

National Aeronautics  
and  
Space Administration

## **Origins and History of NASA**

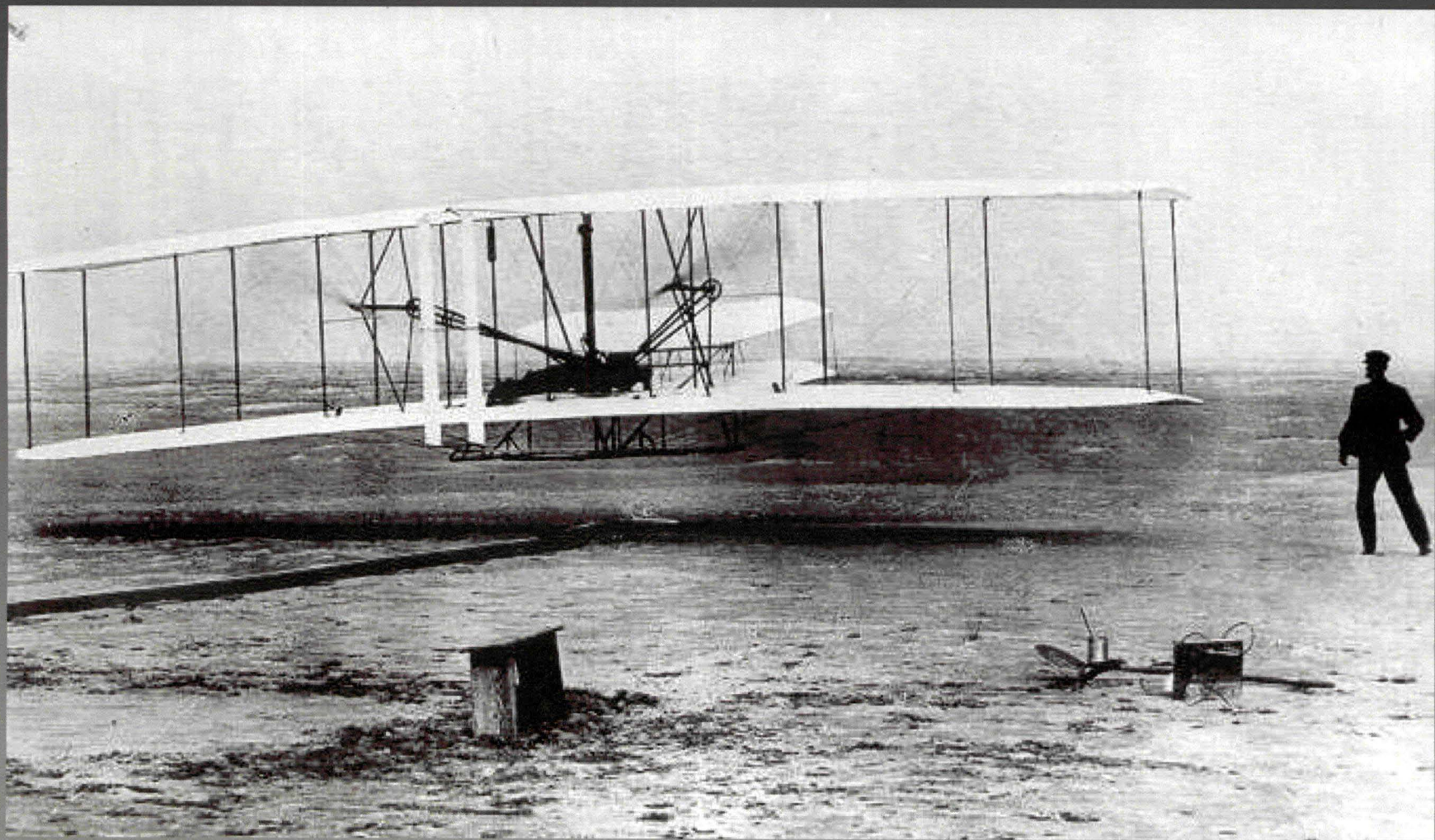
**18 June 2012**

**Jack Fox**

*jack.j.fox@nasa.gov*

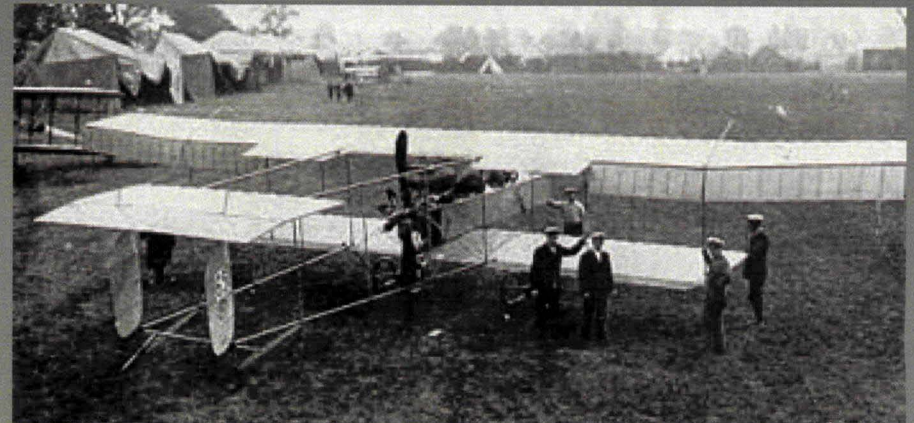
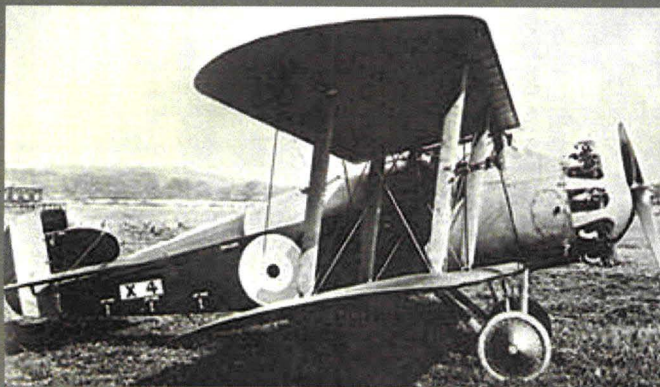
**John F. Kennedy Space Center**





