wipro | wipro 3D

AUTO

Component

# Oil Intake Manifold

Material

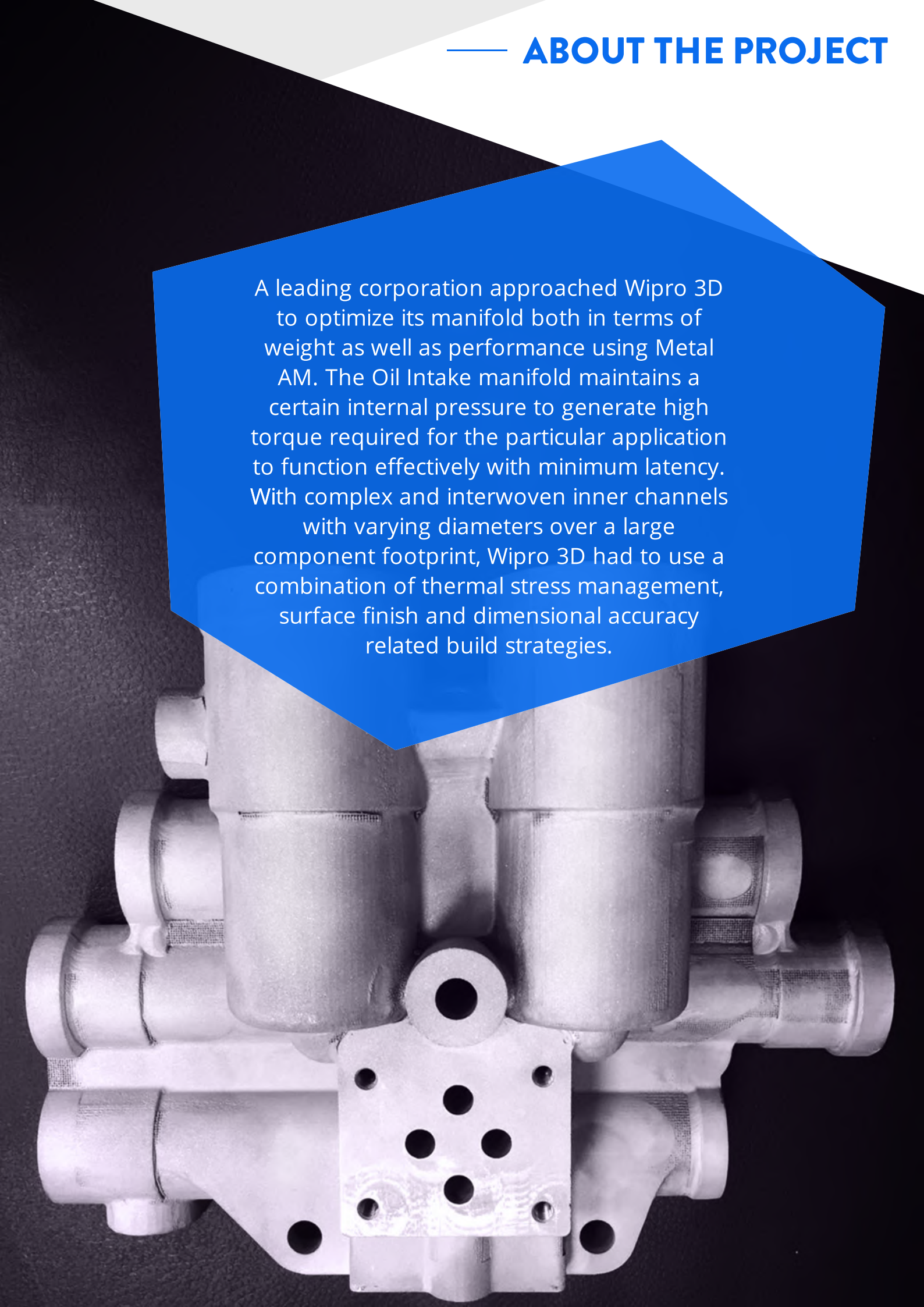
## AlSi10Mg

In the highly competitive auto industry, speed to market, high strength to weight ratios, fuel efficiency are some of the few goals that constantly drive engineers and designers.  New high-strength steels, along with composites and adhesives, are helping to reduce weight and increase strength in modern vehicles. Additive Manufacturing using metal alloys, has found interesting applications in tooling, jigs and fixtures, and design prototypes allowing companies to iterate rapidly and validate designs of components and subsystems. While metal Additive Manufacturing of components at the production scale of automotive may be challenging, there are certainly emerging applications in the low volume, higher end of the industry including Formula 1 and military vehicles.

