

Explore With Us!



www.nasa.gov

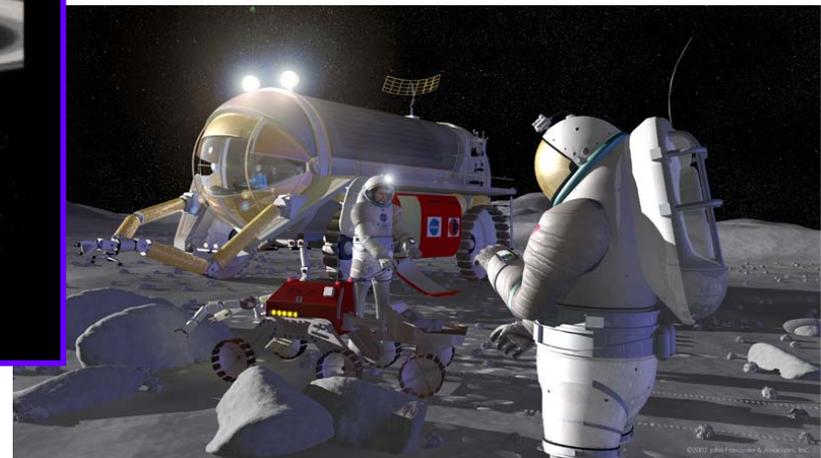
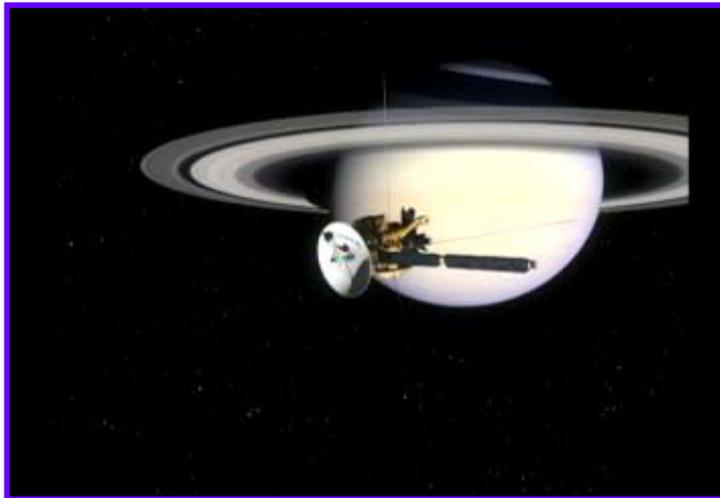
The Vision for Space Exploration

The fundamental goal of this vision is to advance U.S. scientific, security and economic interest through a robust space exploration program

- **Implement a sustained and affordable human and robotic program to explore the solar system and beyond**
- **Extend human presence across the solar system, starting with a human return to the Moon by the year 2020, in preparation for human exploration of Mars and other destinations**
- **Develop the innovative technologies, knowledge, and infrastructures both to explore and to support decisions about the destinations for human exploration**
- **Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests**

The Vision for Space Exploration

NASA is charting a bold new course into the cosmos, a journey that will take humans back to the Moon, and eventually to Mars and beyond. The Vision for Space Exploration calls for a "building block" strategy of human and robotic missions to achieve new exploration goals.



Realizing the Future

Foster and sustain the exploration culture across generations

- **Open new frontiers**
- **Continuing and inspiring**
- **A constant impetus to educate and train**

Identify, develop, and apply advanced technologies to...

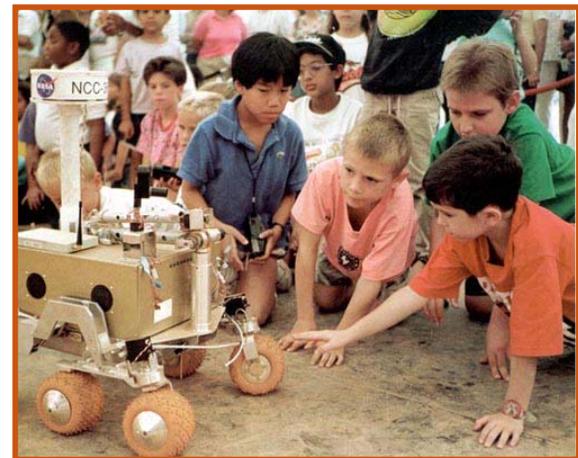
- **Enable exploration and discovery**
- **Allow the public to actively participate in the journey**
- **Translate the benefits of these technologies to improve life on Earth**

Harness the brain power

- **Engage the nation's science and engineering assets**
- **Motivate successive generations of students to pursue science, math, engineering and technology**
- **Create the tools to facilitate broad national technical participation**

Sustaining the Future

- **Have a united front from NASA, Industry, Academia, Researchers, Scientific and Engineering Communities**
- **Develop clear and consistent messages**
- **Engage broader communities**
- **Deliver on commitments / be responsible stewards of taxpayer \$\$**
- **Educate, inspire, and motivate the public**



Why the Moon?