**December 17, 1903**

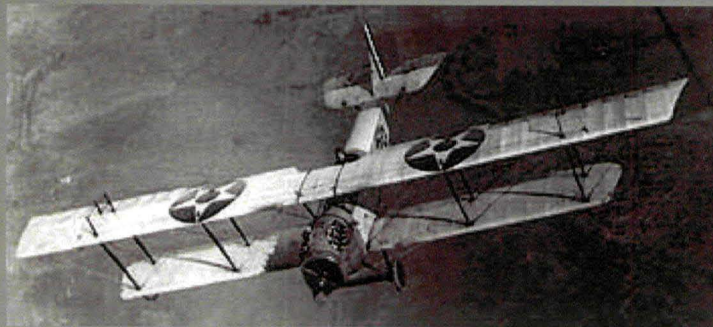
- **1913 - Europeans prepared for war, passed U.S. in land, sea and air weapon technology**
  - France
  - Austria-Hungary
  - Germany
  - Great Britain
  - Italy
  - Russia



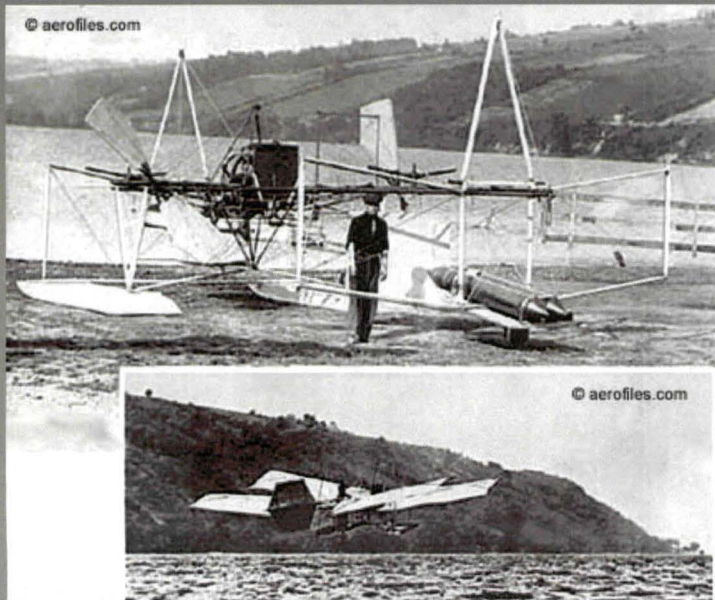
- **1915 – National Advisory Committee for Aeronautics (NACA) chartered by President Woodrow Wilson**

- “Supervise and direct the scientific study of the problems of flight, with a view to practical solutions”

- **1916 - U.S. Curtis “Jenny”**



- **Langley Aeronautical Laboratory dedicated June 11, 1920 in Hampton, Virginia**
  - **Aeronautics research using wind tunnel**
  - **Revolutionary aircraft designs**
  - **Jet engine research**
  - **Named after Dr. Samuel Langley, aeronautics pioneer**



- **Ames Aeronautical Laboratory**

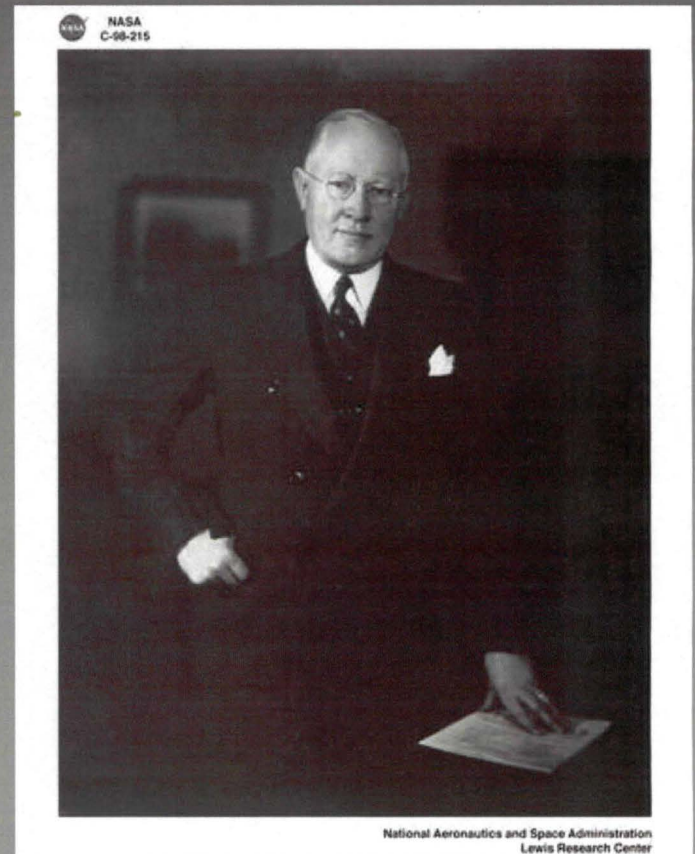
- **Authorized in 1939 at Navy's Moffett Field in California**

- **12 X 24 wind tunnel**

- **Named after Dr. Joseph S. Ames, Physicist**



- **Lewis Aeronautical Laboratory**
  - **Approved by Congress in 1940**
  - **Located adjacent to Cleveland Municipal Airport**
  - **Named After George W. Lewis, NACA Research Director**





**1926**

- **Robert H Goddard**
  - **American Rocket pioneer**
- **Built, tested, and improved rockets**
- **World's first liquid-fueled rocket**



