NASA Ames’
Robotic Exploration of the Moon and Beyond

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NASA Ames Research Center – Silicon Valley

- Founded 1939, 2nd oldest NASA center
- 2500 employees w/ another 1200 students in summers
- $900M+ yearly budget

• Science
  – Space, Earth, Biological Sciences
  – Astrobiology, Lunar Science

• Cost-Effective Space Missions
  – Lunar Exploration
  – Small Spacecraft and Nanosatellites

• Exploration Systems
  – Autonomy, and Supercomputing
  – Entry Systems

• Aeronautics & Aviation
  – NextGen Air Traffic Management
  – Aviation Safety

• Innovative & Entrepreneurial Collaborations
  – NASA Research Park & 90 partners
Kepler / K2 Mission

• Find the number of Earth-size and larger planets in the habitable zone of sun-like stars

Launched: March 7, 2009

Observed 145,000 Stars

3461+ Confirmed Planets

4496+ Candidate Planets to be confirmed
LCROSS Mission

Lunar CRater Observation and Sensing Spacecraft

Launched: June 18, 2009
Impacted: October 9, 2009

Confirmed Water ice in permanently shadowed craters on the Moon

Demonstrated “Secondary” launch with another spacecraft

Impacted a “used” empty rocket and measured the result
LADEE: Lunar Atmosphere and Dust Environment Explorer

Measure the Lunar Dust and Examine the Lunar atmosphere
  • Launched Sept 6, 2013
  • Ended on April 18th, 2014

• First Composite Small Spacecraft
• Demonstrated Laser Communications from Lunar Orbit
BioSentinel: Deep-Space Radiation BioSensor

Mission Objectives:

A CubeSat to be launched on NASA’s first SLS
- 70 million miles from Earth at 18 months
- Far outside the protective shield of Earth’s magnetosphere

Conduct life science studies relevant to human exploration
- 1st biological study beyond LEO in over 40 years
- Uses Yeast DNA as a BioSensor

Design payload with sensors for multiple environments
- Instrument on ISS at similar time to SLS launch
- Ground controls in lab and at radiation beam facilities

Expected Launch in 2019
Resource Prospector (RP) Mission

Understand the nature and distribution of water/ices in lunar polar soil

**Mission:**

- Operate for 6-14 earth days
- Drive into permanently shadowed craters
- Prospect and Drill for Ices
- Determine composition of the Ices and their usability
- Expected Launch in FY21
Summary

• Ames Research Center leads NASA in Lunar Exploration missions

• NASA Ames is actively developing and operating robotic missions for Lunar and Deep Space Exploration

• NASA Ames actively partners with California’s Universities, Companies, and other Government labs to succeed
Questions?