Human Civilization

Extend human presence to the Moon to enable eventual settlement.



Scientific Knowledge

Pursue scientific activities that address our fundamental questions about the history of Earth, the solar system and the universe -- and about our place in them.



Exploration Preparation

Test technologies, systems, flight operations and exploration techniques to reduce the risks and increase the productivity of future missions to Mars and beyond.

Why the Moon?



Global Partnerships

Provide a challenging, shared and peaceful activity that unites nations in pursuit of common objectives.



Economic Expansion

Expand Earth's economic sphere and conduct lunar activities with benefits to life on the home planet.



Public Engagement

Use a vibrant space exploration program to engage the public, encourage students and help develop the high-tech workforce that will be required to address the challenges of tomorrow.

Preparing for Mars Exploration and Beyond

Expand mission operations experience and techniques towards Mars Exploration and beyond



Cross-Agency Integration of Technology for Exploration

**Transit & Launch Systems for
Crew Transport & Support**

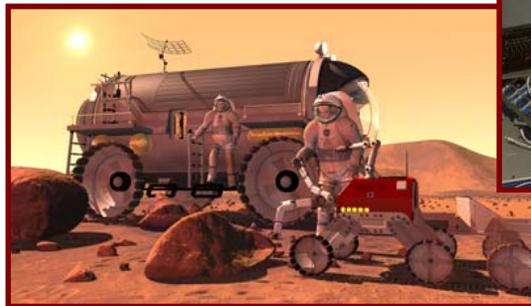
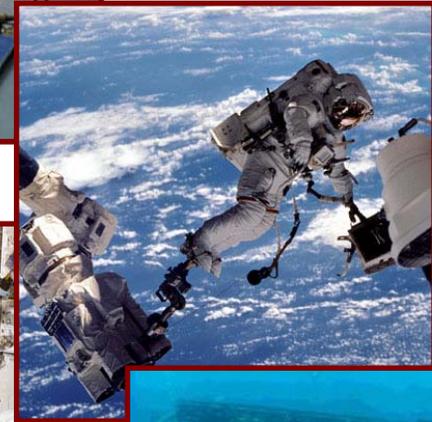
Human Spaceflight

Surface & Orbital Systems

**Supporting Basic &
Applied Research**

**Technology Development for
Long Duration Habitation**

**Preparing for Future Missions –
Moon, Mars, & Beyond**



The Human Body in Space - Surviving the Odyssey

Harmful Radiation Effects

- Tissue Degeneration
- Carcinogen Exposure

Physiological Changes

- Cardiac arrhythmia
- osteoporosis

Acute Medical Problems

- Toxicity
- Ambulatory Health Problems

Behavioral Problems

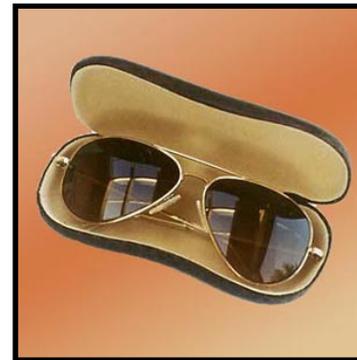
- Disorientation
- Sleep Problems



Partnerships

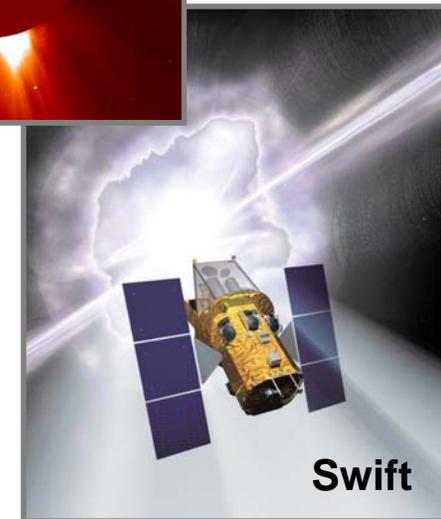
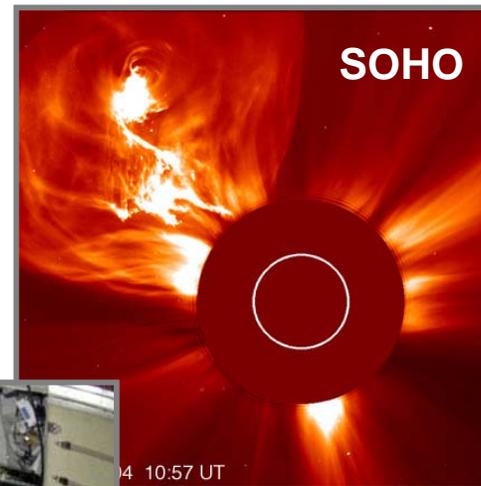
For less than 1% of the Federal budget, people around the world enjoy the benefits of space-based research and technology

