



SPACE WARS

Timothy Compston looks to the heavens to see how geopolitical rivalries on Earth are leading to rising tensions in space

With France announcing a new space force – including plans to launch satellites equipped with lasers and guns by 2030; President Trump looking to ramp-up the US military's space capabilities and countries like China, Russia and India all enhancing their anti-satellite capabilities – there is a danger that in future space will resemble a battleground rather than a new frontier. To put things into context, there are already 320 military satellites orbiting Earth – about a third of the total – with more planned for near-Earth and cislunar space.

Turning first to President Trump's launch over the summer of a space-focused military command, this step is a concrete manifestation of the growing competition in

the space arena and, consequently, a desire to defend the US's strategic interests, including protecting hundreds of satellites that might be vulnerable to attack. The President stressed during his speech that: "SpaceCom will ensure that America's dominance in space is never threatened". Added to this, Air Force General John Raymond, who is to head up the command, sees space very much as a war-fighting domain: "I'm convinced that our way of life and our way of war depend on space capabilities".

As the world's preeminent space power the United States has long been at the forefront of military activity above the Earth dating, as it does, to the origins of the 'space race' with the Soviet Union in the fifties. The strategic value of space was underlined by Vice President Lyndon B Johnson when he addressed a Senate Armed

Services Committee in January 1959: "Control of space means control of the world". It was back then that the US first used reconnaissance satellites to take high-resolution photographs for the military and then to parachute the results to Earth for analysis. The US was also an early developer of satellite navigation systems from the US Navy's Transit in 1960 to the GPS of today. High on the agenda for the military too over the years have been satellites – like Milstar – to facilitate communications with assets on the ground and platforms – and the SBIRS (Space-Based Infrared System) to provide an early warning of the launch of intercontinental ballistic missiles (ICBMs).

In addition, decades-long research has been conducted by the US into satellite-based weapon platforms to target ICBMs. These have ranged from President Eisenhower's Project Defender, based around a large wire mesh, which was ultimately cancelled, to the laser platforms of the Strategic Defence Initiative (SDI) of the Reagan era – otherwise known as Star Wars – which floundered due to technical challenges and the soaring cost. With regards to Anti-Satellite (ASAT) weapons, responding to Russian developments in this area, the US fast-tracked a solution to launch a missile in 1985 from a high-flying F-15 aircraft at a gamma ray spectroscopy satellite. Fast-forwarding to February 2008, and a ship-based missile was also deployed, successfully, from a cruiser – USS Lake Erie – to target a malfunctioning US spy satellite.

It is perhaps not too surprising that, over the years, military and strategic considerations have had an impact on the US civilian space programme, whether it be the size of the Space Shuttle's cargo bay to provide the right cargo-carrying capacity, the availability of ICBMs to convert to launchers for satellites and manned missions or not allowing China to participate in the International Space Station. Interestingly, the re-useable long-endurance Boeing X-37 robotic space plane – or Orbital Test Vehicle (OTV) – which is operated by the US Air Force began life as a NASA project.

CHINA GETS IN ON THE ACTION

The acceleration in China's space plans from space stations to mining on the moon – and the infrastructure that's required to support these endeavours – is starting to cause US policy makers many sleepless nights regarding what may potentially happen not just in Earth's orbit, but what is termed cislunar space (the volume of space in the moon's orbit). This disquiet is much in evidence in documents like that issued by US Air Force Space Command last month entitled: *The Future of Space 2060 and the Implications for US Strategy*. One of the conclusions from the report was that: "China is executing a long-term civil, commercial and military strategy to explore and economically develop the cislunar domain with the explicit aim of displacing the US as the leading space power."

Examples of the strides it has already taken include the Chang'e-4 far-side moon mission and the associated Magpie Bridge relay satellite as well as its manned spaceflight programme. Another concrete demonstration of China coming of age, this time from a military perspective, was the January 2011 anti-satellite missile test, which destroyed a Chinese weather satellite. The event created significant amounts of debris and a few months later it is reported that some passed only 6km away from the International Space Station.

Of course, even after the break-up of the USSR, Russia – the US's long-standing strategic rival – still has a strong space presence through its manned Soyuz programme and cooperation with partner nations – including the US – on the International Space Station. It maintains a wide array of military observation and communication satellites and an alternative navigation system to GPS in the form of GLONASS. As part of the USSR, Russia undertook a large number of anti-satellite (ASAT) tests with the co-orbital Istrebitel Sputnik (IS) system – which was designed to detonate a charge near its target; Earth-based lasers to blind satellites, and air-launched systems carried by a modified MIG-31D aircraft.

