

DESIGN INVENTION DISCLOSURE FORM

Applicant Information

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Design Title:

BIO-INSPIRED WHALE FLIPPER CONTROLLED LOW POWERED ROCKET FOR AGILE FLIGHT MANEUVERING

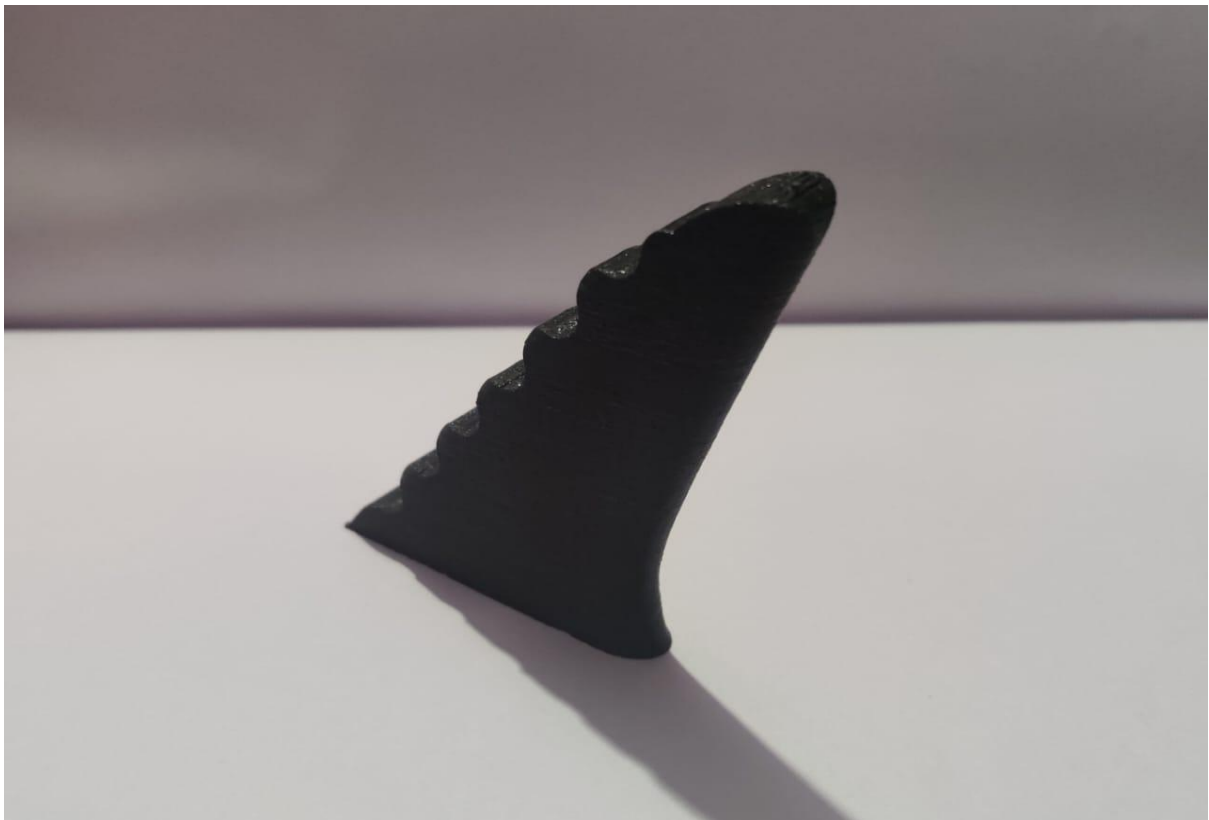
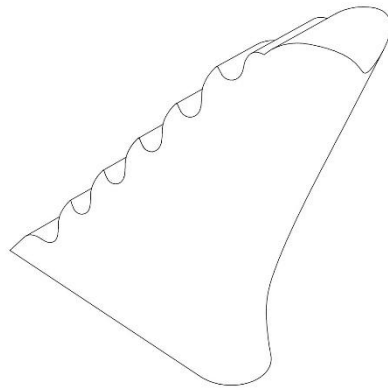
Purpose and Use:

Conventional fin designs are typically flat and lack features that optimize airflow control at high angles of attack. As a result, rockets using such systems can experience early flow separation, increased drag, and reduced stability—especially in turbulent atmospheric conditions or during sharp maneuvers. Thrust vectoring, though effective, demands complex hardware and consumes additional fuel, which can reduce the overall efficiency and operational range of a mission.