Additive Manufacturing allows optimizing the maximum strength with minimum weight and material (Topology Optimization) owing to the potential to handle complex geometries. "Monolithizing" sub-components or child parts into a monolith assembly reduces production time, improves functional performance. Typical applications of Metal AM in Automotive are weight optimized manifolds, turbine housings that form part of the current turbo powertrain ERS systems, water-wheel pumps , aluminum axle pivots. A leading name in industry has developed  rocker arms and camshaft bearing caps using Metal Additive Manufacturing for its next generation truck engines.

# ABOUT THE PROJECT

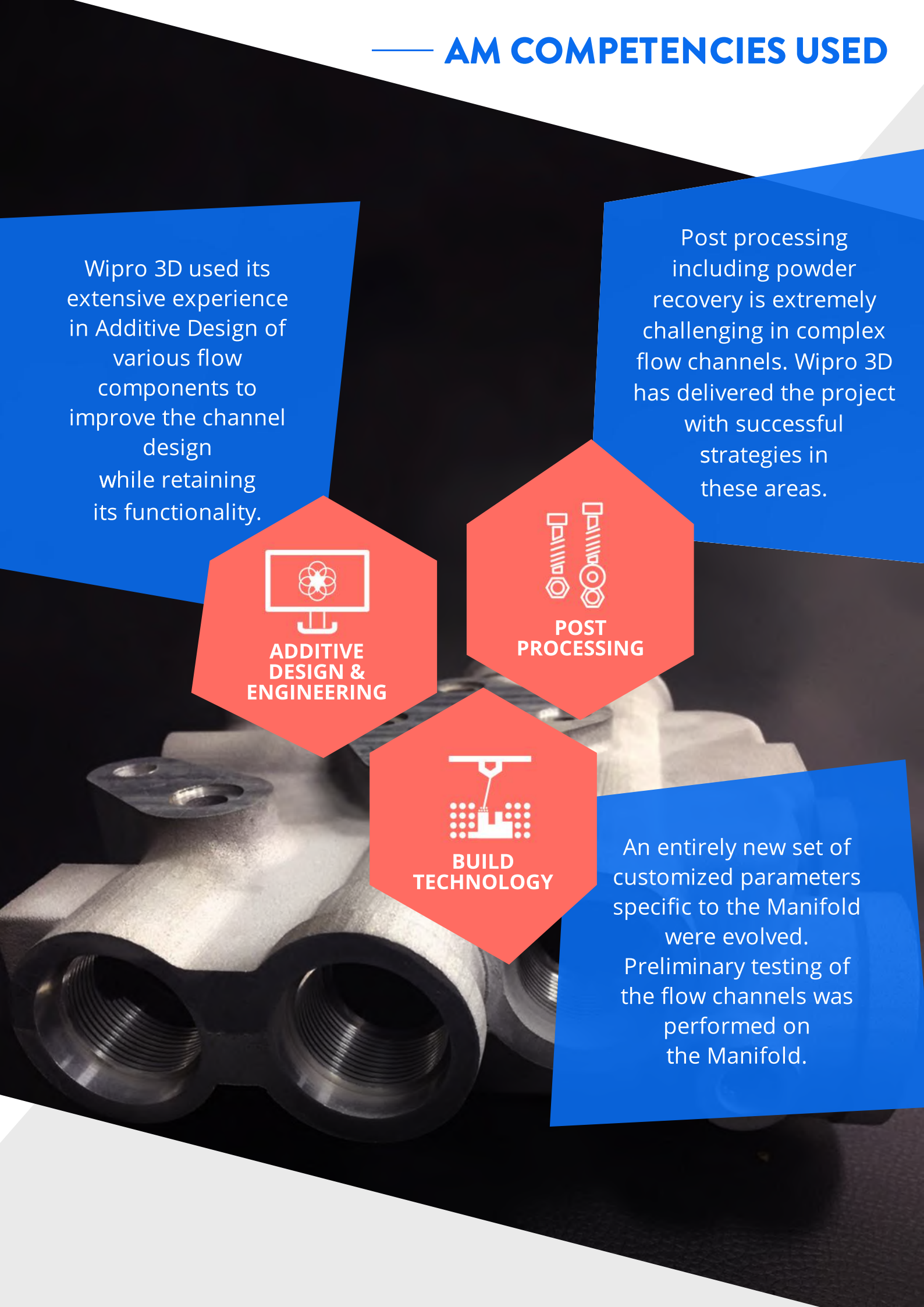
A leading corporation approached Wipro 3D to optimize its manifold both in terms of weight as well as performance using Metal AM. The Oil Intake manifold maintains a certain internal pressure to generate high torque required for the particular application to function effectively with minimum latency. With complex and interwoven inner channels with varying diameters over a large component footprint, Wipro 3D had to use a combination of thermal stress management, surface finish and dimensional accuracy related build strategies.



# AM COMPETENCIES USED

Wipro 3D used its extensive experience in Additive Design of various flow components to improve the channel design while retaining its functionality.

