



THE FUTURE IS 3D



India is witnessing a spurt in the use of 3D printing technology – and Bengaluru-based Wipro 3D is leading the charge, report **Samreen Ahmad and Alnoor Peermohamed**

When the Indian Space Research Organisation (ISRO) lobbied the GSAT-19 communication satellite into space using its Geosynchronous Satellite Launch Vehicle (GSLV) MK III last year, India became part of the prestigious ‘heavy-lift rocket club’. But the mission achieved another quiet victory: it used a 3D-printed component on the satellite, proving that India is now able to successfully employ additive manufacturing, or 3D printing technology, to produce parts that can withstand the extreme conditions of space.

Manufactured by Wipro 3D (a division of Wipro Infrastructure Engineering) in collaboration with ISRO, the 3D-printed feed cluster antenna was part of the communication system of GSAT-19. Previously, each of the four pieces of the antenna had to be manufactured separately and then assembled. This often resulted in minute misalignments which could affect the efficiency of the communication system. A 3D-printed antenna rules out chances of such misalignments since it comes out as one composite piece. Indeed, this is one of the best examples of how precision additive manufac-

turing is gaining ground in India. Though Wipro began exploring the 3D printing space as early as 2012, it is only now that Indian companies are showing an interest in this revolutionary technology. Today, Wipro 3D is at the forefront of metal additive manufacturing in India and works with 20-odd clients in the aerospace, space, industrial and automotive sectors.

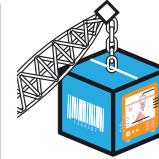
“We began with aerospace and space because these two industries have progressed significantly in using 3D-printed components. We partner with printer companies and bring in capabilities from the services side where our understanding of the technology and its application help companies in their own 3D journey,” says Pratik Kumar, CEO, Wipro Infrastructure Engineering.

Wipro 3D provides services such as consulting, research, designing components, helping with the selection of metals, optimisation, testing and manufacturing. Its clients include ISRO, Defence Research and Development Organisation (DRDO) and Hindustan Aeronautics Limited. Wipro 3D not only prints parts according to their specifications, but also helps develop them.

MADE IN INDIA



IISc’s Society of Innovation and Development (SID) and Wipro 3D are collaborating to build India’s first industrial scale 3D printing machine. The aim is to build a machine that costs less than the imported machines and is also an improvement on them.



Wipro 3D has three 3D printing machines from Electro Optical Systems, Germany. It may import a few more. However, these machines have certain limitations in terms of the parts they can print.



Wipro 3D may sell the indigenous machines to customers. However, right now it is unclear if it will do so or use them only for its own 3D printing business.

For example, it is currently trying to come up with a design for an impeller — a type of rocket thruster — for ISRO’s semi-cryogenic engines. In the automotive sector, it is helping companies come up with better designed intake and exhaust manifolds for internal combustion engines — components that are key to improving a vehicle’s fuel efficiency and reducing emissions.

“We help clients identify the right opportunities for metal additive manufacturing, starting from choosing the right metal,” says Ajay Parikh, Vice President and Business Head of Wipro 3D.

Of course, India has other players in the 3D printing field. Bengaluru-based firm 3D Product Development (3DPD) works with several industries, especially auto manufacturers such as Ford, Mahindra, Tata and Ashok Leyland and so on. It helps them 3D print prototypes and then convert the final designs into tools for making the parts through the traditional manufacturing processes. Pune-based 3D Incredible is another company that works not only with manufacturing industries, but uses the technology in the medical field as well. Several small firms also offer 3D printing services, but they often lack the expertise to help clients in research, design and the development of components.

ISRO, HAL, Tata Advanced Systems and even Tata Elxsi have also developed their own in-house additive manufacturing capabilities.

But 3D printing has its limitations. It is too expensive to be employed in a mass manufacturing industry such as automobiles other than in printing prototypes. This is one reason why the bulk of the demand for 3D printing comes from the aerospace and defence sectors, where you need one-off components or perhaps no more than a few thousand units of a component.

That may change. General Electric, one of the pioneers in 3D printing worldwide, has printed over 20,000 units of a fuel nozzle that goes into its LEAP jet engines, reducing their weight and cost while increasing durability. Though these components are not being manufactured in India, teams at GE’s technology centre in Bengaluru have contributed to their design.

GE, which also manufactures 3D printing machines, is looking at India as a market for these printers as the demand for precision additive manufacturing is on the rise in the country.

But imported machines are expensive, says Wipro 3D’s Parikh. Each of Wipro’s printing machines costs between €600,000 to €2 million. To solve this problem, the company has now turned to the Indian Institute of Science (IISc), Bengaluru, to help build India’s first indigenous 3D printer. The project, which is a



‘Feed Cluster Antenna’ printed in aluminium by Wipro 3D for ISRO. The antenna was part of the GSAT-19 satellite’s communication system

collaboration between Wipro 3D and IISc, has been allocated ₹100 million and may be completed by 2020.

“As of December 2017, to the best of my knowledge, there was not one manufacturer of enterprise-class 3D printers in India,” says Pete Basiliere, Research Vice-President for Additive Manufacturing at Gartner. “Although it is likely that there are Indian manufacturers of low-cost 3D printers,” he admits.

Experts point out that India’s precision 3D printing sector can only grow if the impetus comes from large labs such as the DRDO or the Aeronautical Development Agency (ADA). Says Col. H S Shankar, Chairman and Managing Director of Alpha Design Technologies, a defence and aerospace electronics manufacturer, “Additive manufacturing should be looked at as a feasible manufacturing method right from the design stages for upcoming projects such as the Fifth Generation Fighter Aircraft (FGFA).”

Others assert that 3D printing is the technology of the future. “There are issues that need to be resolved, but 3D printing is a very potent technology and there are many areas where it can make a huge difference. Building capabilities in this technology is essential for the future of the country,” says Kiran Kumar, former ISRO Chairman and the man who helmed the launch of the GSLV-MK III.