

Study Case of Spacecraft Instruments in Structural Modelling with Nastran-Patran

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Abstract : The intense structural loads during the launch of a spacecraft represent a challenge for the space structure designers because enough resistance has to be achieved while maintaining at the same time the mass and volume within the allowable margins of the mission requirements and inside the limits of the budget project. In this conference, we present the structural analysis of the Lunar Lander Neutron Dosimetry (LND) experiment on the Chang'E4 mission, the first probe to land on the moon's far side included in the Chinese' Moon Exploration Program by the Chinese National Space Administration. To this target, the software Nastran/Patran has been used: a structural model in Patran and a structural analysis through Nastran have been realized. Next, the results obtained are used both for the optimization process of the spacecraft structure, and as input parameters for the model structural test campaign. In this way, the feasibility of the lunar instrument structure is demonstrated in terms of the modal modes, stresses, and random vibration and a better understanding of the structural tests design is provided by our results.

Keywords : Chang'E4, Chinese national space administration, lunar lander neutron dosimetry, nastran-patran, structural analysis

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