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India's First Private Rocket Launch is a Turning Point for the Space Industry

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Image Source: NDTV.com



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The launch of India's first privately owned and developed rocket has opened new avenues for the commercial space sector. Skyroot Aerospace, a space tech start-up, launched India's first private rocket, named Vikram-S, on November 18, 2022, from the space launch centre of Indian Space Research Organisation (ISRO) at Sriharikota. The rocket took-off at an elevation of 80 degrees and an azimuth of 100 degrees to achieve an altitude of 89.5 km at a range of 121.2 km from the launch pad. The rocket reached peak velocities beyond hypersonic flight, and the total flight lasted for 280.87 seconds until splash down.¹ The launch was a suborbital test and demonstration flight to showcase the capabilities of the company. The rocket met all the planned parameters for flight and also carried three payloads. The mission, aptly named 'Prarambh,' is the first from Skyroot Aerospace, and a first of its kind from a private operator.

The maiden launch proved the technological prowess of Skyroot Aerospace. The company was not only able to reassure its investors, but also light the pathway in this sphere. Vikram-S is a six-metre tall, single-stage, spin-stabilised solid-propellant rocket that was developed in just two years. The rocket used 3D-printed solid thrusters for spin stability.² With a weight of 545 kg and a diameter of 0.375 metres, Vikram-S is one of the most affordable rockets in its category, globally. Vikram-S also boasts cutting-edge avionics and a carbon fibre core structure.³ Skyroot Aerospace claims that the technology architecture of the Vikram Launch Vehicle offers special capabilities like multi-orbit insertion as well as customised and dedicated ride-share options that can be used to meet a variety of small satellite customers' needs.

Of the three payloads carried, two are Indian and one is from a foreign customer. These payloads were built by the Andhra Pradesh-based N Space Tech, the Chennai-based start-up Space Kids, and the Armenian BazoomQ Space Research Lab.⁴ The payloads were not released from the rocket's nose cone for orbit insertion; instead, they were exposed after the payload fairing separated, and they remained with the rocket as it splashed into the sea. This could be because of the sub-orbital apogee, which is insufficient to achieve orbit but sufficient to test the payloads at altitude.⁵

Skyroot Aerospace is a Hyderabad-based space start-up. Skyroot Aerospace has been developed by a team of 200 engineers in a record time of two years. The start-up plans to manufacture a series of launch vehicles to be named after the founder of India's space programme, Dr. Vikram Sarabhai. The start-up has raised US \$68 million in total, including US \$51 million in a Series B round led by a Singapore-based company, and has a valuation of US \$165 million.⁶ In 2021, it became the first start-up in the country to sign a memorandum of understanding (MoU) with ISRO in 2021 to launch its rockets. ISRO and IN-SPACe (Indian National Space

Promotion and Authorisation Centre) have provided all assistance in the development and launch of the Vikram-S rocket from the Sriharikota Rocket Launch Station. Skyroot Aerospace is known to be working closely with other global space companies. It has agreements with Innova Space of Argentina, Ride and ConnectSAT of France, and Hex20 of Australia, among others.⁷

The launch has generated a favourable environment for private operators in the space sector. It has kicked off a new phase of activity for the private space industry, and it is an important milestone in the journey of India's space growth. According to Skyroot Aerospace, the rocket launch has validated most of the technologies to be used in their Space Launch Vehicles, as well as those sub-systems that will be used in the pre-lift off and post-lift off phases of the launch.⁸ This includes telemetry and tracking, avionics systems, inertial measurement, GPS systems, onboard cameras, data acquisition, and propulsion systems.⁹ The Vikram series of launchers from Skyroot Aerospace would offer the fastest and the most affordable rides to space. These rockets could be assembled and launched in a matter of 24 to 72 hours from any site.¹⁰ This gives it great potential to be used as a 'responsive launch' or 'launch-on-demand' option for the armed forces.

India's space sector was opened to the industry in 2020 for the participation of private players in the space sector. Since then, the government has been making efforts to attract commercial launch service providers to launch from India. The Skyroot Aerospace launch will create an ecosystem for the growth of commercial space launch activities, which are now a global trend. India's own Space-X phenomenon may become a reality in the near future. The ultimate goal is to provide options for cost-effective satellite launch services within the country by removing entry barriers. This will make spaceflight affordable and accessible for domestic space activity.¹¹ To make things better, the government is in the advanced stages of releasing a new space policy to increase private participation and encourage investment in the space sector. The space policy is expected to address most issues being faced by private players. Some of the initiatives include a single window clearance system, spectrum allocation for various space applications, a revision of foreign direct investment policy, and incentives on taxes and import duties.

The future of indigenous space launch vehicles is promising. We are heading into a new phase in India's space journey, where private space launch providers will be the key to India's space development. The path has been set for bigger rockets, more launches, and a lower turnaround time for satellites to orbit, which are provided by the commercial launch providers. While Skyroot Aerospace may be the first to launch a private rocket into space, they are certainly not the only start-up on the scene. Chennai-based launch vehicle start-up Agnikul Cosmos is scheduled to test launch its rocket, Agnibaan, in December this year. Both of these start-ups will

soon be seen launching satellites into space, which is something to look forward to. The trend is clearly towards smaller and cheaper rocket options for accessing the Low Earth Orbit region. The armed forces too can explore these emerging options for putting military satellites into orbit.

NOTES

¹ Jagmeet Singh, "India's first private rocket, built by startup Skyroot, makes successful launch", [TechCrunch](https://techcrunch.com), November 18, 2022, <https://techcrunch.com>, accessed on November 19, 2022. Link doesn't direct to the article.

² Ibid

³ Stalin J Sam Daniel, "New Dawn": Launch Of India's First Private Rocket, Vikram-S, Successful", *NDTV*, 18 November, 2022 <https://www.ndtv.com/india-news/indias-first-privately-built-rocket-vikram-s-carrying-three-payloads-lifts-off-from-sriharikota-3531739>, accessed on November 19, 2022.

⁴ Ibid

⁵ Sandhya Ramesh, "5-minute flight, 2 Indian & 1 foreign payloads — India launches first private rocket", *The Print*, November 18, 2022, <https://theprint.in/science/5-minute-flight-2-indian-1-foreign-payloads-india-to-launch-first-private-rocket-today/1222748/>, accessed on November 20, 2022.

⁶ Singh, n1.

⁷ Siddiqui Huma, "History made! First successful launch of Skyroot's private rocket by ISRO", *Financial Express*, November 19, 2022, <https://www.financialexpress.com/lifestyle/science/history-made-first-successful-launch-of-skyroots-private-rocket-by-isro/2859259/>, accessed on November 19, 2022.

⁸ Daniel, n3.

⁹ Singh, n1.

¹⁰ "Launch of India's first private rocket 'Vikram-S' is a success", *Siasat Daily*, November 18, 2022, <https://www.siasat.com/vikram-s-marks-the-beginning-of-private-venture-in-indian-space-programme-with-maiden-success-2459981/>, accessed on November 20, 2022.

¹¹ "Vikram-S: India's first private rocket all set for launch tomorrow", *Livemint*, November 14, 2022, <https://www.livemint.com/news/india/vikrams-india-s-first-private-rocket-all-set-for-launch-tomorrow-11668388683742.html>, accessed on November 19, 2022.