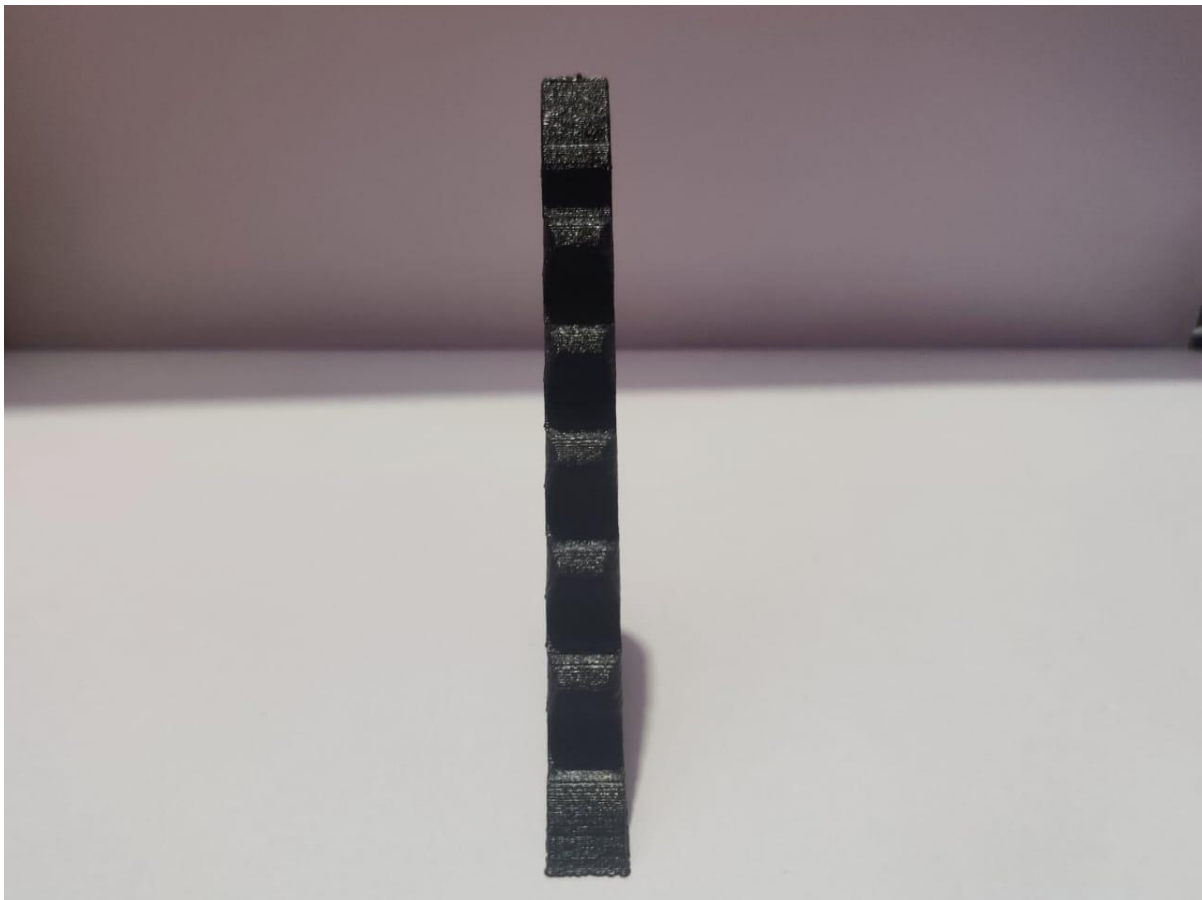
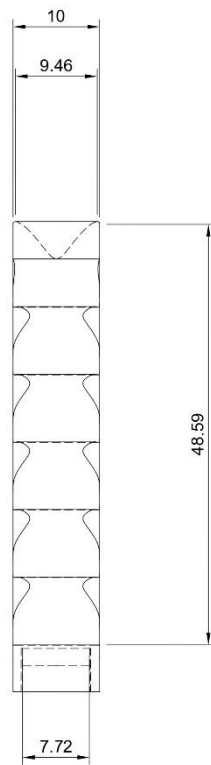
In contrast, nature has evolved highly efficient systems for movement and control in fluid environments. One notable example is the humpback whale's flipper, which features distinctive leading-edge bumps known as tubercles. These tubercles generate vortices that help maintain smooth airflow over the surface, significantly delaying aerodynamic stall and enhancing lift even at steep angles. This principle of bio-mimicry has been studied and applied in other fields such as wind turbine blades, aircraft wings, and underwater vehicles, but has seen little to no application in rocket systems.

