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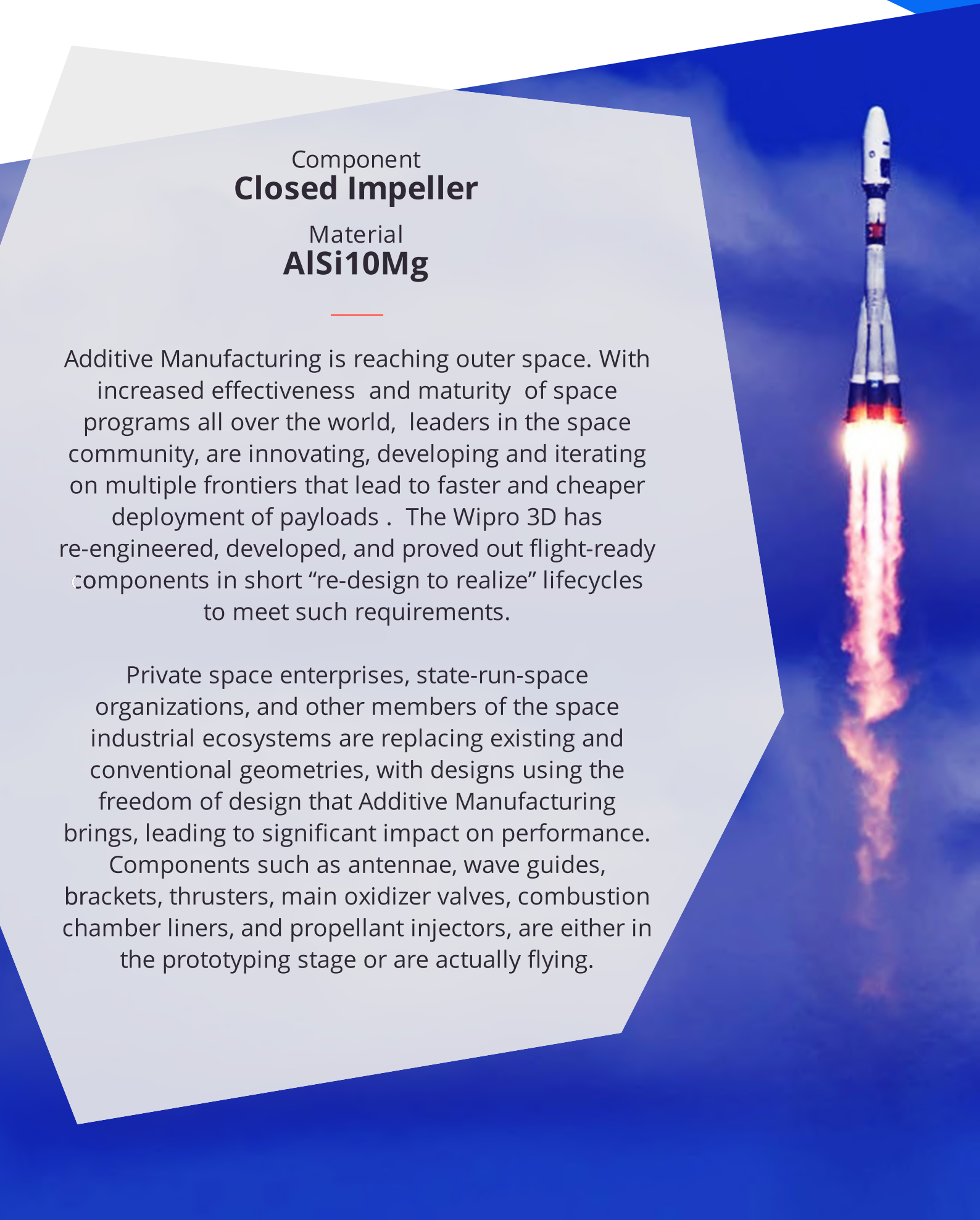
SPACE