NASA spinoffs:



International Cooperation

We will engage other nations to further our exploration goals



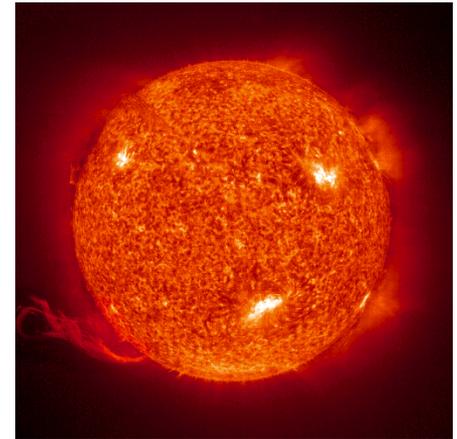
One Step at a Time

Affordable, Sustainable, Focused, Achievable

***NASA has the talent, experience and leadership
to fulfill our destiny as Explorers***



The Sun

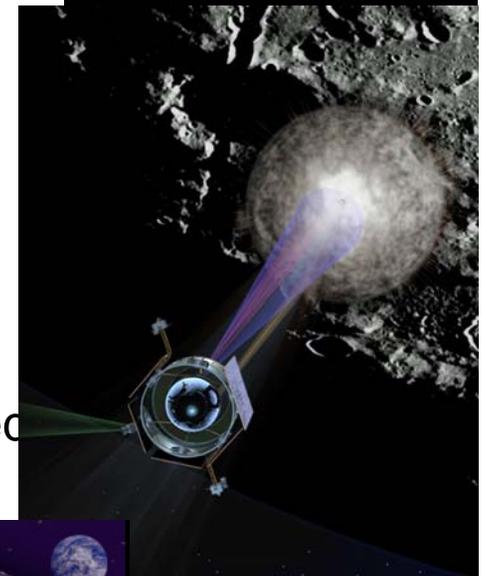


- **SOHO** – *Solar and Heliospheric Observatory*
 - Studies the sun from the deep core to the outer corona and the solar wind
- **TRACE** – *Transition Region and Coronal Explorer*
 - Explores the magnetism of the visible surface and structure of the upper atmosphere
- **STEREO** – *Solar TERrestrial RELations Observatory*
 - Captures 3D structure of coronal mass ejections
- **SDO** – *Solar Dynamic Observatory*
 - Launches in Feb. to help in predicting space weather

The Moon

Lunar Reconnaissance Orbiter (LRO)

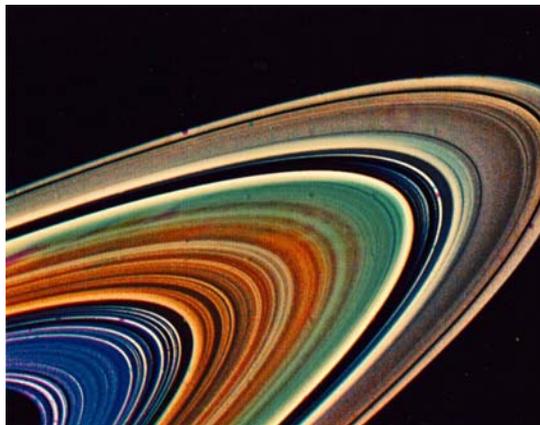
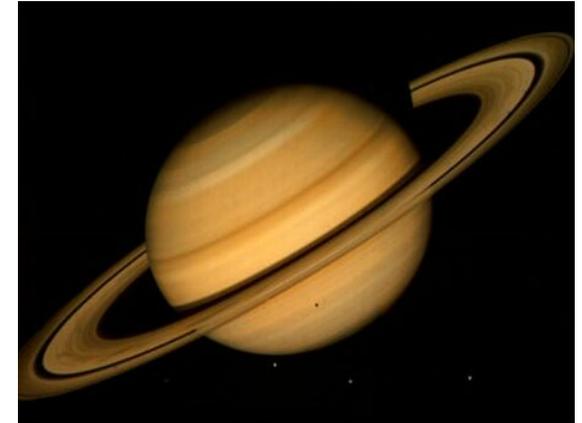
- Find safe landing sites, locate potential resources, characterize the radiation envir.
- Day-night temperature maps, high resolution images, search for water
- LCROSS – Lunar CRater Observation and Sensing Satellite Crashed can study plume



