

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (2) (2)

Author: Prof. Artur Bertoldi
University of Brasilia, Brazil, bertoldi@unb.br

Dr. Carlos Alberto Gurgel Veras
University of Brasilia, Brazil, gurgel@unb.br

Dr. Jungpyo Lee
Univerisity of Brasilia, Brazil, jpleerocket@gmail.com

Dr. Olexiy Shynkarenko
University of Brasilia, Brazil, olexiy@unb.br

Dr. Artem Andrianov
University of Brasilia, Brazil, andrianov@unb.br

COMBUSTION INSTABILITY IN SARA HYBRID ROCKET MOTOR

Abstract

The Hybrid Rocket Team from University of Brasília is currently developing an engineering and functional model for the SARA spacecraft reentry system, which is a microgravity recoverable and reusable research platform developed by the Institute of Aeronautics and Space (Brazilian Air Force) and the Brazilian Space Agency. Previously, the research team proposed a conceptual hybrid propellant rocket motor for the reentry system, following a multidisciplinary optimization study based on genetic algorithm. Based on this first approach the industrial engineering process was applied to the final prototype design. In this work, we present the experimental results of SARA hybrid rocket motor operating with Polyethylene and liquid Nitrous Oxide as propellant. Special attention was given to identify the dynamic pressure signature for the SARA propulsion system. The signal FFT analysis with combustion chamber pressure data and the study on the mechanism of combustion instability were performed.