IAF SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations - IAF SPACE PROPULSION SYMPOSIUM (IP)

Author: Mr. Claudio Antonio Morales Benítez
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, claudiomobe@gmail.com

Mr. Ángel Perez
Universidad Nacional Autónoma de México (UNAM), Mexico, angelsebastiann666@gmail.com
Ms. Arantxa Mendoza Collado
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, arantxacollado0@gmail.com
Mr. Diego Fernando Maya Hernández
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, DiegoMHn54@gmail.com
Mr. Elias Basaldua
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico, eliasbasaldua30@gmail.com
Mr. Fabián Sánchez Hernández
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico,
fabian.sanchez@ingenieria.unam.edu
Ms. Natalie Jimena Roldán Cruz
High Technology Unit (UAT) Faculty of Engineering - UNAM, Mexico,
natalie.roldan@ingenieria.unam.edu
Ms. Ximena Zepeda Sandoval
Universidad Nacional Autónoma de México (UNAM), Mexico, ximena.zepeda@ingenieria.unam.edu

IMPROVING ROCKET NOZZLE EFFICIENCY WITH ROUGH SURFACES

Abstract

Turbulence is one of the most chaotic and unpredictable phenomena in physics and it affects the aerodynamic performance of flying bodies. Therefore, being able to prevent and control the turbulent effects during the process of design is convenient. Doing so not only reduces the risk margin, but also improves flight performance, which has positive impacts on aspects such as stability and fuel efficiency that in turn provokes decreases in cost and also promotes care for the environment, which is a very important factor in the actual world. There have been studies of the behavior of shark skin in the water and it has been observed that the riblets on it help to reduce drag by controlling turbulence in the boundary layer, which allows sharks to swim faster and with less energy expenditure. Since water is a fluid, similar to air, we can expect it to behave similarly. The present research focuses on applying different types of roughness to the inner surface of the divergent section of a rocket nozzle in order to determine the changes in the working fluid properties and analyze the resulting increase of the aerodynamic performance through computational simulations and comparisons with a smooth surface.