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.
Expand mission operations experience and techniques towards Mars Exploration and beyond

Deep Space 1

Martian landscape 3/15/04

Jupiter and Io
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
Harmful Radiation Effects
- Tissue Degeneration
- Carcinogen Exposure

Physiological Changes
- Cardiac arrhythmia
- Osteoporosis

Acute Medical Problems
- Toxicity
- Ambulatory Health Problems

Behavioral Problems
- Disorientation
- Sleep Problems
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

- Determine how much water is in Jupiter’s atmosphere
- 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

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  - Education Specialist
  - Questions?