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ANALYSIS

A top secret US spacecraft is rewriting the rules of warfare

The X-37B returned to Earth last month, but details of its time in space remain a mystery

On 21 August, in the dead of night, a mysterious spacecraft launched from NASA's Kennedy Space Center in Florida. The craft in question was the eerily named X-37B – an experimental and highly secretive US government project that has been quietly unfolding for more than a decade.

The launch marks its eighth mission in space, after racking up 4,208 days in orbit on its previous flights.

Details about the X-37B and its mission remain scarce. Over the years, only a trickle of information has emerged, allowing us to piece together fragments of what's happening above our heads.

While the race to return to the Moon plays out in full view – driven by private corporations and national space agencies – another, more shadowy contest is unfolding behind the scenes: the race to militarise space.

This is where the X-37B comes in – one of many covert experiments likely being conducted by the US,

Russia and China, among others. Recently, new details have emerged about this enigmatic spacecraft, offering a rare glimpse into its features and what the future of military space operations might hold.

TESTING ITS CAPABILITIES

The X-37B is not new, per se, but its capabilities put it at the cutting edge of space exploration and defence. Built by Boeing, the spacecraft was born out of NASA's X-37 programme, which began in 1999, although the X-37B's first flight wasn't until 2010.

Since then, control of the spaceplane has passed from the Defense Advanced Research Projects Agency (DARPA) to the Department of the Air Force Rapid Capabilities Office and, most recently, the United States Space Force (USSF).

“The US stood up the Space Force as a separate service in 2019, partly in recognition that any future war will

ABOVE The X-37B looks like a smaller version of the Space Shuttle, but flies autonomously – hence there's no cockpit or windows



have a significant space component,” says Vivienne Machi, military space editor at Aviation Week.

“The US military has long been reticent to describe the space domain as anything but a place for cooperation and benign activity, but that rhetoric is now changing to one of space rapidly becoming a war-fighting domain.”

But if the X-37B is a key tool in the US military’s push for space dominance, how exactly does it achieve that?

This is where things get murky. We know that the X-37B has so far flown seven missions, with its longest lasting two and a half years. The most recent, saw the test vehicle remain in orbit for 434 days.

The craft itself is launched atop a rocket, but flies and lands autonomously (no crew that we know of are inside). Onboard, there’s room to store experiments, some of which have been made public while others remain cloaked in secrecy.

For example, following its sixth flight, Space Force announced that the X-37B had been testing a module designed to capture solar energy beyond Earth’s atmosphere and transmit power back to Earth as radio frequency microwave energy.

The X-37B is also capable of deploying satellites. During its sixth mission, it carried an experimental US Air Force satellite equipped with plasma thrusters.

Beyond carrying experiments, the X-37B itself is a testbed for how to operate in the harsh conditions of outer space, explains Machi.

“Basically, it’s an ideal testbed for Space Force to gather critical data on orbit, send experiments to space and see how different instruments work, and help inform new capability development,” she said.

In a rare move, Space Force offered the public a glimpse into the X-37B’s activities last October – while it was still in flight.

A Space Force press statement revealed that the X-37B had performed a novel ‘aerobraking’ manoeuvre – making multiple passes through Earth’s atmosphere to lower its orbit using drag instead of fuel.

This level of manoeuvrability serves several purposes, including the ability to vanish and reappear unpredictably, leaving adversaries guessing.

Why Space Force broke with tradition to announce the X-37B’s activities mid-mission remains unclear (such disclosures usually come after the plane is back on the ground). “One potential reason is that they wanted to highlight its capabilities as a deterrent to other nations,” says Todd Harrison, a senior fellow specialising in space policy and security at the American Enterprise Institute in Washington DC.

ABOVE A recent manoeuvre by the X-37B may have been a way for it to dispose of a service module without adding to the problem of space junk around Earth

RIGHT The sixth test flight of the X-37B took place in 2020 when it was launched into orbit aboard an Atlas V rocket from Cape Canaveral in Florida

“The craft itself is launched atop a rocket, but flies and lands autonomously (no crew that we know of are inside)”

“They may also have realised that there was no way to hide this manoeuvre. Space trackers would easily be able to see what the X-37B is doing.”

Harrison also suggested a third possibility: a demonstration of responsibility in managing space debris. The aerobraking manoeuvre wasn’t only a test of the X-37B’s capabilities, but also a way to safely dispose of a service module headed for atmospheric re-entry.

“They want to do that at a low altitude so the module will re-enter the atmosphere and burn up, rather than [have it] linger in space and potentially become a collision hazard for other satellites,” he added.

The X-37B has almost certainly seen some significant upgrades during its service, though details remain largely under wraps. Its batteries and solar cells have been replaced multiple times, yet, remarkably, it still relies on the original heat shields from its first mission.

Boeing, the aerospace giant behind the X-37B’s development, declined to comment for this story.

SPACE WARS

While it’s clear that the X-37B itself isn’t a weapon, it plays an important role in preparing the US for the new frontier of space warfare.

“The X-37B fits into that picture because the Space Force has never fought a war in space and needs to train to do so without, you know, a war actually breaking out first,” said Machi.

With more than 10,000 satellites in orbit and countless more debris, data the X-37B gathers is critical for understanding how to operate in an increasingly congested environment.

As Harrison puts it: “it supports modernisation readiness, but not operational readiness.” In other words, the X-37B is laying the groundwork for whatever defensive capabilities may be needed in the future.

It also keeps the West competitive in the covert space race. The X-37B isn’t alone up there, after all – China has its own spaceplane, the Shenlong, which has completed three missions and remains even more secretive than its American counterpart.

More than anything, the X-37B’s most valuable lesson may be mastering the art of invisibility.

“Countries including Russia and China are developing and fielding new systems meant to track and observe US assets in space, and potentially target them,” Machi said. “There are reports of China demonstrating a fractional orbital bombardment system in July 2021 and of Russia pursuing a nuclear anti-satellite capability in orbit in 2024.”

Whatever the full scope of the X-37B’s mission, its very existence makes one thing clear: space is no longer just a place for exploration, but an arena where nations are preparing for the future of defence.



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