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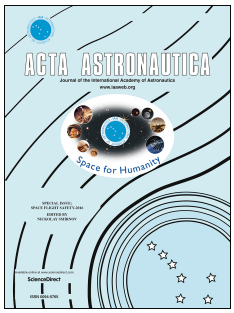

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Effect of the heat release distribution on the stability of component coordination in the rocket-based combined cycle engine by numerical and freejet experimental analysis

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Abstract

Efficient combustion without damaging the inlet state is the key to achieve the stable operation in the engine. In the present study, effect of the heat release distribution on the component matching is analysed on an integrated rocket-based combined cycle (RBCC) model through three-dimensional numerical simulations and the freejet tests under $Ma_\infty = 4$ and $Ma_\infty = 5$ conditions. Numerical pressures are in good agreement with the experimental data. Results indicate that the increasing pre-combustion shock strength during the movement can balance the pressure difference between air intake and combustion effectively. In order to ensure inlet operation, the main combustion heat should be released in the back cavity under $Ma_\infty = 3$ condition. Thus, the thermal choking can be controlled in the combustor exit to employ high-pressure combustion to generate thrust in the large expansion section. With the flight velocity increasing, the main combustion zone should be moved forward and control thermal choking in

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