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Written by **Anonna Dutt** [Follow](#)

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Agnikul Cosmos successfully carried out a sub-orbital test-flight of its home-built 3D-printed semi-cryogenic rocket Agnibaan from its own launch pad at Sriharikota (Image Credit: Agnikul Cosmos)

Indian space startup Agnikul Cosmos on Thursday successfully launched its first sub-orbital test vehicle powered by the world's first single-piece 3D-printed rocket engine, after calling off its launch at least four times previously.

Agnibaan SOrTeD (Sub-Orbital Technology Demonstrator) lifted off at 7.15 am on Thursday in a mission of many firsts. While it is the second launch by a private startup in India, it is the first to use a private launchpad that the company has set up at the country's only operational spaceport at Sriharikota.

“Elated at the successful launch of Agnibaan SOrTeD by @AgnikulCosmos! A historic moment for India's space sector. Powered by world's first single piece 3D printed semi-cryogenic engine, this achievement showcases brilliance of our young innovators,” Dr Pawan Goenka, chairman of IN-SPACe responsible for coordinating with the private space sector, said on X.

The Indian Space Research Organisation ([ISRO](#)) also congratulated Agnikul in a post on X, saying it is “a major milestone, as the first-ever controlled flight of a semi-cryogenic liquid engine realized through additive manufacturing”.

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Congratulations [@AgnikulCosmos](#) for the successful launch of the Agnibaan SoRTed-01 mission from their launch pad.

A major milestone, as the first-ever controlled flight of a semi-cryogenic liquid engine realized through additive manufacturing.

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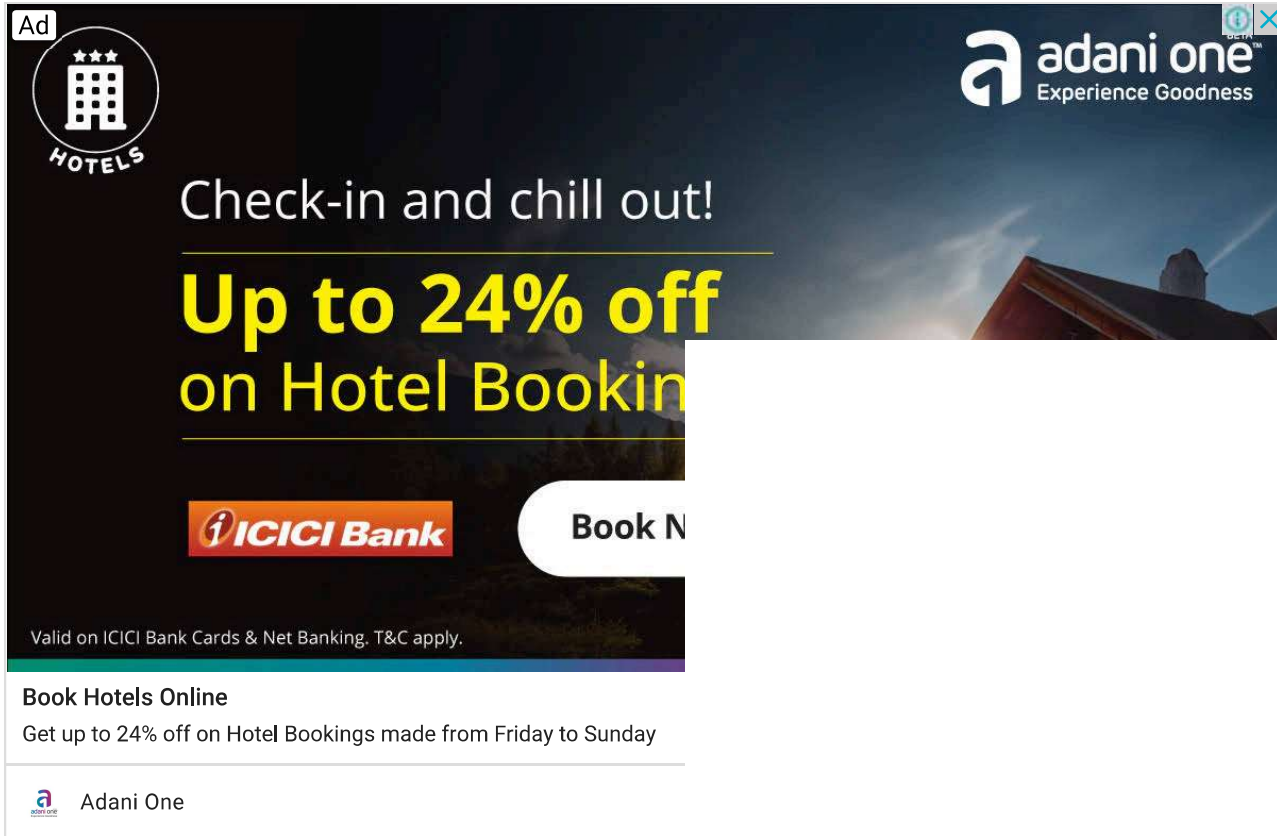
Typically, engine parts are manufactured separately and assembled later. Using the 3D-printed manufacturing process is likely to lower the launch cost and cut down the vehicle assembly time. The company aims to offer affordable launch services to small satellites.

“We are proud to present India’s first semi-cryo rocket engine, which is also the world’s most integrated single shot 3D printed piece. It signals the ability to rapidly assemble rockets that is unparalleled,” said Prof Satyanarayanan R Chakravarthy, founding advisor Agnikul Cosmos and head of National Centre for Combustion Research and Development, IIT Madras.

The launch vehicle, developed by the IIT Madras-incubated startup, also demonstrated India’s first semi-cryogenic engine. The engine—called Agnilet—uses sub-cooled oxygen as fuel. Cryogenic engines, such as the one used in the upper stages of India’s heaviest launch vehicle, LVM3, use gases liquified at extremely low temperatures as fuel.

The launch vehicle has been designed to launch from its mobile launchpad, called [Dhanush](#), from any location. While this was a suborbital launch, the vehicle can fly

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The mission was designed to reach a height of about 8 kilometres before splashing into the sea. The company hopes to conduct its first orbital launch, which will be able to carry satellites to an orbit around the Earth by the end of the financial. They hope to provide regular launches in the next calendar year. The other private launch provider Skyroot, which achieved its first sub-orbital launch in 2022, is also likely to undertake its first orbital launch this year.

“This is the culmination of 1000s of hours of reviews and hard work by the team. We are blessed to have had the opportunity and the full support of IN-SPACE and ISRO to design and build original space worthy hardware in India,” said Srinath Ravichandran, co-founder and CEO of Agnikul Cosmos.