

64th International Astronautical Congress 2013

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

Author: Dr. He Wei

China Academy of Launch Vehicle Technology, China, hewei79@sina.com

Prof. Dong Li

China Academy of Launch Vehicle Technology, China, lidong615@sina.com

Dr. Yu Luan

China Academy of Launch Vehicle Technology, China, lionyee@gmail.com

Mr. Tang Xiao-han

China Academy of Launch Vehicle Technology, China, txh1982@sina.com

Mr. Liu Hai-long

China Academy of Launch Vehicle Technology, China, liuhailong3@163.com

Mr. Yuan Shui-lin

China Academy of Launch Vehicle Technology, China, yuanshuilin123@yahoo.com.cn

Mr. Lei Yong-jun

Dept. Engineering Mechanics, Dalian University of Technology, China, Leiyj108@nudt.edu.cn

Mr. Li Gang

Dept. Astronautical Science and Engineering, National University of Defense Technology, China,  
ligang@dlut.edu.cn

Mr. Huang Bin

China Academy of Launch Vehicle Technology, China, huangbbj@yahoo.com.cn

DYNAMIC ANALYSIS AND VALIDATION FOR ROTATING SEPARATION OF LM-5'S  
LARGE-SCALE PAYLOAD FAIRING

**Abstract**

Separation strategy and structural design for payload fairing are key technologies during development of launch vehicle. In this paper, present strategy of fairing separation and simulation technique is reviewed. Then, rotating separation of LM-5's large-scale payload fairing is simulated through both multi-body dynamics and explicit structural dynamics, based on which, influence of elastic deformation and vibration responses on separation characteristic, enveloping space, and structural strength of the fairing are discussed. Furthermore, to estimate effects of atmosphere during separation experiment of the fairing, coupled Euler Lagrange method is employed. LM-5's fairing separation experiment results are introduced. Finally validity and accuracy for the analysis strategy are evaluated by the experiment results.