Space exploration

Japan’s space ambitions fizzle after rocket failure

Decade-long effort was source of national pride and meant to be symbol of technological prowess

The H3 rocket lifts off from Tanegashima in southern Japan on Tuesday. Japan's space agency intentionally destroyed the rocket moments later after an engine failure © Kyodo News/AP

Kana Inagaki and **Eri Sugiura** in Tokyo YESTERDAY

When Japan's space agency issued a self-destruct command to its new flagship rocket this week, it was more than just the 63-metre H3 that went up in smoke.

Within 15 minutes of the rocket's launch from the southern island of Tanegashima, an engine failure crushed nearly a decade's worth of efforts that were a source of national pride and a symbol of Tokyo's technological prowess and oversized ambitions to join the top league of global space competition.

"Japan's future depends on the H3 rocket," Masashi Okada, a project manager at the Japan Aerospace Exploration Agency (Jaxa), said at a news conference following the failed launch on Tuesday. "We will aim for its return to flight as early as possible."

The H3, Japan's newest rocket and its first large one in three decades, was seen as Tokyo's competitor to Elon Musk's SpaceX Falcon 9, which has sent prices plunging in the potentially lucrative commercial satellite launch market.

Developed by Jaxa in partnership with Mitsubishi Heavy Industries, the H3 launched at an ambitious cost of ¥5bn ($37mn), half that of its predecessor and the $67mn needed for a Falcon 9 launch.

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Ahead of the H3's launch, Nobuhiko Abe, who heads MHI's defence and space business, told reporters the starting point for marketing the new rocket was that it would be as reliable as its predecessor H2A, which boasted a 98 per cent launch success rate. "With the significant cost reduction, H3 can compete better than the H2A in the current market," Abe added.

Analysts said the botched maiden flight, which was already two years behind schedule, could seriously undermine Japan's chances of becoming a real contender in the crowded market for commercial satellite launches.

It could take more than a year for Jaxa to investigate the engine failure's cause and relaunch the H3, analysts said. In that time, rivals including SpaceX and Arianespace, which is jointly owned by Airbus and Safran, are likely to succeed in bringing down costs further.

"Until recently, Japan was at the edge of a cliff but it was still hanging on. Now, it has fallen from the top league," said Akira Sawaoka, a space expert and president emeritus of Daido University.

The fallout of the rocket failure could also have implications for Japan's national security strategy in space, an area of increasingly deeper co-operation with the US to compete against Russia and China. The $1.6bn rocket programme is critical to Japan's ambition of retaining independent access to space and a pillar of the government's broader space strategy.

The H3 had carried an earth observation satellite and the defence ministry's experimental infrared sensor for use in monitoring missile launches and other military activities. Both were destroyed when the rocket self-destructed.

Hirotaka Watanabe, a space policy expert at Osaka University, said the impact on security-related satellite programmes was likely to be limited if Jaxa could resolve the issue and relaunch the H3 during the 2023-24 fiscal year.

"Still, Japan should have anticipated several years of delay in development and prepared a back-up plan," Watanabe said, adding that the country should have ensured the ability to switch back to the H3's predecessor model, which will be retired by next year.

The failure of maiden rocket launches is not unusual. But the H3's failure was an even greater setback for a nation that was already constrained by underfunding and the lack of a military programme that would help accelerate the development of rockets.

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"Japan's budget for rocket development is considerably smaller than that of [rivals] overseas, but the bigger difference is national security. Both the US and China use rockets for military purposes but Japan doesn't, so the number of launches is significantly lower," said Ko Ogasawara, professor at the Tokyo University of Science and a former rocket engineer at MHI.

For industrial conglomerate MHI, the H3 trouble follows the recent collapse of another $10bn national project to develop a regional jet that was meant to elevate Japan's standing in the global aviation market.

After what appeared to be a successful take-off, the failure of the H3's second-stage engine to ignite left engineers at both MHI and Jaxa baffled. Last month, the rocket launch was aborted after the booster engines failed to ignite, an issue Jaxa said had been resolved before this week's attempt.

"We believe that our initial responsibility is to thoroughly investigate the cause of the accident with all of our resources, and we will make every effort together with Jaxa," MHI said.

Beyond establishing the exact cause of the second engine trouble, experts said the future success of the rocket programme hinged on addressing an underlying weakness in Tokyo's broader space policy.

"The biggest challenge for Japan's space development is not only to demonstrate its technology but to link it to commercialisation," said Haruhiko Kataoka, vice-president of the Japan Institute for Space and Security. "There is a broader shift towards using a strong commercial base for national security, but Japan is behind the US and Europe because it doesn't have that."