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SPACE

Component
LPFT Straightener

Material
Ti6Al4V

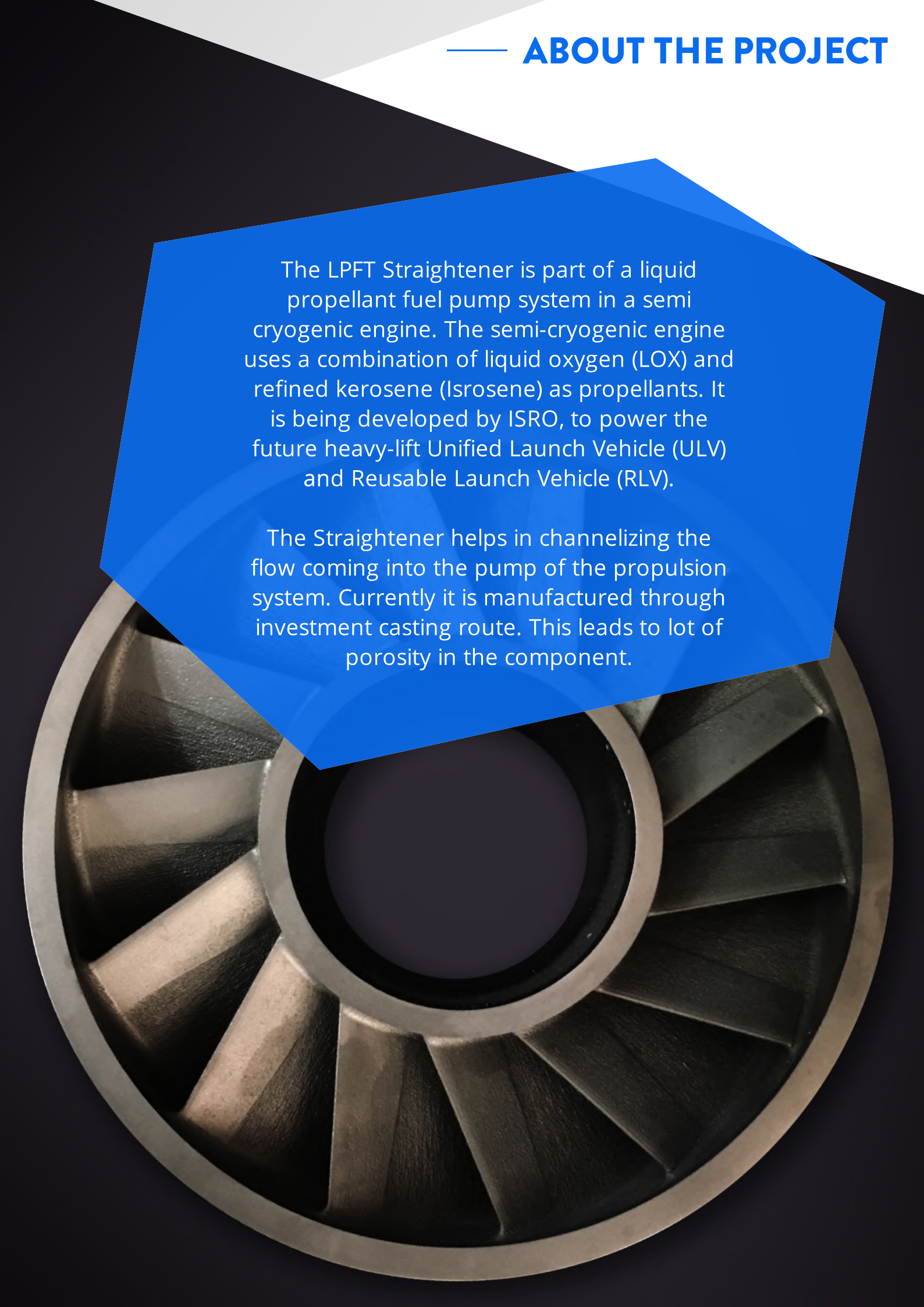
Additive Manufacturing is reaching outer space. Where every gram counts, in an environment with extreme cyclic temperature variations and harsh forces during the launch, the functional life of components is a critical part of design considerations. Wipro 3D has re-engineered, developed, and proved out flight-ready components in short “re-design to realize” lifecycles.

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 LPFT Straightener is part of a liquid propellant fuel pump system in a semi cryogenic engine. The semi-cryogenic engine uses a combination of liquid oxygen (LOX) and refined kerosene (Isrosene) as propellants. It is being developed by ISRO, to power the future heavy-lift Unified Launch Vehicle (ULV) and Reusable Launch Vehicle (RLV).

