

HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Near Term Strategies for Lunar Surface Infrastructure (1)

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THE REALIZATION OF A LUNAR GRAVITY SIMULATION SYSTEM

Abstract

In China's lunar exploring plan, a lunar landing research vehicle will be launched soon. The lunar gravity simulation system is investigated for fulfilling the requirements of lunar landing simulation test on the earth. The system includes mainly a set of 3-dimensional electro-mechanical system which can move following the vehicle in high speed and a huge structure supplying the flying space for the vehicle. The 3-dimensional electro-mechanical system must exert a constant force almost extremely upwards to the vehicle during the soft landing process. A multilevel 3-dimensional electro-mechanical system is proposed to solve the tough coupling control problem of force and displacement. The wire rope system introduced into the system to keep the stiffness of the moving equipment leads to another complicated problem : multi-equipment (16 axes) synchronization control. To meet the needs, the high response control system including hardware and software is designed. The success of the realization of the lunar gravity simulation system is proved by the lunar landing simulation test result analysed in detail. The system investigation method can be promoted to other applications as Martial landing simulation test.