

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures - Dynamics and Microdynamics (3)

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RESEARCH ON THE MODAL TEST TECHNOLOGY FOR THE LARGE LAUNCH VEHICLE WITH
FOUR BOOSTERS

Abstract

With the development of space technology, the scale of the large launch vehicle with four boosters is larger and the structure of that becomes more complex, so the modal test on large launch vehicle with four boosters is more difficult. Some key technologies on the modal test of the large launch vehicle with four boosters were elaborated in this paper. Aiming at the new characteristics of the large launch vehicle which contains large and complex structures, closely spaced modes and difficult identification of local modes, a series of key technologies of the modal test were studied in-depth such as the free boundary simulation, the propellant liquid substitution, excitation to the whole and local structure, vibration response measurements and the identification of closely spaced mode parameters. Based on the above research results, a range of modal tests of 10:1 scale model of a large launch vehicle with four boosters was carried out, which verified and improved the modal test methods. The above research solved some problems of a large launch vehicle modal test and will be applied to modal tests of a newly developed large launch vehicle.