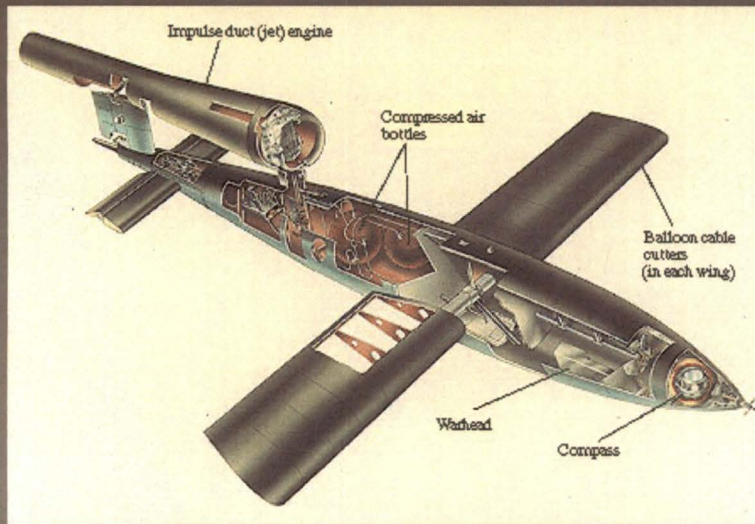


**1936**

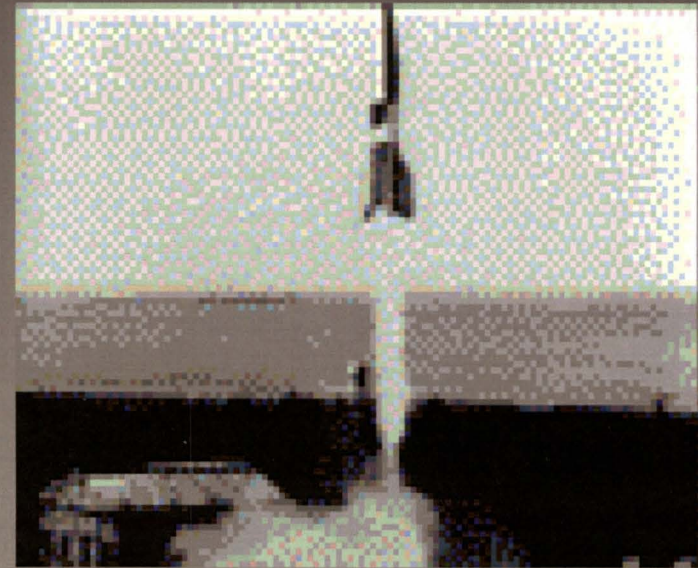
- Europeans begin investigating in rocketry, Germans obtain major funding for lab research

**1944**

- Hitler moves toward rocket use after Battle of Bulge



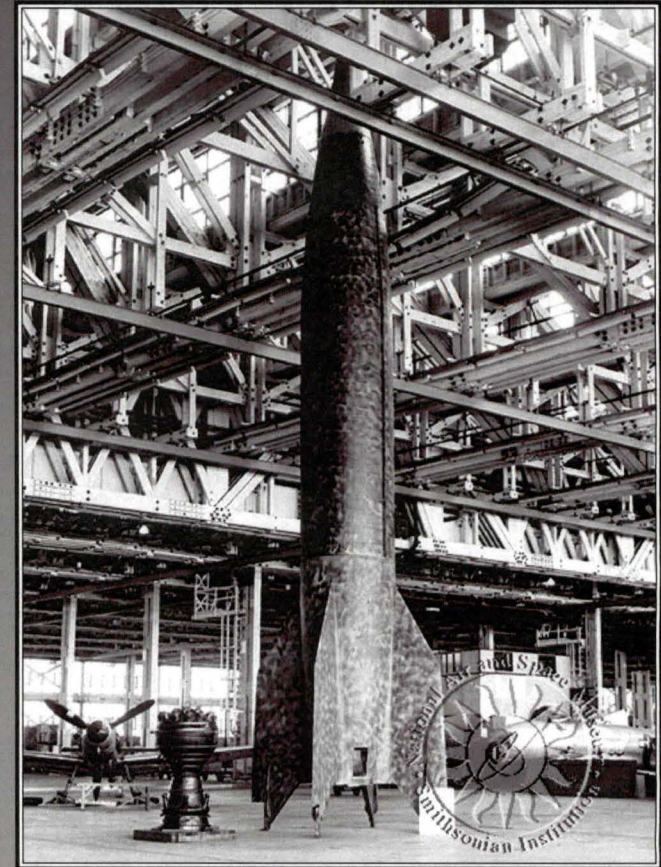
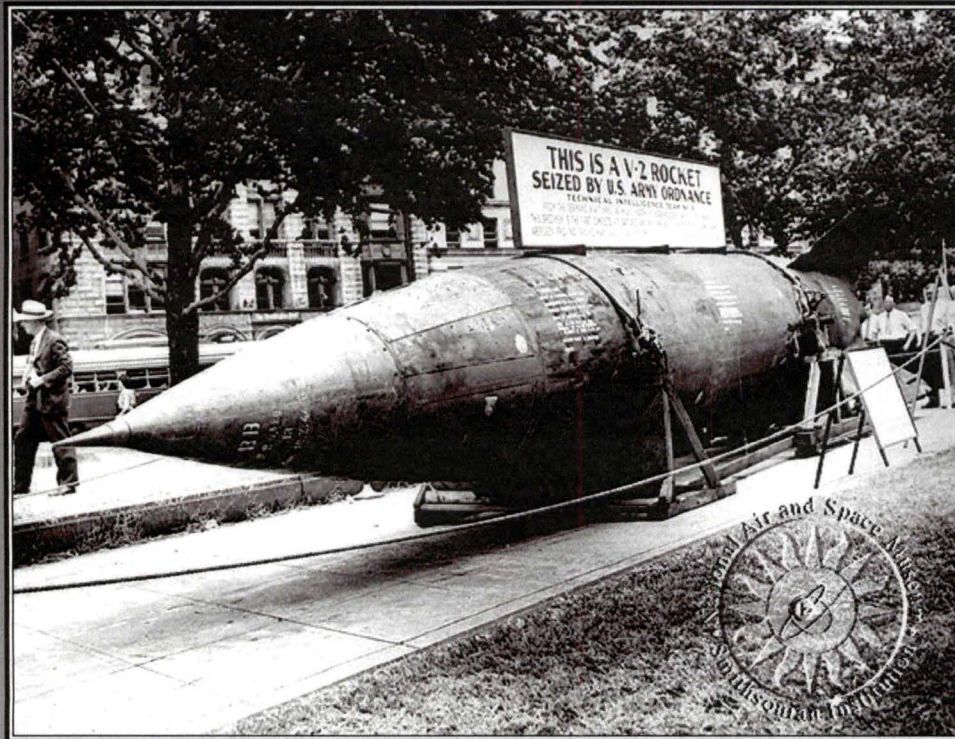
**V-1 (Vengeance  
Weapon) developed;  
360 mph**



