

52nd IAF STUDENT CONFERENCE (E2)
Student Team Competition (3-GTS.4)Author: Mr. Oscar Matías Hernández García
MexicoMEXICAN SUSTAINABLE SOLID PROPELLANT FOR SPACE EXPLORATION: VALIDATED
PERFORMANCE THROUGH HOT FIRE STATIC TESTS”**Abstract**

Solid rocket boosters (SRBs) are indispensable in the contemporary space sector, playing a vital role nationally and globally. Amidst a burgeoning space industry, SRBs stand out for their unparalleled reliability in launching satellites and space probes. For Mexico, embracing and advancing SRB technology is pivotal to expanding the country’s space presence, facilitating forthcoming satellite launches for communication, Earth observation, and scientific exploration.

Yet, conventional SRB propellants, comprising ammonium perchlorate, polymeric binders, additives, and metallic fuels, pose grave health and environmental hazards throughout their lifecycle. In response, we propose a sustainable alternative that replaces traditional polymeric binders with a novel polymer developed in-house, alongside one sourced from the cosmetics industry. This innovative solution minimizes the adverse impacts of traditional propellants while maintaining performance integrity.

Crucially, our proposal’s efficacy has been rigorously validated through a series of hot fire static tests. These tests demonstrate conclusively that our sustainable propellant maintains comparable specific impulse to its conventional counterparts, affirming its reliability and viability for space missions.

In line with the theme of Responsible Space for Sustainability at IAC 2024, our presentation underscores the imperative of environmentally conscious space propulsion solutions. By advocating for sustainable solid propellants and emphasizing the robust validation through hot fire static tests, we contribute to the ethos of the International Astronautical Congress, promoting a future where space exploration harmonizes with environmental stewardship.