Lunar Atmosphere and Dust Environment Explorer Integration and Test

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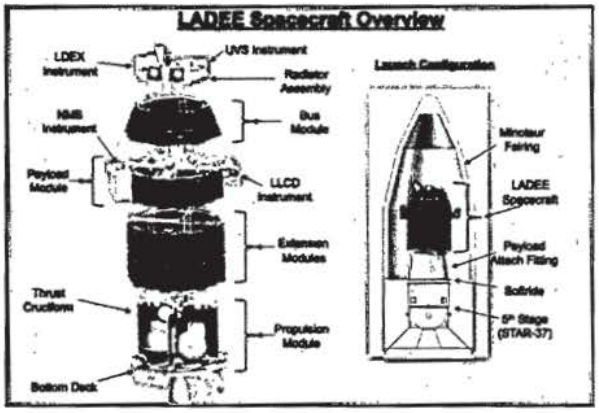
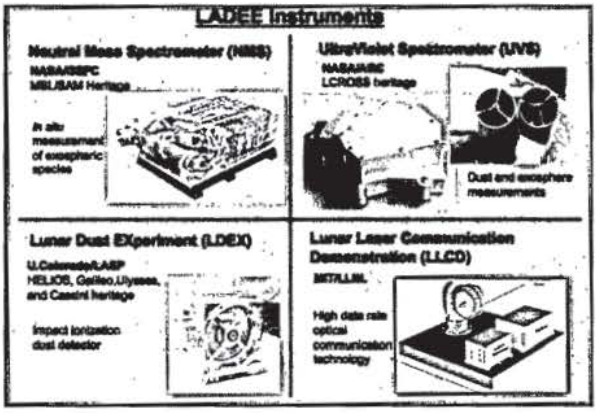
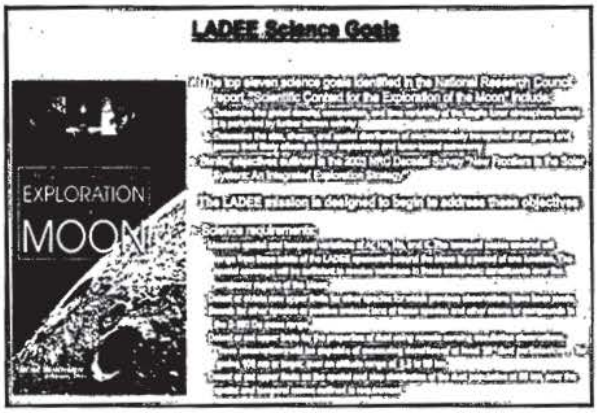
The Lunar Atmosphere and Dust Environment Explorer (LADEE) is a NASA collaborative flight project to explore the lunar exosphere. It is being developed through a unique partnership between NASA's Ames Research Center (ARC) and Goddard Space Flight Center (GSFC). Each center brings its own experience and flight systems heritage to the task of integrating and testing the LADEE subsystems, instruments, and spacecraft. As an "in-house" flight project being implemented at low-cost and moderate risk, LADEE relies on single-string subsystems and protoflight hardware to accomplish its mission.

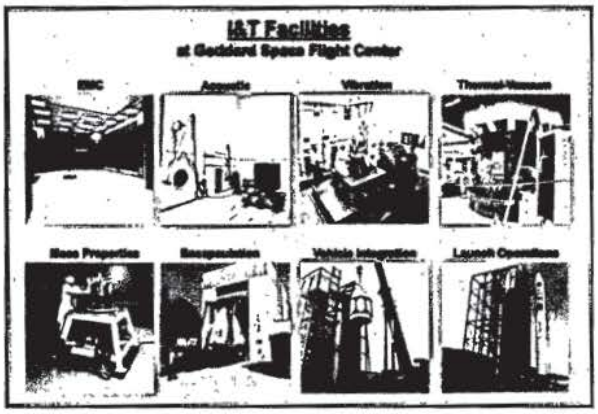
Integration and test (I&T) of the LADEE spacecraft with the instruments will be performed at GSFC, and includes assembly, integration, functional testing, and flight qualification and acceptance testing. Due to the nature of the LADEE mission, I&T requirements include strict contamination control measures and instrument calibration procedures. Environmental testing will include electromagnetic compatibility (EMC), vibro-acoustic testing, and thermal-balance/vacuum.

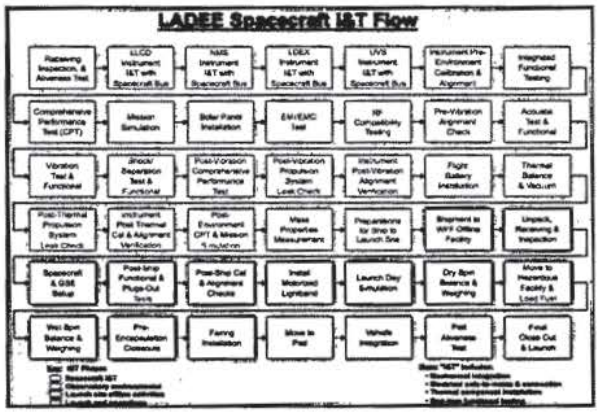
Upon successful completion of spacecraft I&T, LADEE will be launched from NASA's Wallops Flight Facility. Launch of the LADEE spacecraft is currently scheduled for December 2012.











LADEE I&T Challenges & Mitigations

Challenge	Mitigation
• Low-cost (Class D Enhanced)	• Streamline procedures, reduced paper • Leverage expertise from both centers (ARC, GSFC) • Thorough planning and preparations • Protoflight test program, with "fatest" testing
• Cleanliness Requirement (10K+)	• 10K cleanliness facilities upgrades • Spacecraft bakeout prior to instrument integration • Procedural controls, personnel training
• Spin-Balance Table Not Suitable	• Upgrade GSFC's table for explosion-proofing • Arrange for shipping to launch site
• Schedule is short, with long-lead items and only 30-days slack	• Establish contingencies and flexibility in components • Ensure facilities are available when needed • Reorder I&T sequence if necessary • Plan for single-shift operations; go to multi-shift A/R
• New launch vehicle configuration	• Perform vehicle simulation testing • Ensure interface test procedures well-defined
• Unique intercenter relationship	• Leverage expertise from both centers (ARC & GSFC) • Well-defined roles and responsibilities • Robust communication