**V-2 (Surprise attack  
guided missile); 3600  
mph**

1945-46

•V-2 Comes to America with 130 Germans and settle in White Sands, New Mexico



**October 1, 1949**

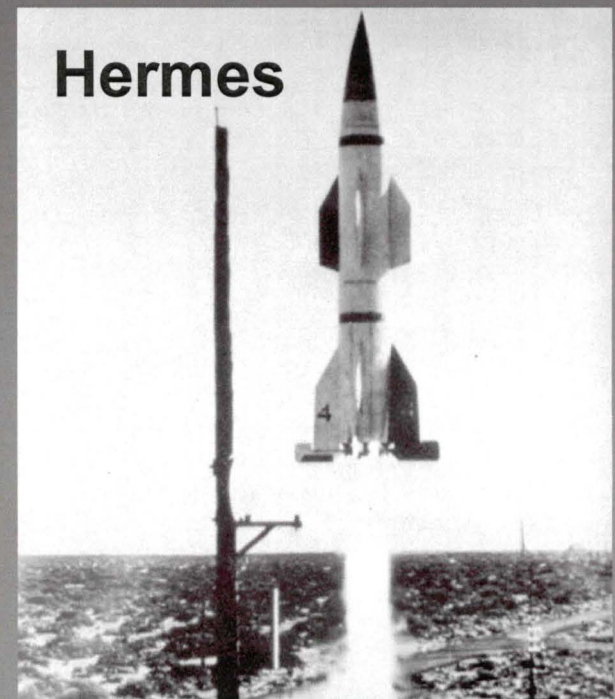
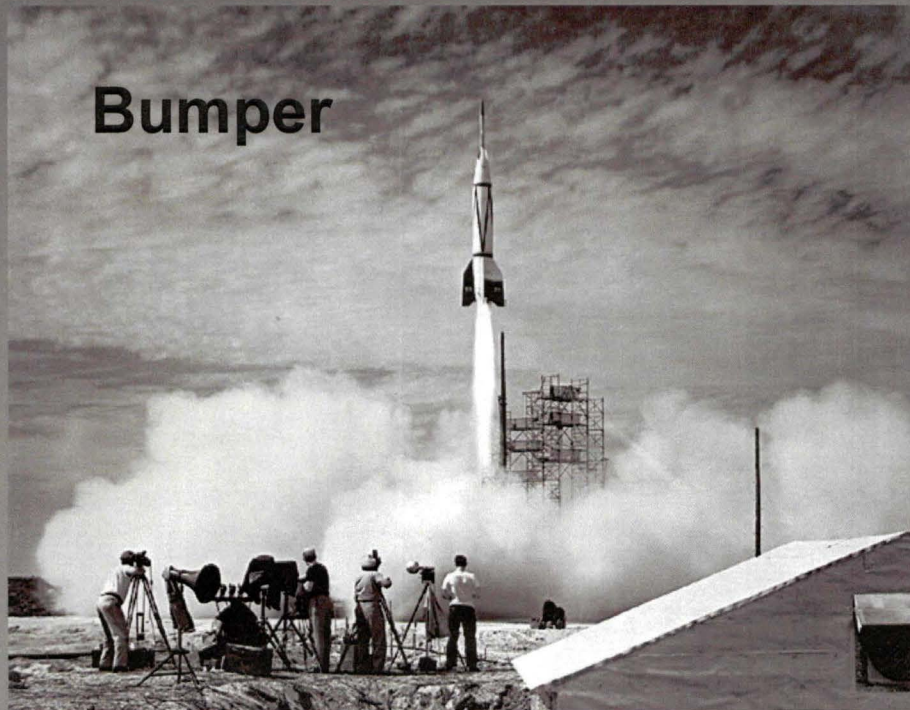
- **Joint Long Range Proving Ground established at Cape Canaveral**

**July 24, 1950**

- **First missile launched from Cape Canaveral (V-2 with WAC Corporal upper stage "Bumper")**

**1951**

- **USAF converts Banana River Naval Station to headquarters for the Air Force Missile Center and Range**