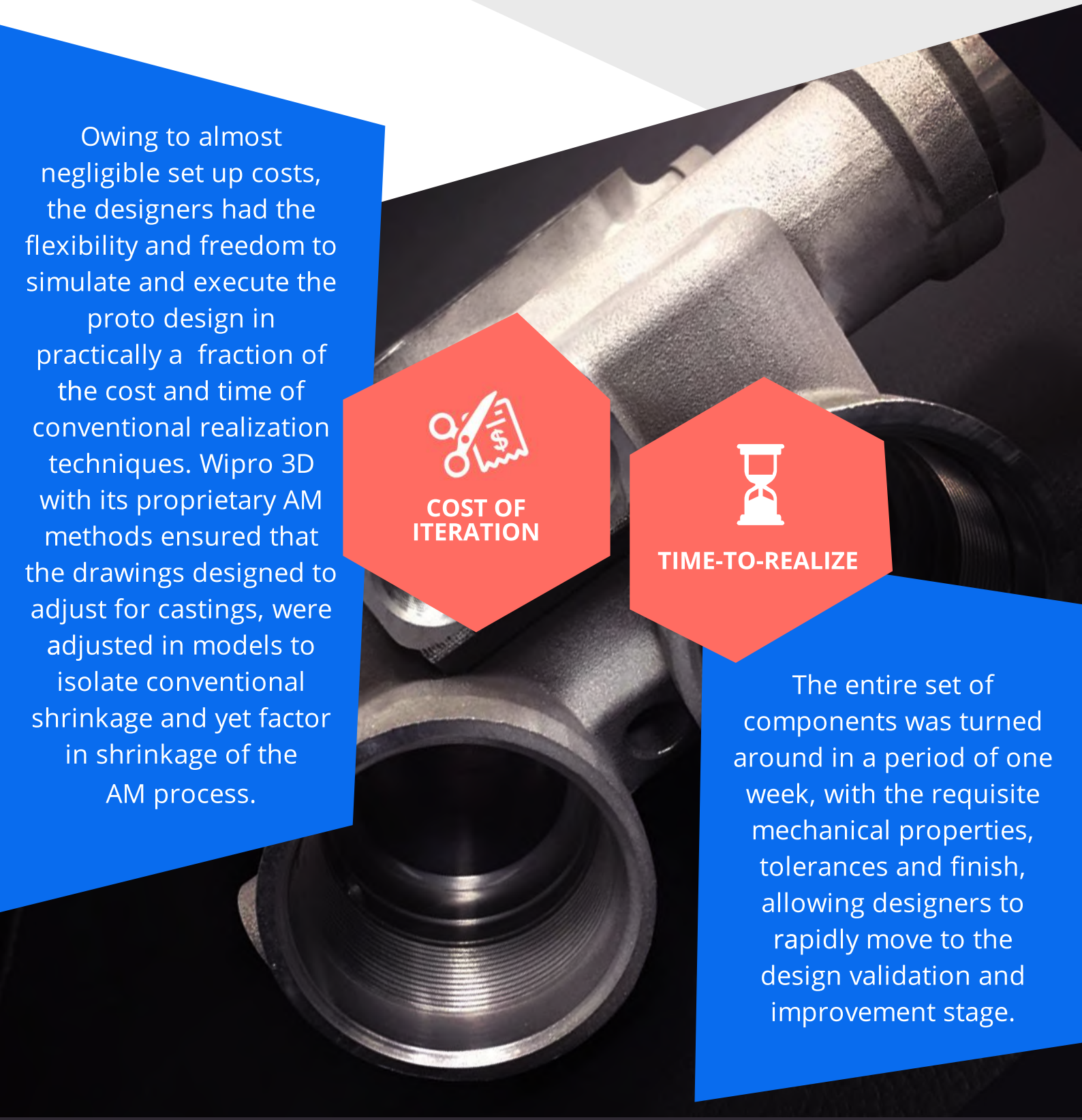
Post processing including powder recovery is extremely challenging in complex flow channels. Wipro 3D has delivered the project with successful strategies in these areas.




An entirely new set of customized parameters specific to the Manifold were evolved. Preliminary testing of the flow channels was performed on the Manifold.

# AM VALUE ADDITION

Owing to almost negligible set up costs, the designers had the flexibility and freedom to simulate and execute the proto design in practically a fraction of the cost and time of conventional realization techniques. Wipro 3D with its proprietary AM methods ensured that the drawings designed to adjust for castings, were adjusted in models to isolate conventional shrinkage and yet factor in shrinkage of the AM process.



**COST OF ITERATION**

**TIME-TO-REALIZE**

The entire set of components was turned around in a period of one week, with the requisite mechanical properties, tolerances and finish, allowing designers to rapidly move to the design validation and improvement stage.

## 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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