Component
Closed Impeller

Material
AlSi10Mg

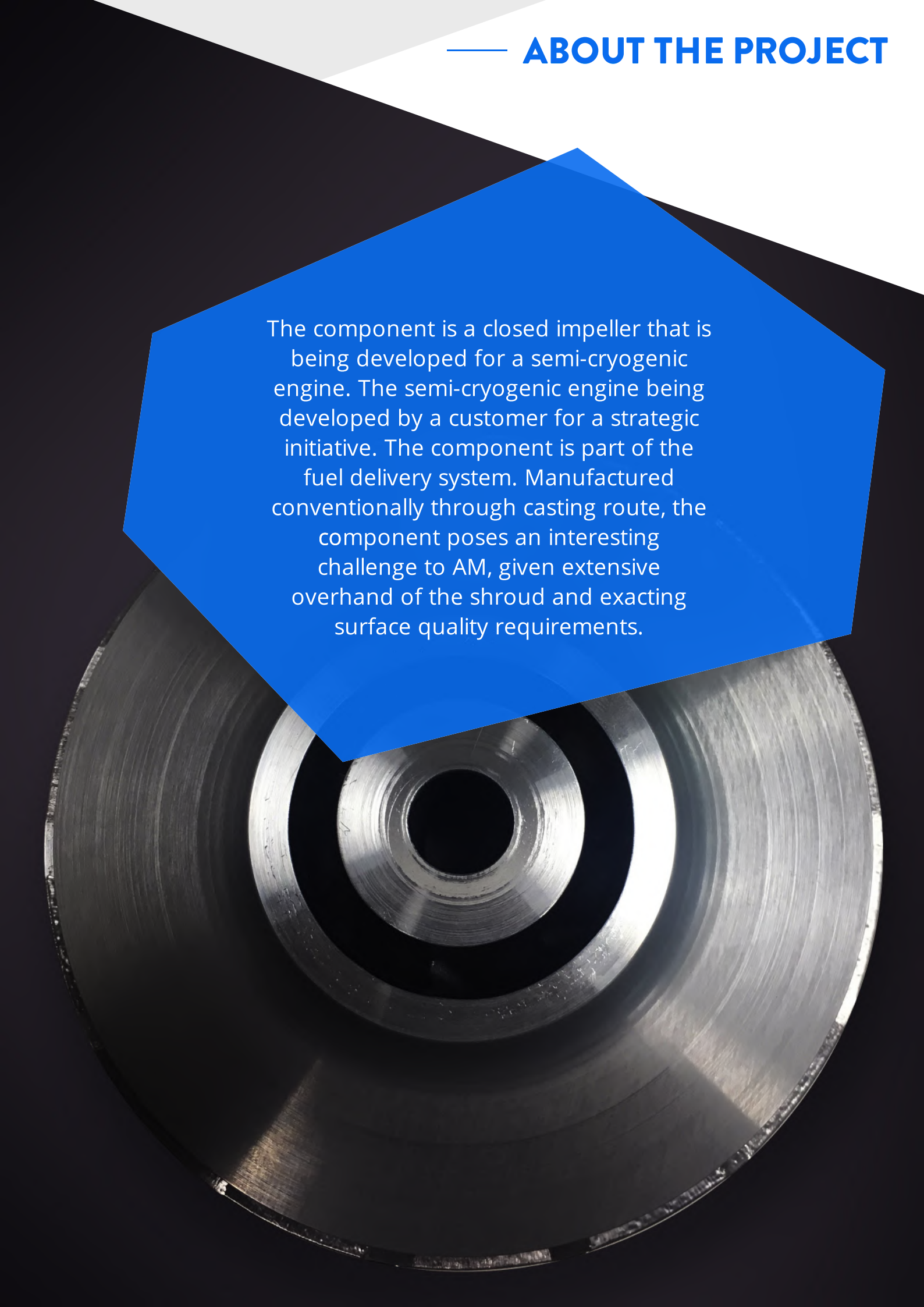
Additive Manufacturing is reaching outer space. With increased effectiveness and maturity of space programs all over the world, leaders in the space community, are innovating, developing and iterating on multiple frontiers that lead to faster and cheaper deployment of payloads . The Wipro 3D has re-engineered, developed, and proved out flight-ready components in short “re-design to realize” lifecycles to meet such requirements.

Private space enterprises, state-run-space organizations, and other members of the space industrial ecosystems are replacing existing and conventional geometries, with designs using the freedom of design that Additive Manufacturing brings, leading to significant impact on performance. Components such as antennae, wave guides, brackets, thrusters, main oxidizer valves, combustion chamber liners, and propellant injectors, are either in the prototyping stage or are actually flying.



ABOUT THE PROJECT

The component is a closed impeller that is being developed for a semi-cryogenic engine. The semi-cryogenic engine being developed by a customer for a strategic initiative. The component is part of the fuel delivery system. Manufactured conventionally through casting route, the component poses an interesting challenge to AM, given extensive overhand of the shroud and exacting surface quality requirements.