1950

- Dr. Wernher von Braun and U.S. Army's "Redstone" move to Huntsville, Alabama





**July 29, 1957**

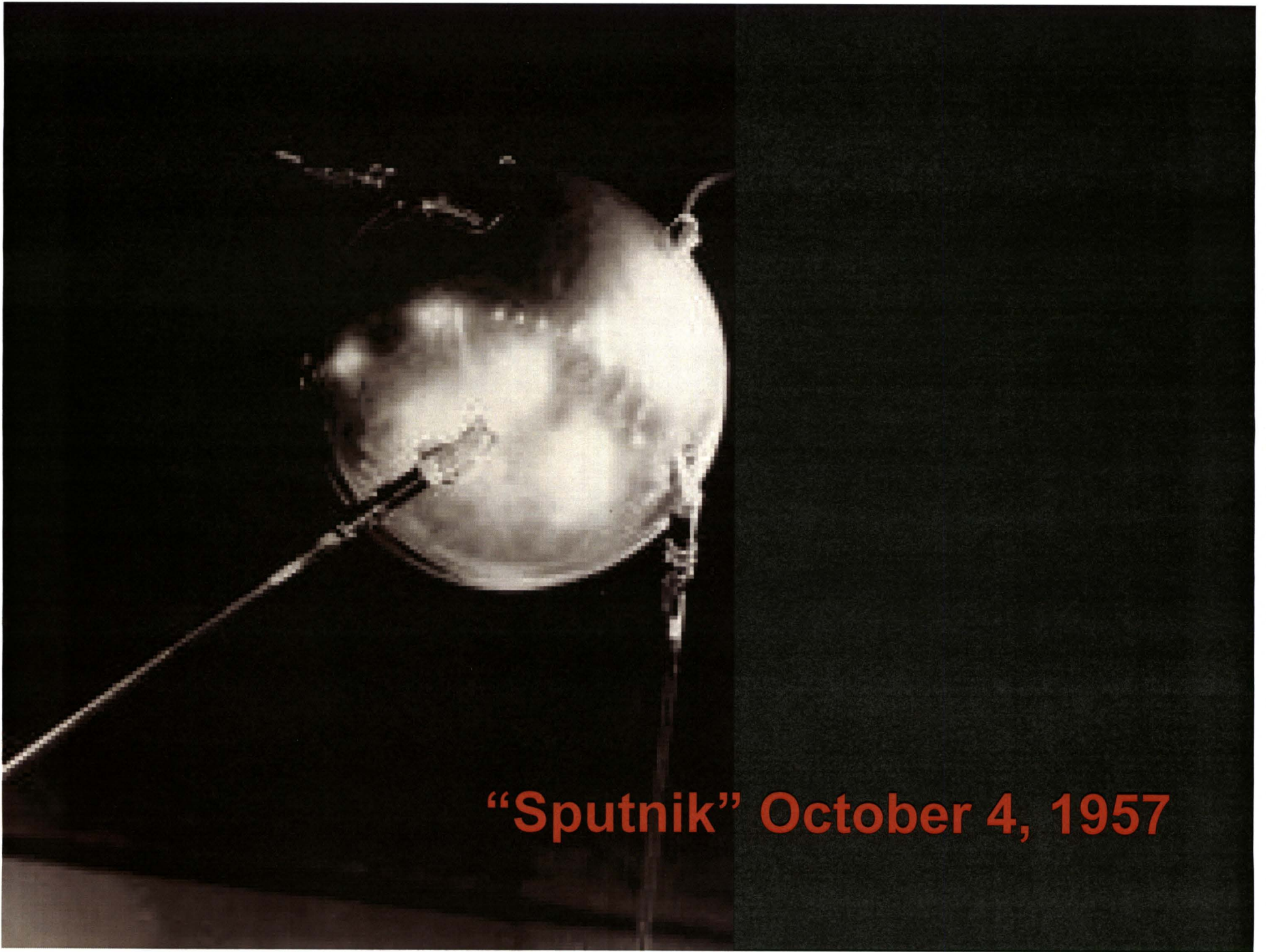
**• President Eisenhower announces that United States will orbit a satellite as part of celebration of International Geophysical Year**

**USSR makes similar pledge**

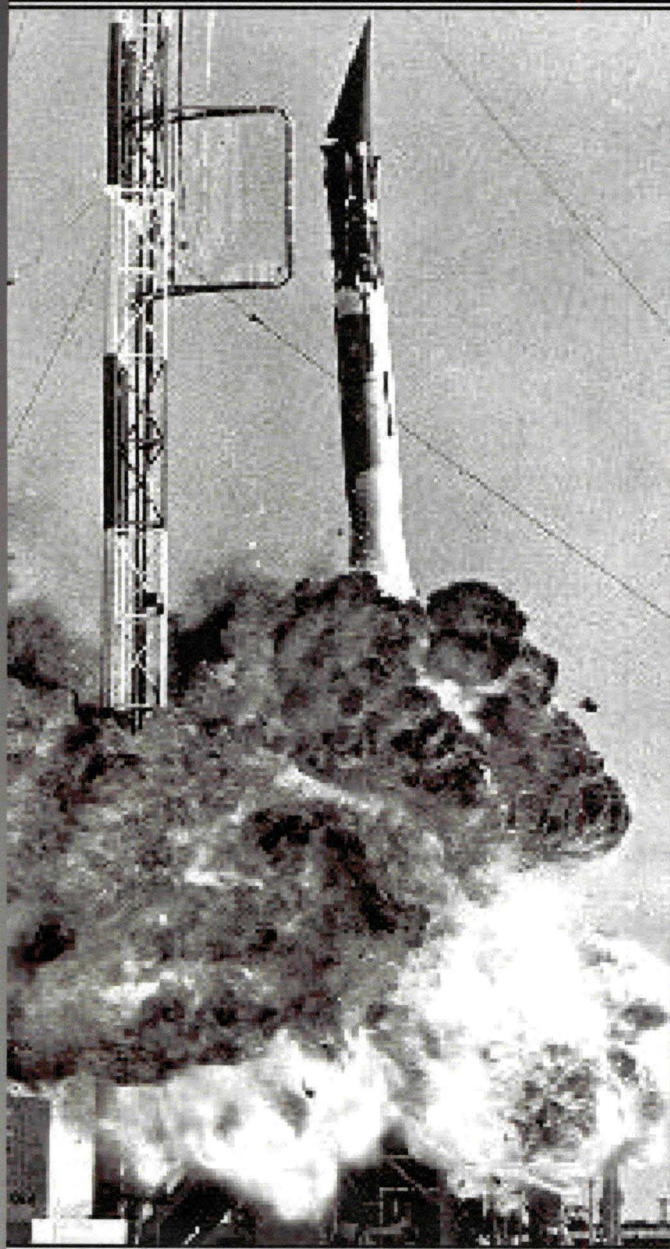




U.S. Navy's "Vanguard"

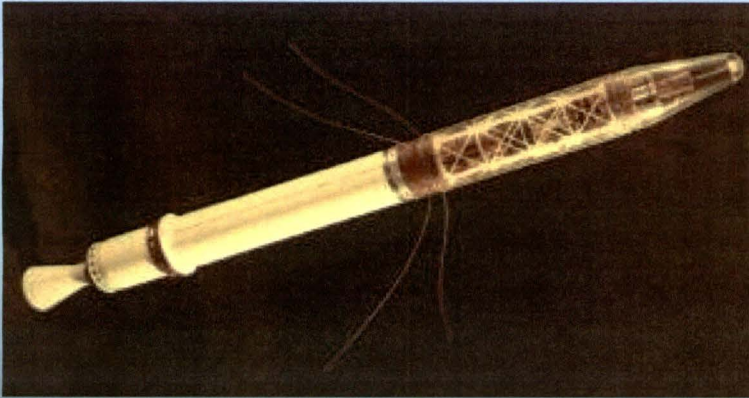


**"Sputnik" October 4, 1957**



**Vanguard explodes 2 seconds  
after launch December 6, 1957**





“Explorer 1” launches  
on January 31, 1958



SATELLITE EXTRA      **The Huntsville Times**      SATELLITE EXTRA

# Jupiter-C Puts Up Moon

*Wail Of Sirens Brings In Era On Space Here*      **Eisenhower Officially Announces Huntsville Satellite Circles Globe**      **Weather Change Sped Launching**

