

IAF SPACE PROPULSION SYMPOSIUM (C4)
Hypersonic Air-breathing and Combined Cycle Propulsion (9)

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BANTAM AFTER BURNING ROCKET ENGINE (ABRE) PROPULSION SYSTEM FOR A
REUSABLE HYPERSONIC TEST BED

Abstract

Aerojet Rocketdyne (AR) has created a conceptual design of a Bantam After Burner Rocket Engine (ABRE) main propulsion system for the Hypersonic Routine Experimental Vehicle (HyREV) reusable hypersonic test bed vehicle. HyREV is an Air Force research Laboratory (AFRL) concept study to evaluate the potential development of a reusable hypersonic test bed. This Mach 6-10, air dropped, rocket-powered platform is intended to conduct a variety of tests and missions to enable the maturation of hypersonic technologies in an operational efficient and affordable manner. While liquid rocket engines typically target launch vehicle applications, notional hypersonic vehicles have a vastly different flight regime in which a liquid rocket engine system may be valuable. Therefore it was desirable to create requirements for a liquid rocket engine system that could be used for a hypersonic test vehicle application. Once established, these requirements may lay the foundation needed to initiate development of a propulsion system for the hypersonic flight experimentation test vehicle. The paper describes and provides insight into the ABRE system, its genesis and current state of the art of the ABRE system and its technology. The paper highlights the potential benefits of this revolutionary propulsion approach that can deliver significantly increased rocket performance in thrust to weight, thrust/sand trajectory Specific Impulse (I_{sp}). The paper also provides an overview of the Bantam rocket engine family and distribution.

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