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A TWO-STAGE-TO-ORBIT SPACEPLANE CONCEPT WITH GROWTH POTENTIAL



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Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.A two-stage-to-orbit (TSTO) spaceplane concept developed in 1993 is revisited, and new information is provided to assist in the development of the next-generation space transportation vehicles. The design philosophy, TSTO spaceplane concept, and the design method are briefly described. A trade study between cold and hot structures leads to the choice of cold structures with external thermal protection systems. The optimal Mach number for staging the second stage of the TSTO spaceplane (with air-breathing propulsion on the first stage) is 10, based on life-cycle cost analysis. The performance and specification of a prototype/experimental (P/X) TSTO spaceplane with a turbo/ram/scramjet propulsion system and built-in growth potential are presented and discussed. The internal rate of return on investment is the highest for the proposed TSTO spaceplane, vis-A-vis a single-stage-to-orbit (SSTO) rocket vehicle and a TSTO spaceplane without built-in growth. Additional growth potentials for the proposed spaceplane are suggested. This spaceplane can substantially decrease access-to-space cost and risk, and increase safety and reliability in the near term It can be a serious candidate for the next-generation space transportation system.



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