The NASA Vision
To improve life here,
To extend life to there,
To find life beyond.

The NASA Mission
To understand and protect our home planet,
To explore the universe and search for life,
To inspire the next generation of explorers
. . . as only NASA can.
RTF Planning Process

Columbia Accident Investigation Board (CAIB) Recommendations

Space Shuttle Proposes Plan

Space Flight Leadership Council Approves Plan

Stafford Covey Task Group Validates Plan

Space Shuttle Team Returns to Flight
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; and

Promote international and commercial participation in exploration to further U.S. scientific, security, and economic interests.
The Vision

1. Return the Shuttle to safe flight as soon as practical, based on CAIB recommendations
2. Use Shuttle to complete ISS assembly; retire the Shuttle after assembly complete (2010 target)
4. **Focus ISS research to support exploration goals; understanding space environment/countermeasures**
5. Meet foreign commitments
6. **Undertake lunar exploration to support sustained human and robotic exploration of Mars and beyond**
7. **Series of robotic missions to Moon by 2008 to prepare for human exploration**
8. **Expedition to lunar surface as early as 2015 but no later than 2020**
9. **Use lunar activities to further science, and test approaches (including lunar resources) for exploration to Mars & beyond**
10. **Conduct robotic exploration of Mars to prepare for future expedition**
11. **Conduct robotic exploration across solar system to search for life, understand history, search for resources**
12. **Conduct advanced telescope searches for habitable environments around other stars**
13. **Demonstrate power, propulsion, life support capabilities for long duration, more distant human and robotic missions**
14. **Conduct human expeditions to Mars after acquiring adequate knowledge and capability demonstrations**
15. **Develop a new Crew Exploration Vehicle; flight test before end of decade; human capability by 2014**
16. **Separate cargo from crew as soon as practical to support ISS; acquire crew transport to ISS after Shuttle retirement**
17. **Pursue international participation; pursue commercial opportunity for transportation and services**
Key Elements of the Vision

- **Objectives**
  - Implement a *sustained* and *affordable* human and robotic program
  - Extend human presence across the solar system and beyond
  - Develop supporting innovative technologies, knowledge, and infrastructures
  - Promote international and commercial participation in exploration

- **Major Milestones**
  - 2008: Initial flight test of CEV
  - 2008: Launch first lunar robotic orbiter
  - 2009-2010: Robotic mission to lunar surface
  - 2011: First Unmanned CEV flight
  - 2014: First crewed CEV flight
  - 2012-2015: Jupiter Icy Moon Orbiter (JIMO)/Prometheus
  - 2015-2020: First human mission to the Moon
Preparing for Mars Exploration

- **Moon as a test bed to reduce risk for future human Mars missions**
  - **Technology advancement** reduces mission costs and supports expanded human exploration
  - **Systems testing** and technology test beds to develop reliability in harsh environments.
  - **Expand mission and science surface operations** experience and techniques
  - **Human and machine collaboration**: Machines serve as an extension of human explorers, together achieving more than either can do alone
  - **Breaking the bonds of dependence on Earth**: (e.g., Life Science/Closed loop life support tests)
  - **Power generation and propulsion** development and testing

Implement a **sustained** and **affordable** human and robotic program to explore the solar system and beyond

Extend human presence across the solar system **Common investments** in hardware systems for Moon, Mars and other space objectives
On Earth, where there is liquid water, there is life... even in extreme environments.
Exploration Plan: “Follow the Water”

Prepare for Human Exploration

When • Where • Form • Amount
First Views of a Martian *Delta*!


Lena delta in Siberia (NASA Scientific Data Purchase/Landsat 7)
Abundant Water Ice at High Latitudes
Mars: An Environment for Life?
Future Mars Exploration: Human Exploration and Science

Just as with the exploration of the moon where we first sent robots...

...some day humans will get to explore, study, and experience the red planet Mars
Jupiter’s Moons: An Environment for Life?
JIMO will search for subsurface oceans on Jupiter’s three icy moons: Europa, Ganymede, and Callisto.
Future Colonies with Nuclear Power
Formation of Extra-Solar Disks
Detection of Extra-Solar Planets

* Fifteen extra-solar planets discovered in 2003 as of September.
Kepler will determine the abundance of planets of all types around a vast number of stars.
Space Interferometry Mission

SIM will search for hints of Earth-like masses around nearby stars
Terrestrial Planet Finder

TPF will study the chemical composition of Earth-like planets
Planet Imager . . .

. . . will image the planet
Planet Imager
The Universe in Perspective

Stars: ~70,000,000,000,000,000,000,000,000

Planetary Systems: ??

Earthlike Planets: ??

Life Beyond Earth: ??
Who Else is Looking for Their Origins?
To find life beyond