Saturn

■ Cassini-Huygens

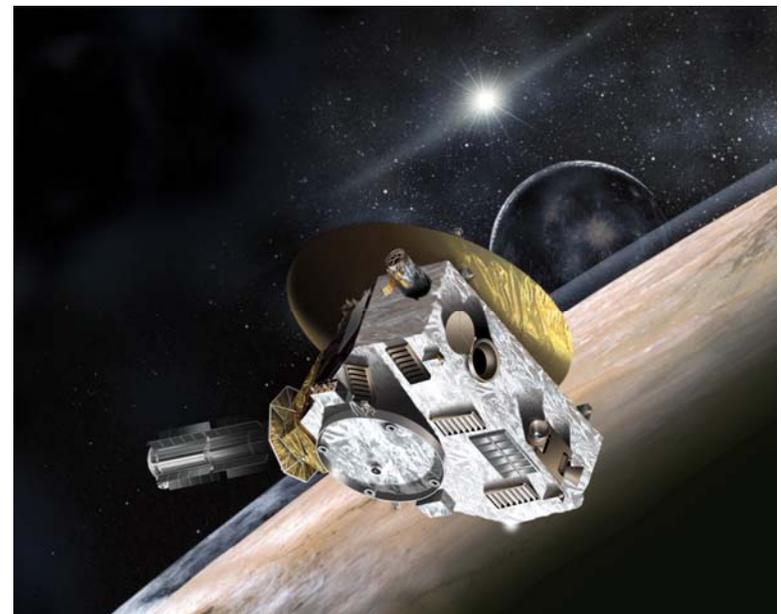
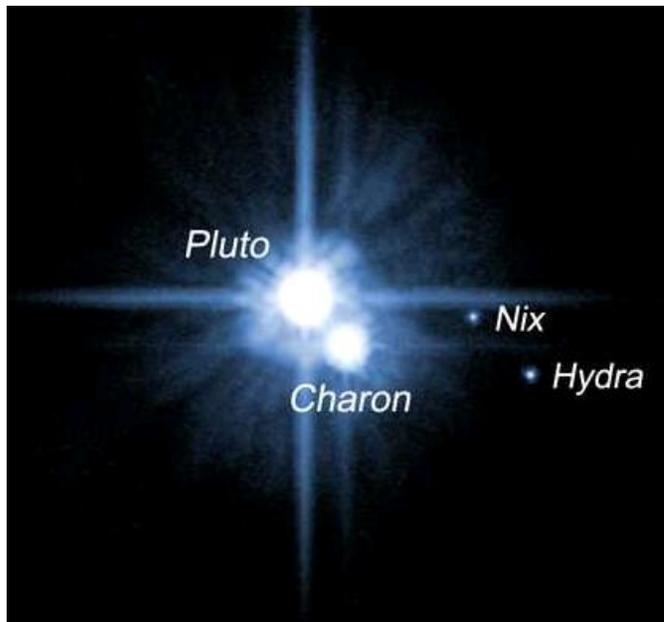
- Orbiting Saturn to learn more about the planet and its rings
- Launched in 1997, mission extended through 2009
- Probe Huygens launched into atmosphere of Titan, largest moon in the solar system



Pluto

■ New Horizons

- First probe to study Pluto
- Fastest vehicle ever launched
- Launched in 2006, arrives in 2016
- Will go on to visit objects in the Kuiper Belt



Juno

■ Juno

- Determine how much water is in Jupiter's atmosphere
- Look deep into Jupiter's atmosphere to measure composition, temperature, cloud motions Launched in 2006, arrives in 2016
- Map Jupiter's magnetic and gravity fields
- Explore and study Jupiter's magnetosphere



Mars Science Laboratory

■ MSL (Curiosity)

- assess the biological potential of at least one target environment by determining the nature and inventory of organic carbon compounds
- characterize the geology of the landing region
- investigate planetary processes of relevance to past habitability
- Explore and study Jupiter's magnetosphere
- characterize the broad spectrum of surface radiation, including galactic cosmic radiation, solar proton events, and secondary neutrons



Presenter

■ Lester Morales, MD

- Lester.Morales@nasa.gov
- NASA's Kennedy Space Center
- Education Specialist
- Questions?



Explore With Us!



www.nasa.gov