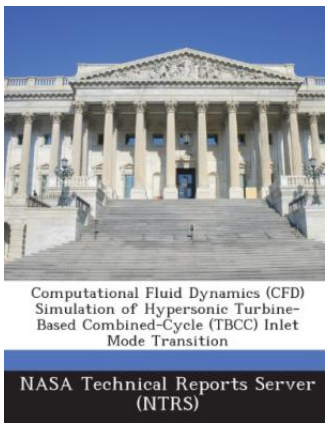

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Computational Fluid Dynamics (Cfd) Simulation of Hypersonic Turbine-Based Combined-Cycle (Tbcc) Inlet Mode Transition

By -

Bibliogov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 36 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Methods of computational fluid dynamics were applied to simulate the aerodynamics within the turbine flowpath of a turbine-based combined-cycle propulsion system during inlet mode transition at Mach 4. Inlet mode transition involved the rotation of a splitter cowl to close the turbine flowpath to allow the full operation of a parallel dual-mode ramjetscramjet flowpath. Steady-state simulations were performed at splitter cowl positions of 0deg, -2deg, -4deg, and -5. 7deg, at which the turbine flowpath was closed half way. The simulations satisfied one objective of providing a greater understanding of the flow during inlet mode transition. Comparisons of the simulation results with wind-tunnel test data addressed another objective of assessing the applicability of the simulation methods for simulating inlet mode transition. The simulations showed that inlet mode transition could occur in a stable manner and that accurate modeling of the interactions among the shock waves, boundary layers, and porous bleed regions was critical for evaluating the inlet static and total pressures, bleed flow rates, and bleed plenum pressures. The simulations compared well with some of the wind-tunnel data, but uncertainties in both...

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