The Straightener helps in channelizing the flow coming into the pump of the propulsion system. Currently it is manufactured through investment casting route. This leads to lot of porosity in the component.



AM COMPETENCIES USED

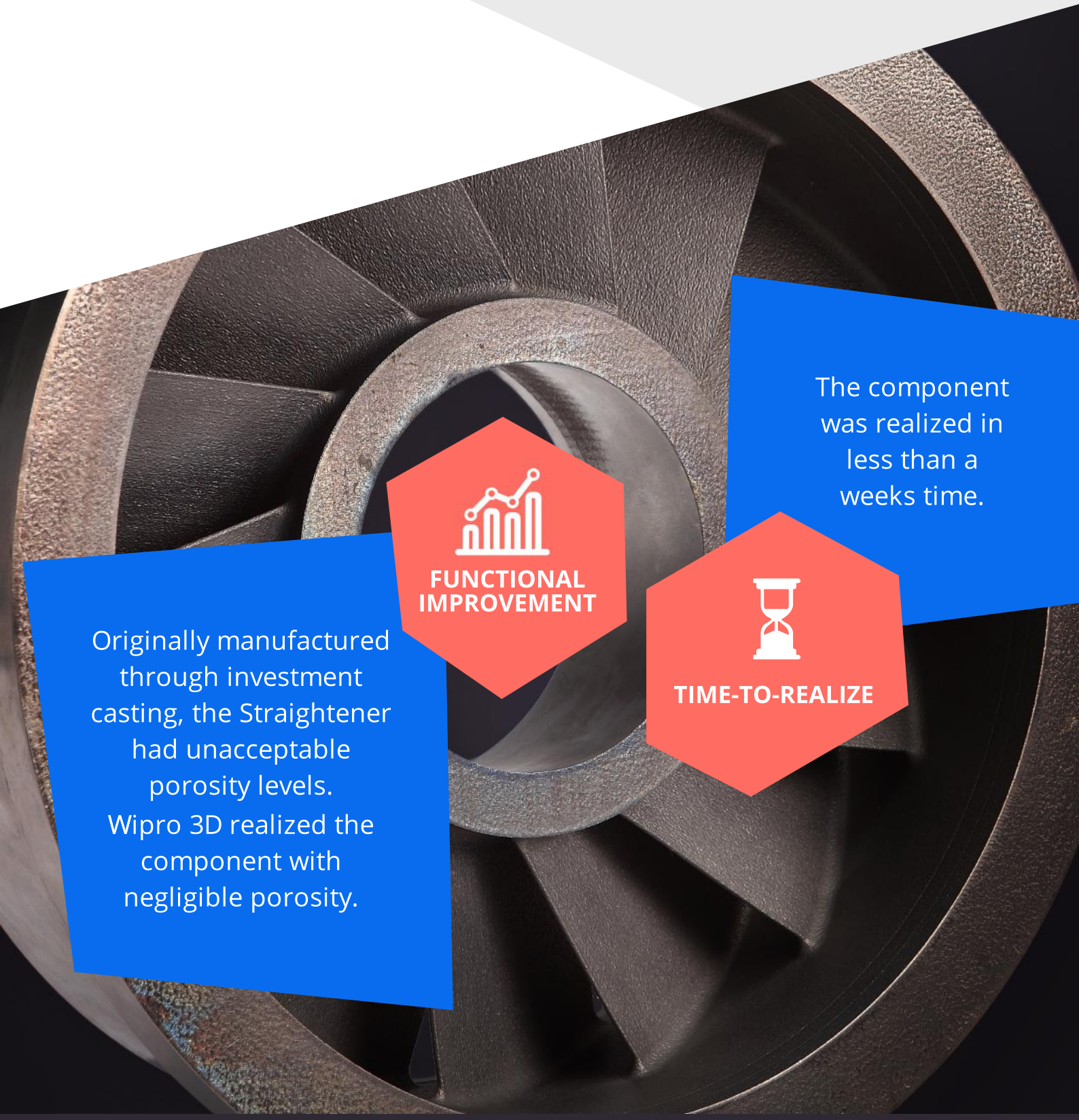
Finish-Machining was done to achieve the desired surface finish.

POST PROCESSING

The component with this complex geometry was realized as a monolith.

BUILD TECHNOLOGY

AM VALUE ADDITION



Originally manufactured through investment casting, the Straightener had unacceptable porosity levels.
Wipro 3D realized the component with negligible porosity.

FUNCTIONAL IMPROVEMENT

TIME-TO-REALIZE

The component was realized in less than a weeks time.

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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