

LUNAR LANDING AND LAUNCH FACILITIES (COMPLEX 39L):
GUIDANCE SYSTEMS AND PROPELLANT SYSTEMS

FLORIDA INSTITUTE OF TECHNOLOGY

After a general, overall definition of Complex 39L during the previous two years, the 1988-89 projects were chosen to focus on more specific aspects, specifically, guidance systems and propellant systems. Six teams or subtasks were formulated: (1) Cascade refrigeration for boil-off recovery of cryogenic storage vessels; (2) Lunar ground-based radar system to track space vehicles; (3) Microwave altimeter for spacecraft; (4) Development of a computational model for the determination of lunar surface and sub-surface temperatures; (5) Lunar cryogenic facility for the storage of fuels; and (6) Lunar lander fuel inventory tent for the storage of cryogenic vessels.

At the present time, a cascade refrigeration system for a cryogenic boil-off recovery system has been designed. This is to serve as a baseline system. The ground-based tracking system

uses existing technology to implement a reliable tracking radar for use in the lunar surface. A prototype has been constructed. The microwave altimeter is for use on lunar landers. It makes use of the Doppler effect to measure both altitude and the vertical velocity component of the spacecraft. A prototype has been constructed. A computational model that predicts the spatial and temporal temperature profiles of the lunar sub-surface was formulated. Propellant storage vessels have been designed. A support for these vessels which minimizes heat leaks was also designed. Further work on the details of the Fuel Inventory Tent (FIT) was performed. While much design work on the overall Complex 39L remains to be done, significant new work has been performed in the subject areas.