The rockets Gettier On The Square For Neasy Successive Demonstration

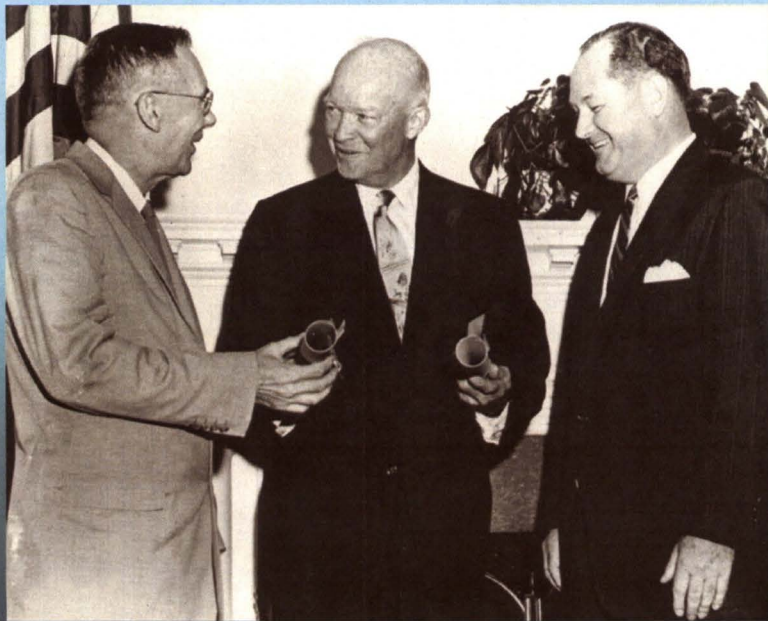
**9 Labs Here Aided Project Of Launching**

**Army Reveals Second Moon Is Scheduled**

*Weather Change Sped Launching*

*Army Reveals Second Moon Is Scheduled*





**National Aeronautics and  
Space Administration  
founded October 1, 1958**

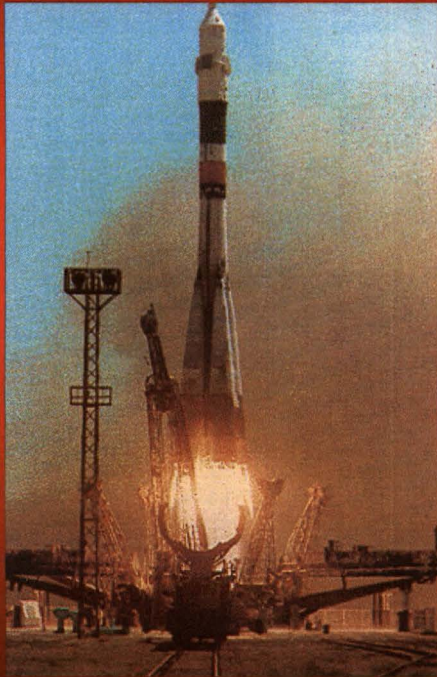


**After 43 years, NACA  
ceases to exist**

**1959**

**• Army Ballistic missile division in Huntsville,  
Alabama transferred to NASA including Saturn  
rocket, 4000 employees, and Werner von Braun**

1958 Dog  
"Laika"  
orbits Earth  
on Sputnik 2



Yuri Gagarin orbits Earth  
April 12, 1961



**May 1, 1959**

- **Goddard Space Flight Center is established in Greenbelt, Maryland for space science research, satellite development, flight operations and tracking**



**May 28, 1959**

- **Monkeys “Able and Baker” launched on Jupiter missile**

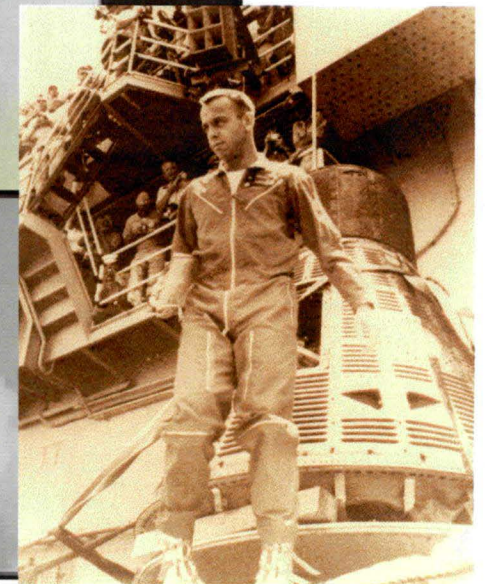
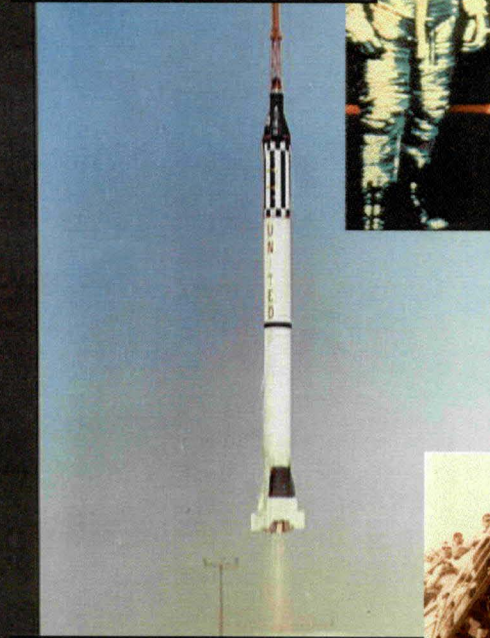
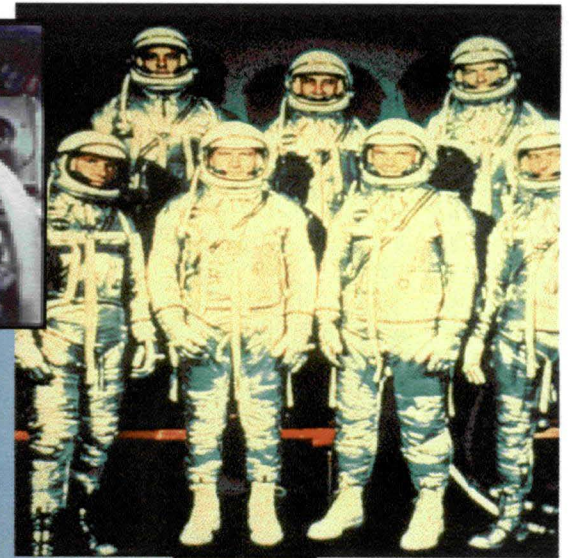
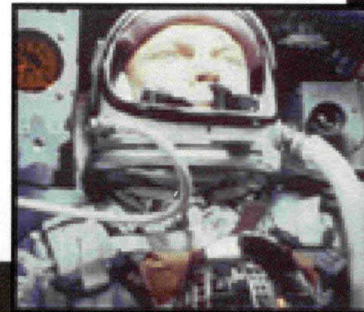
**January 31, 1961**

