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

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DEVELOPMENT OF A 35KN-THRUST-CLASS CLOSED-CYCLE HYDROGEN PEROXIDE / KEROSENE ENGINE

Abstract

The hydrogen peroxide / kerosene engine is non-toxic, storable, reusable, and has the multiple-start ability, and high density specific impulse. It can well meet the requirements for present and future propulsion systems which seek for low cost, rapid response, easy to handle and friend to environment. A new style 35kN-thrust-class hydrogen peroxide / kerosene engine has been designed and tested. The closed power cycle was selected for system program. The silver based catalyst bed was used to decompose the 90% concentration hydrogen peroxide into high temperature water vapor and oxygen, which in turn powered the turbine and ignited the kerosene in thrust chamber. The gas film and regenerate cooling technique were adopted to achieve the reliable engine operating. During the engine development, the catalytic decomposing technique, the high efficiency combustion technique, cooling technique and closed-cycled system technique, typically a well design time sequence, were all successfully verified. The hot test result showed that the combustion efficiency of this new style engine is higher than 0.98, and the vacuum specific impulse can be over 300s.