Drawings and Illustrations:

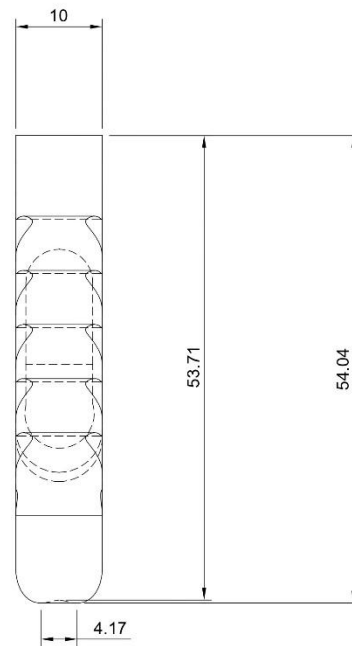
Perspective view:



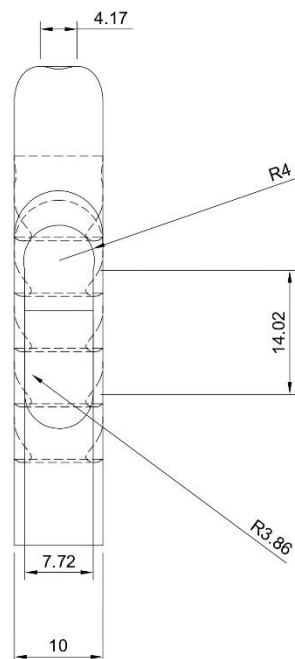
Front view:



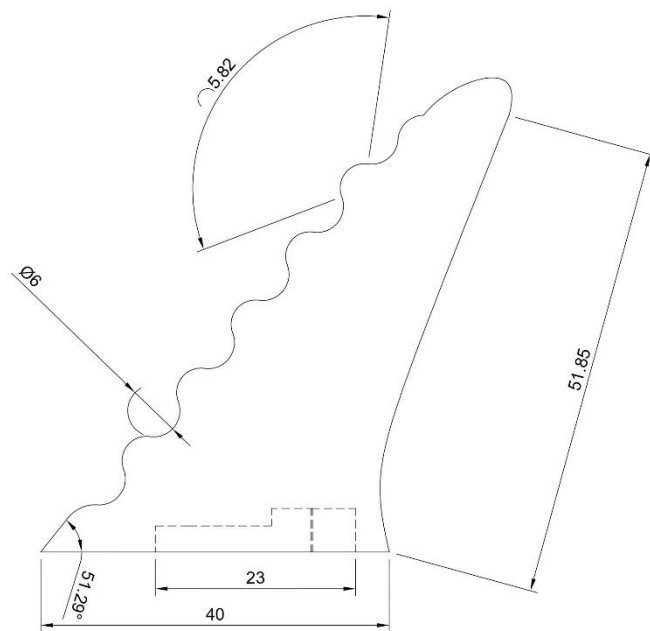
Top view:



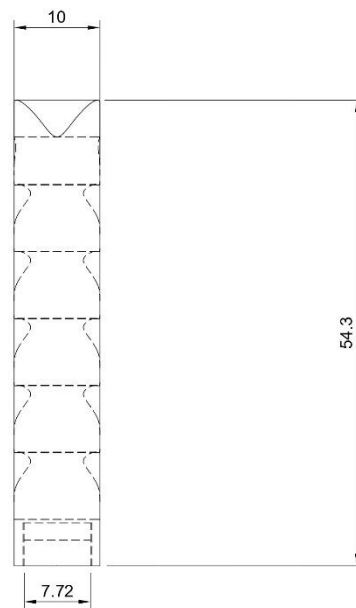
Bottom view:



Side view:



Back view:



Date of Invention:

21th march 2025