- **Chimp “Ham” launched on Mercury/Redstone**





Carpenter/Cooper/Glenn/Grissom/Schirra/Shepard/Slayton



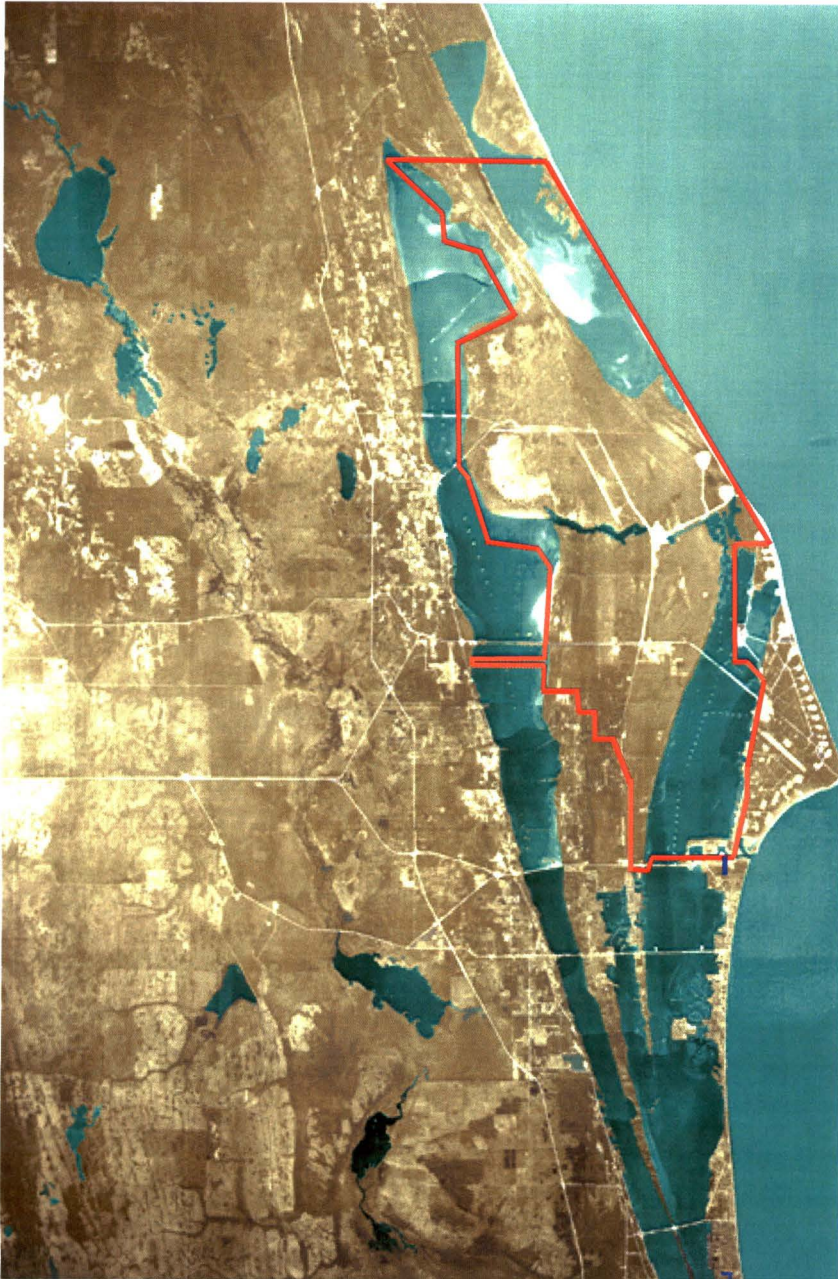
"I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth. No single space project in this period will be more impressive to mankind, or more important in the long-range exploration of space; and none will be so difficult or expensive to accomplish."

