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NASA Ames Research Center
HAT-P-7 Light Curves

Ground-based Measurements

Kepler Measurements

Brightness

Time (In Days)  1.3  2.6
Transit Light Curves

- **Kepler 4b**: Flux graph showing a small dip in light intensity over the phase range. Orbital period is 3.2 days.
- **Kepler 5b**: More pronounced dip in light intensity with phase shift. Orbital period is 3.5 days.
- **Kepler 6b**: Similar to Kepler 4b with a slight dip. Orbital period is 3.2 days.
- **Kepler 7b**: Larger dip than Kepler 4b and 5b. Orbital period is 4.9 days.
- **Kepler 8b**: Profiles similar to 7b but with a different orbital period of 3.5 days.

The graphs illustrate the transit effect on light flux over the orbital phase.
<table>
<thead>
<tr>
<th>LCROSS Payload Science Instrument</th>
<th>Sponsorship</th>
<th>Measurement</th>
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</table>
| Visible Camera (1 total)                         | Ecliptic Enterprises       | • Visible context imagery  
• Monitor ejecta cloud morphology  
• Determine visible grain properties |
| Near Infrared Cameras (2 total)                  | Goodrich Sensors Unlimited | • NIR (0.9–1.7 um) context imagery  
• Monitor ejecta cloud morphology  
• Determine NIR grain properties  
• Water concentration maps |
| Mid-Infrared Cameras (2 total)                   | Thermoteknix (black case)  | • MIR (6.0–13.5 um) thermal image  
• Monitor the ejecta cloud morphology  
• Determine MIR grain properties  
• Measure thermal evolution of ejecta cl  
• Remnant crater imagery |
| Visible Spectrometer (1 total)                    | Ocean Optics               | • Visible (263–650 nm) emission and reflectance spectrometry of vapor plume, ejecta cl  
• Measure grain properties  
• Measure emission H2O vapor dissociation (308 nm) and H2O+ (619nm) fluorescence |
| Near Infrared Spectrometers (2 total)            | Polychromix                | • NIR (1.2–2.4um) emission and reflectance spectrometry of vapor plume, ejecta cl  
• Measure grain properties  
• Measure broad H2O ice features  
• Occultation viewer to measure water v  
• Occultation viewer to measure water vapor absorption by cloud particles |
| Total Luminance Photometer (TLP) (1 total)       | NASA Ames Research Center  | • Measures total impact flash luminance (425–1,000 nm), magnitude, and decay luminance curve |
187-216 sec Period

Wavelength (mm)
Octagonal Bus Module
Orbiter Configuration

- Bus Module
- Payload Module
- Module
- Extension Module
- Propulsion Module
- Propulsion Module
NEO Mission Concept

Mission Characteristics

Launch Vehicle: Falcon-1e

Rendezvous with NEO Target: Delta-V (PE): ~3 km/sec (2.3 + 0.7)

Spacecraft Mass: 56Kg

Instrumentation: Multi-spectral Imager, Laser or Radar Altimeter
LADEE UVS Components

- Spectrometer
- Solar Viewer
- Limb Telescope
Robotic Recon Instruments

- PanCam (GigaPan)
  - Oblique, wide-angle, color, context views
  - 60x180 deg
  - >100x resolution of LRO LROC-NA
    (and in color)

- Microscopic Imager
  - High-res, close-up, color, terrain views
  - 72 micron / pixel
  - >7,000x resolution of LRO LROC-NA
    (and in color)

- 3D scanning lidar
- 3D topography measurements
Airship Ventures

- Headquartered in Historic Building 20
- Over 50 possible collaborative projects including:
  - Assist engineering for the South Bay Salt Ponds reclamation project
  - Participate in a Woods Hole Oceanographic Institute project involving Resident Killer Whale Populations in WA State
  - Work with NRP Partner UAV Collaborative and the University of Alaska on next generation Air Traffic Control
New Collaboration Partners for FY2006
Finder Scope

Classification: Spiral Galaxy in Canes Venatici

Names: M51; Whirlpool Galaxy

RA: 13h29m54s
Dec: 47° 12' 00"
Alt: 89° 04' 20"
Az: 241° 58' 29"

Magnitude: 8.1
Dimensions: n/a
Rise: Circumpolar
Set: Circumpolar
Transit: Circumpolar

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Close

Look At
Sky
Seven top galaxies
Out of This Whirl...
Whirpool Galaxy
M51

Imagery
DSS Digitized Sky Survey (Query)
End Constellation
Constellation behind schedule and would require large budgets to land astronauts on the Moon

Add $6 billion over five years
Top line increase of $6.0 billion over 5-years compared to the FY 2010 Budget, for a total of $100 billion over five years.

Safely fly out the Shuttle
$600 million in FY 2011 to ensure the safe retirement of the Space Shuttle upon completion of the current manifest.
$1.7 billion over ~ one year

Extend the ISS
In consultation with our partners, extends operation of the International Space Station likely to 2020 or beyond and enhances its utilization, bringing nations together in a common pursuit of discovery in space.
$15 billion over five years
Highlights of NASA’s FY 2011 Budget

Demonstrate new technologies
Initiates several new programs to transform the state of the art in space technologies, including flagship exploration technology development and demonstration programs, investments in early-stage advanced concepts, potential “game-changing” technologies
$7.8 billion (“critical technologies”) + $4.9 billion (“space technologies”) over five years

Heavy lift and propulsion R&D
Reduce costs and shorten development timeframes for future heavy-lift systems. Target R&D activities include: New approaches to first-stage launch propulsion; In-space advanced engine technology development and demonstrations; Foundational (basic) - propulsion research.
$3.1 billion over five years

Enhance climate change research
Enhance the Nation’s global climate change research and monitoring system, accelerating decadal survey missions and re-flying OCO.
$10 billion over five years

Expand aeronautics
Bring cleaner, safer, and more efficient transportation to our skies
$2.9 billion over five years
Enable our commercial space sector
Directs NASA to partner with the aerospace industry in a fundamentally new way, making commercially provided services the primary mode of astronaut transportation to the International Space Station.
$6 billion over five years

Robotic missions
Provides for a robust program of robotic solar-system exploration and new astronomical observatories
  $3.0 billion (exploration precursors)
  + $3.4 billion (heliophysics) + $5.6 billion (astrophysics) + $7.9 billion (planetary science) over five years

Education
Inspire more young people to engage in science, technology, engineering, and mathematics.
$750 million over five years

Operations, construction & environmental compliance
“Cross agency support”. Continues to fund operations and maintenance of NASA’s 9 field centers, Funds agency-wide management functions, CS salaries?
$18 billion over five years (+ $1.9 billion over five years KSC upgrades)