Here in the UK – although not on the scale of the US, China or Russia – there are now a series of space-related initiatives in the works, above and beyond the latest iteration of the Skynet family of military communications satellites. For example, back in July at the Royal Air Force Air and Space Power Conference

THE 1967 OUTER SPACE TREATY LIMITS THE USE OF THE MOON TO PEACEFUL PURPOSES

the then Defence Secretary, Penny Mordant, highlighted the need to work more closely with allies and committed £30-million to fast-track the launch of a small satellite demonstrator within a year, an area where the UK already has considerable commercial expertise, saying: "Today we show that the sky is no longer the limit of our armed forces". To support the new system the UK MOD has set up team ARTEMIS to bring together UK and US defence and industry personnel.

In addition, the Defence Secretary announced that the UK is the first formal partner in the US-led Operation Olympic Defender: a multi-national coalition designed to strengthen deterrence against hostile actors in space and to reduce the spread of debris in orbit. To this end, the UK plans to send personnel to work out of a Combined Space Operations Center (CSpOC) in California. Beyond this, the Defence Secretary confirmed that the RAF has seconded a member of staff to the Virgin Orbit programme, which is researching the launching small satellites from the wing of a Boeing 747 aircraft. She also highlighted the success of a Space to Innovate Competition to boost the surveillance capability of UK satellites and to identify hostile actors in space.

Just last month (September) at the Defence and Security Equipment International (DSEI) trade show in London, Gary Aitkenhead, the chief executive of the UK's Defence Science and Technology Laboratory (Dstl), announced news of Project Oberon a design study with Airbus for a cluster of military radar satellites to look at the Earth in high resolution. The hope is to have a demonstrator by 2022 and, if all goes well, an operational capability by 2025.

The UK's space activities are, of course, not immune from the implications of Brexit. A case in point being the UK's participation in the EU's Galileo satellite navigation programme where it had played a

As early as 1959 the US believed that "Control of space means control of the world"

major role in developing the satellites and associated technology. Moving ahead, the fact that access to the Public Regulated Service (PRS) element of Galileo – an encrypted navigation service for use by the military and Government bodies – would only be available to EU member states means that the UK will find itself locked out of this critical resource. The end result is that Britain is now looking at the potential – as confirmed by previous Prime Minister Theresa May – to develop its own constellation of satellites to bridge this capability gap.

Across the English Channel, France is also very much on an upward trajectory where the defence of its assets in space is concerned. In the lead up to the Bastille Day celebrations, French President Emmanuel Macron underlined his country's space ambitions by approving the creation of a space command within the French air force. Speaking about the rationale for the move he said that it was: "To assure the development and reinforcement of our capabilities in space". The French military spending plan for 2019 to 2025 includes €3.6-billion for defence in space including communications, Earth observation, electromagnetic monitoring satellites and the updating of a radar surveillance system.

Drilling down into more detail on France's space command efforts, a fortnight after Emmanuel Macron's speech the French Minister of Defence, Florence Parly, offered up some more details at the Lyon Mont-Verdun airbase with the *Le Point* newspaper reporting that this includes: equipping the next generation of Syracuse communication satellites with submachine guns or lasers to disable or destroy other satellites. She emphasised that France did not want to embark on a space arms

race: "We will conduct a reasoned 'arsenalization'."

Parly also confirmed that the French air force would receive €700-million in addition to the planned 2019 to 2025 budget. There is to be a new Air Force Space Operations Centre in Toulouse and the space command will bring together 220 personnel from the existing Joint Space Command, the Operational Centre for Military Surveillance of Space Objects and the Satellite Observation Military Centre.

Turning to India, the world's largest democracy has a well-developed commercial space programme and is making big strides in military applications too. This transformation into a major space and military power was underlined earlier this year when we saw the testing of an anti-satellite weapon. In the test a ground-launched ASAT interceptor was used to successfully target a satellite in low Earth orbit (282km/176 miles up) with a kinetic kill vehicle. The ASAT is a spin-off of technology that India has been developing for ballistic missile defence, given concerns over the threat posed by strategic rivals China and Pakistan.

So, what can be done to decelerate the militarisation of space? Thankfully on the nuclear weapon front there is the Outer Space Treaty from 1967, which does at least prohibit the placement of such weapons in space and limits the use of the Moon and other celestial bodies to peaceful purposes. However, when it comes to conventional weapons things are more problematic. Despite the UN General Assembly adopting a December 2014 resolution on the 'No First Placement of Weapons in Outer Space' and Russia and China putting forward draft texts in a similar vein to the Conference on Disarmament – in 2008 and 2014 – such efforts have, sadly, proved to be to no avail, and tensions between the major space powers remain at a heightened level ●

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