

Structural Development and Manufacturing of the DemoP1 Demonstrator

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Abstract:

Aerospike engines are considered as more efficient alternatives to bell nozzle configurations. However, their development has been ignored in the past decades due to their complex cooling and manufacturing requirements. With the recent advancements in materials for propulsion applications and additive manufacturing technologies, aerospike engines are becoming a viable option for launch vehicles and satellites in the “new space” environment.

This paper introduces the structural development and manufacturing of the Pangea Aerospace DemoP1 demonstrator (Fig 1). The first part of the paper addresses the outline of the design and cooling system of the engine. The second part of the paper focuses on the unique layout of the propulsion system and its structural aspects. Then the detailed design and finite element analyses are discussed. The final part of the paper describes the manufacturing procedures, mainly related to additive manufacturing.

The parameters and capabilities of DemoP1 have been selected to be compatible with current research fields in the space sector. The demonstrated technologies will provide a basis for a booster-class engine intended for the next generation of launch vehicles.

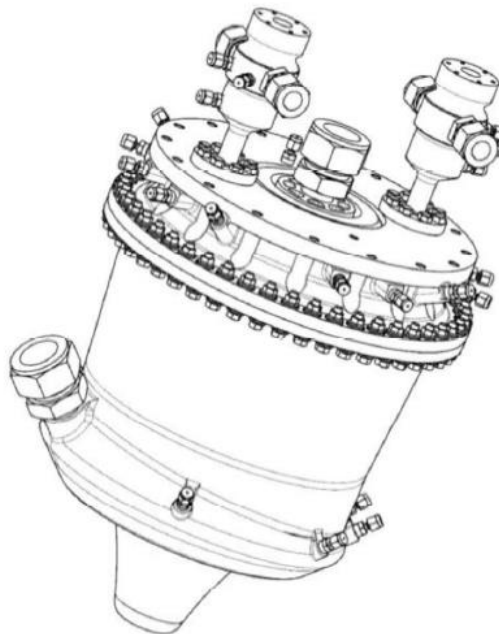


Figure 1 – DemoP1 demonstrator