

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Systems I (1)

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FUEL-RICH GAS GENERATOR DEVELOPMENT FOR A LOX/KEROSENE SPACE ROCKET
ENGINE

Abstract

The first time ever development of a pump-fed space liquid rocket engine propelled by LOx and kerosene has been conducted in the Republic of Korea. The powerpack of the engine plays a crucial role in supplying propellants at high pressures. As its major component for driving the turbine, a gas generating device had gone through complete and systematic processes that result in the successful development of a final model. The development procedures including design, manufacturing and test will be presented in the paper. The present gas generator burns bi propellants at a fuel rich condition to provide uniform property gas at design values of 5.8 MPa and 900 K. An injector, the critical component of a gas generator, had been finally selected out of numbers of candidates through screening tests by help of subscale specimens. Various analytical and computational methods including flow, thermal and structural analysis have been utilized in the design of the gas generator. Full scale prototypes were fabricated through precision machining, tungsten inert gas welding and brazing. The performance requirements have been verified experimentally through ignition tests, combustion performance and instability assessment tests and duration tests. The gas generator has proven that it stably works within a defined working window of varying chamber pressure and mixture ratio, and demonstrated compliance to the performance and life time requirements.