AM COMPETENCIES USED

Depending on the usage of single stage or multi stage build plan, different post processing operations were applied to achieve the required surface finishing the flow parts and dimensional tolerance and balance.

POST PROCESSING

BUILD TECHNOLOGY

Wipro 3D has used a unique combination of complex orientation work outs, proprietary build strategies designed for features with no line of sight, custom parameters, and machine preparation to be able to realize this complex geometry as a monolith. Necessary methods to manage the thermal profile of the build, that has significant impact on dimensions, were deployed to achieve planned tolerances (as-built)

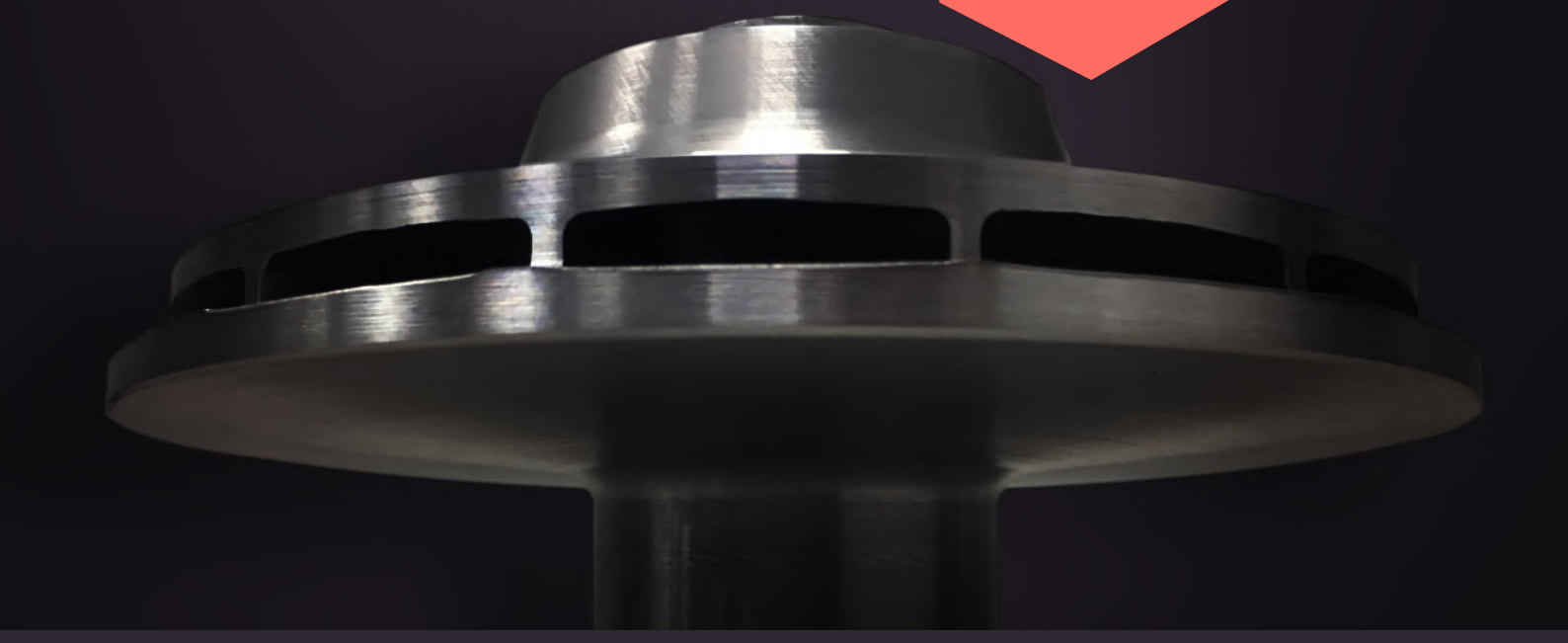
AM VALUE ADDITION

Originally manufactured through investment casting, the Closed Impeller had unacceptable porosity levels. Wipro 3D realized the component with negligible porosity with the help of customized and coordinated pre and post build strategies.

FUNCTIONAL PERFORMANCE

The component was realized in less than a weeks time.

TIME-TO-REALIZE



About Wipro 3D

Wipro 3D is an AS9100 Certified metal AM solutions and services provider, serving Aerospace, Space, Defense, Industrial, Heavy Engineering, Automotive, Energy, Nuclear & Healthcare sectors. Our solutions include AM Consulting, Additive Engineering & Design Offerings, Manufacturing Services, Research & Development based solutions right unto Design - Deployment and Operation of captive metal AM centers.

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