA, with support from the UK, are planning to launch 2 complementary space weather monitoring spacecraft.

National Space Council

The UK can use its space capabilities to promote security, prosperity and science, as well as trade, international partnerships and global influence.

A new National Space Council, to be established later this year, will provide strategic leadership on space across government, coordinating all aspects of the UK's space strategy, investment and use of space through a new National Space Framework.

Science Minister Chris Skidmore said:

> As we approach the 50th anniversary of the Apollo 11 moon landing, these announcements demonstrate the UK government's commitment to space. Satellite technology is crucial to our daily lives, for observing the Earth and gathering vital climate change data, and the space industry is growing rapidly with 42,000 jobs across the country. Establishing a National Space Council is a landmark occasion and will help put space at the heart of government policy.

The UK will remain a leading member of the European Space Agency and is also considering a national investment programme to forge new international partnerships, position the sector to access more than £70 billion of emerging commercial opportunities and foster crucial industrial capabilities.

Andy Green, President of UKspace, said:

> We welcome the government's announcement to establish a National Space Council. Around the world governments act as key customers, enablers and regulators of space.

> The creation of a National Space Council is critical step to a more joined up approach across government to support the growth of the UK space sector and mirroring the approach taken in the United States.

Notes to editors

1. Government is committed to supporting all potential spaceports to realise their plans. Following its call for Spaceflight grant proposals in Spring 2017, the UK Space Agency assessed 26 proposals to determine what would deliver the best value for money and strategic opportunity for the growth of the UK space sector. The government is supporting the creation of a vertical launch spaceport in Scotland, which Lockheed Martin and Orbex will operate from, as well as the development of horizontal spaceflight. Last month, the UK Space Agency opened a £2 million Horizontal Development Fund to enable future horizontal spaceports to support their plans for small satellite launch and sub-orbital flight. Find out more about the promotion and regulation of spaceflight from the UK

2. In the absence of space weather forecast capability, the socioeconomic impacts of an extreme space weather event, known as a Carrington event, could cost the UK £16 billion.

3. The National Space Framework will consist of 3 priority areas:

- Prosperity and Knowledge
- Security and Protection
- Global Influence

4. The US National Space Council was re-established in June 2017 in order to provide a coordinated process for developing and monitoring the implementation of US space policy and strategy. The Vice President of the United States chairs the Council.

5. Virgin Orbit: Thanks to its “mobile launch pad,” a modified 747 dubbed Cosmic Girl, LauncherOne offers satellite customers an unparalleled level of control over when and where their spacecraft are deployed. Expanding to an additional launch site in the UK further enhances the agility and flexibility of Virgin Orbit’s dedicated launch services. Virgin Orbit has now tested every component and system of the LauncherOne platform in the run up to the company’s first orbital launch, expected soon.