SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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# LOW FREQUENCY COMBUSTION INSTABILITY CHARACTERISTICS OF POLYETHYLENE-N2O BASED HYBRID ROCKET MOTOR

**Abstract**

Combustion instabilities in rocket propulsion systems may impose undesirable accelerations profile over the payload and vehicle structure. Gas pressure oscillation is, therefore, an important issue when designing a new rocket engine for practical application. The Hybrid Rocket Team from University of Brasília, Brazil, is currently developing hybrid propellants rocket engines for a broad range of applications, from 500 to 10000 N. In this work we present theoretical and experimental studies on combustion instabilities of a 1000 N hybrid rocket operating with Polyethylene and Nitrous Oxide as the main propellants. We compare the dynamic pressure signature of injector plates composed of pressure swirl atomizers and a recent proposed type of injector based on cavitating venturi. The latter was intent to help suppressing pressure oscillations originated from feed system coupled combustion instabilities. Experimental results showed important advances toward designing new hybrid rocket engines that are less sensitive to develop combustion instabilities.