

Air Chief Marshal Sir Mike Wigston, Chief of Air Staff

It's a great pleasure to be at the Defence Space Conference once again. And well done to everyone involved for gripping the 2020 replan – it's a fantastic programme with a great line up, so I'm sure there will be plenty of useful and important conversations, despite us not being in the same physical room.

And we do need more conversations about Space. I know I am preaching to the choir here, but we have a collective responsibility to raise the volume. We know we are critically dependent on space. We know our access to space is fundamental to national security and our way of life, and any loss or disruption to our satellite services would have a disastrous effect on people's day-to-day lives. But that reality doesn't register with many people. What is happening out of sight 1000 miles or more away, is not something our average citizen frets about. We don't hear much about a disruption to space services at a personal level and how they could affect all of us – without space there would be no bank transactions, no cash out of an ATM, no petrol in the pumps, traffic gridlock, a malfunctioning national grid to list just a few examples. In the context of COVID 19, around 15 million items of NHS PPE are delivered every day and the delivery of these vital items are dependent upon space, as will be the immense logistics effort supporting a future vaccine.

We are all dependent on space, whether that is in our personal lives, or in my case commanding air and space operations, so we must ensure the safety and security of the space domain. That means understanding what malign actors are doing in space, that means having the means of protecting our critical interests and freedom of operations in space, and that means being prepared to fight to defend those interests if it came to it.

I recognise talk of space as a warfighting domain is contentious but I would offer that ignoring the fast-evolving threats to our national interests in space would be tantamount to negligence by me, and my fellow Chiefs. Space gives us and our closest allies a unique operational advantage, so it would be odd to assume our potential adversaries would allow us to continue with that advantage unhindered. We see nations like China and Russia and others developing anti-satellite capabilities. This year, Russia conducted a series of tests to advance space-based anti-satellite weapons on-orbit with COSMOS 2542 and 43. Actions like this threaten the peaceful

use of space directly and they also risk creating debris that could pose an indirect threat to satellites and the space systems on which the world depends. The increased debris density may contribute to reaching a threshold in low earth orbit that could start a chain reaction of follow-on collisions – the Kessler effect; leaving parts of space completely unusable.

We've seen directed energy weapons that have the ability to deny sensors; causing temporary or permanent damage to satellites that may be supporting a wide range of tasks from earth observation to weather to disaster relief operations. We have seen several examples of Direct Ascent Anti-Satellite testing; firing a rocket from Earth to orbit, with the aim of destroying satellites. In 2007 China destroyed a weather satellite, creating more than 3000 pieces of debris greater than 10cms in one single event. When you consider that the number of objects that size or greater is approximately 22,000 – that one irresponsible action represents a significant portion of the total debris in orbit today.

When deterrence has failed and political discourse has run its course, a future conflict may not start in space, but I am in no doubt it will transition very quickly to space, and it may even be won or lost in space.

So we have to be ready to protect and if necessary defend our critical national interests in space. And just as we protect and control the skies, we must protect the security of the space domain, not only for our access to those vital space-based services, but also to protect and enable multi-domain activity by land, sea, air and cyberspace. If we don't think and prepare today, we won't be ready when the time comes.

I make no apologies for painting a grim picture, because we have to work to do to prepare for that worst-case outcome. Even today, space is a far from benign environment, with almost daily cyber-attacks and dubious sub-threshold activity.

Russian satellites continue to conduct suspect rendezvous proximity operations in GEO - possibly an indication of commercial and military espionage activities. One Russian satellite has been on GEO for several years transiting from one slot to the next, parked up to next to other nations' and commercial satellites. Meanwhile, China

seeks to become the world's pre-eminent space power by 2045, an aspiration supported by developments in cyber, electromagnetic and kinetic systems that potentially could threaten other users in space.

So what are we doing about it.

Firstly, activity in space is governed by the applicable UN space treaties and general international law. The UN General Assembly First Committee on 6 November 2020 voted in favour of the new UK resolution on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviours. This will allow nations to collectively produce a better understanding of the current threats to space security and enhance trust and confidence between states to create a more secure space environment; and avoiding miscalculation and misunderstanding.

Secondly, we have to be able to monitor what is going on in space to build that understanding of threats, and be ready to protect and if necessary, defend our critical interests and freedom of action, and those of like-minded allies and partners. For me, that means our collective understanding of the risks, threats and opportunities in space, must become as deeply rooted to our business as our understanding of the air domain. Conferences like this help of course. They're another opportunity to collaborate with our partners and allies – relationships that are critical to space operations. As a global commons, space has always been a place of collaboration internationally, and with civilian and commercial partners as well as the military.

So thirdly, we're working closely with international allies, including the US, to reinforce responsible and safe behaviours in space and to build expertise, and understanding of what others are doing in space. The UK has a long record of collaboration with the US which began in a meaningful way when RAF Fylingdales became operational in September 1963, and it's remained the jewel in the crown of our space relationship to this day. Last year we announced that the UK has become the first formal partner in the US-led Operation Olympic Defender – a multinational coalition formed to strengthen deterrence against hostile actors in space. We also make a prominent contribution to the Combined Space Operations Initiative which seeks to identify further areas for collaboration across the US, Canada, Australia,

New Zealand, France and Germany. And we are working with NATO on their “Initial Implementation Plan for Space as an Operational Domain”

Closer to home the Royal Air Force in collaboration with the UK Space Agency and key industry partners have grown a Commercial Integration Cell as part of the UK Space Operations Centre. This endeavour is already bearing fruit: helping to coordinate government and commercial activity, and developing the AURORA information system, which aims to significantly enrich our space situational awareness. AURORA is an agile, cloud-based system that will fuse analysis of space events, enabling the UK to make a leading-edge contribution to international space domain awareness.

Our ambition does not stop there. We have made significant progress within Defence scoping a UK Space Command in line with this Government's 2019 election manifesto.

We continue to build on our ambition to develop a Sovereign low-earth constellation of responsive small satellites. We've called it Artemis, so no confusion there with NASA's moonshot! We are developing the programme with industry partners from across the space enterprise to understand key requirements for a future operational multi-sensor constellation, exploring the military utility of responsive horizontal and vertical launch, and potentially creating a national space framework that could benefit both Defence and the civil sector alike.

So, we are already doing a lot, planning a lot, and we have plenty of ambition. There are plenty of challenges in all that, but as you will hear from Patrick next, in partnership with UK Strategic Command, and aligned across Government, Defence, academia and industry we can and should be a leading space nation, and doing it for the benefit of all.

In saying all that, it would be easy to be distracted by our future space ambitions and overlook what's going on now. In essence, every military operation from a Land Battle to the Carrier Strike Group is dependent on Space. The UK Space Operations Centre is the UK Armed Forces current Operational level Command and Control organisation that provides space effects across all Domains, and monitors what our potential adversaries are up to. Space operations for the Royal Air Force are not

conceptual or experimental; they are an essential element of the multi domain integrated force of today.

To conclude. Space is critical to the day to day life of every citizen of the UK. Likewise, its contribution to current and future multi domain military operations is ever more significant, and non-discretionary. In that context, the ambition from our political leaders is clear; the Space sector is important to the nation and we must be at the forefront of this explosion of technological and commercial opportunities. For Patrick and me, the Royal Air Force alongside Strategic Command and on behalf of Defence, must be radically forward-looking to be able to protect and promote the United Kingdom's interests in space, and make a leading-edge contribution to the coalition of like-minded nations and organisations who have come together to ensure space is there for the benefit of all. Thank you.