John F. Kennedy

Special Joint Session of Congress

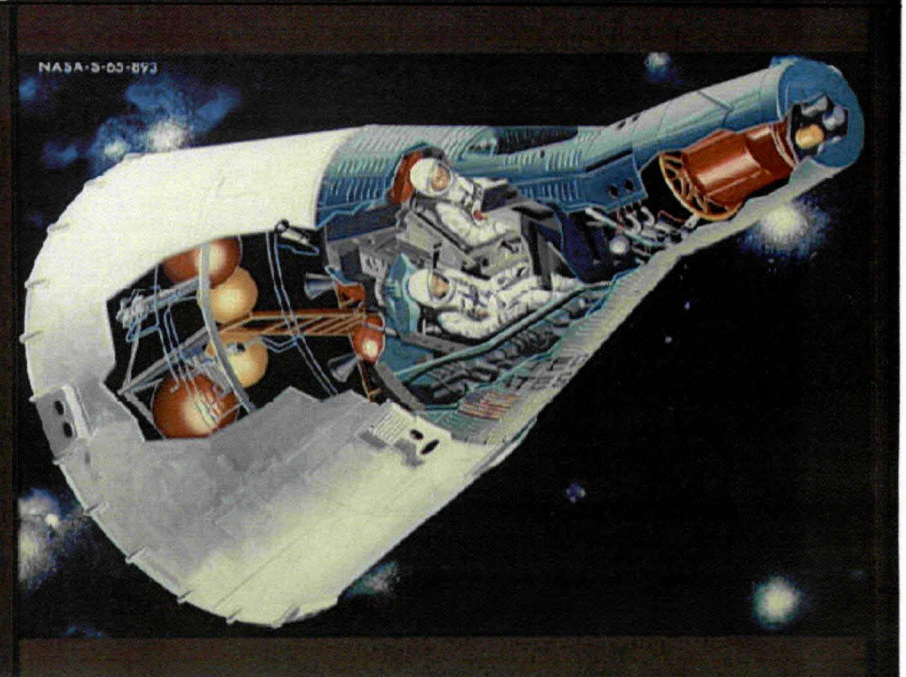
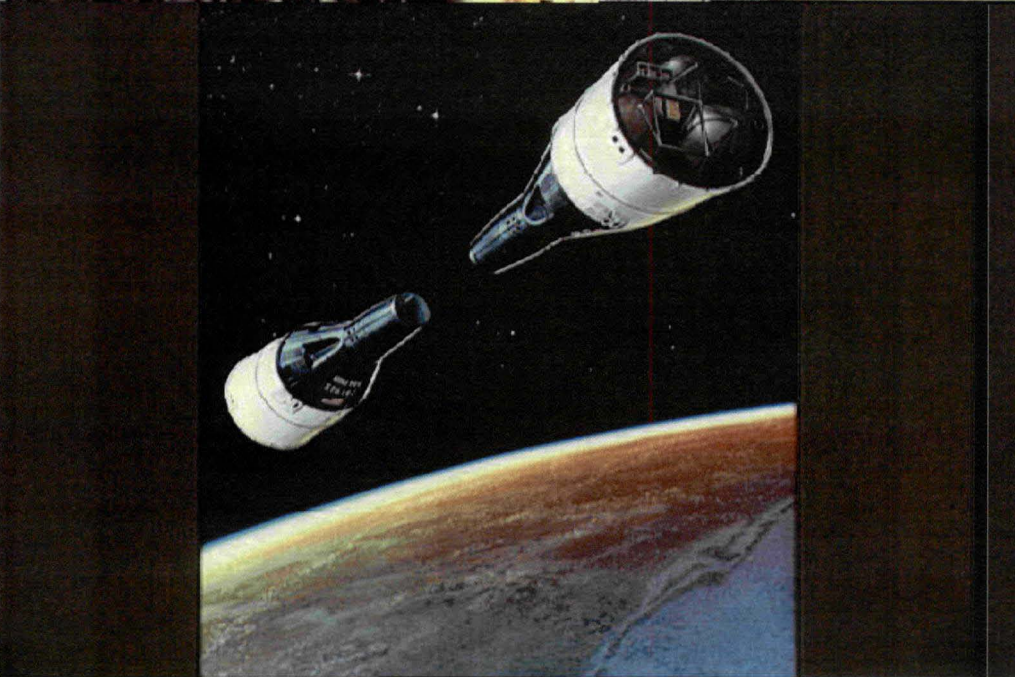
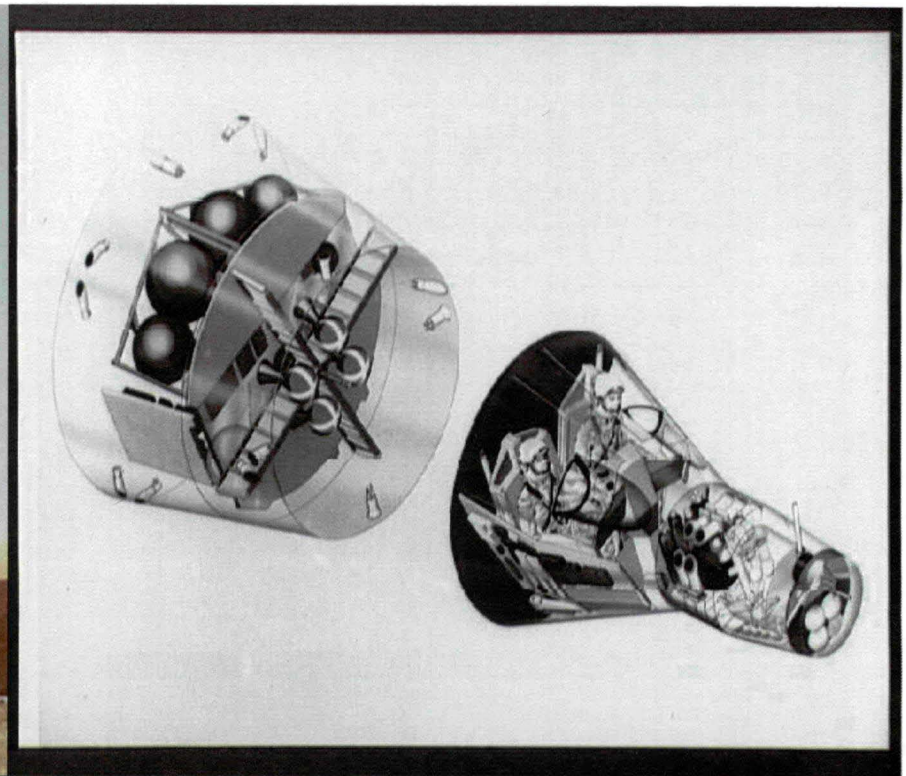
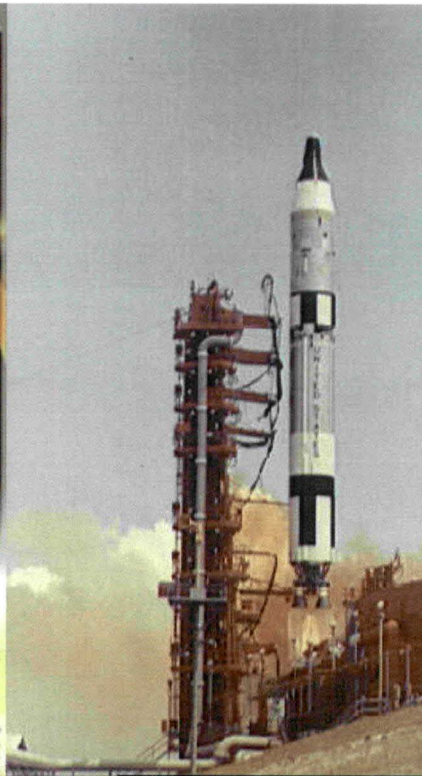
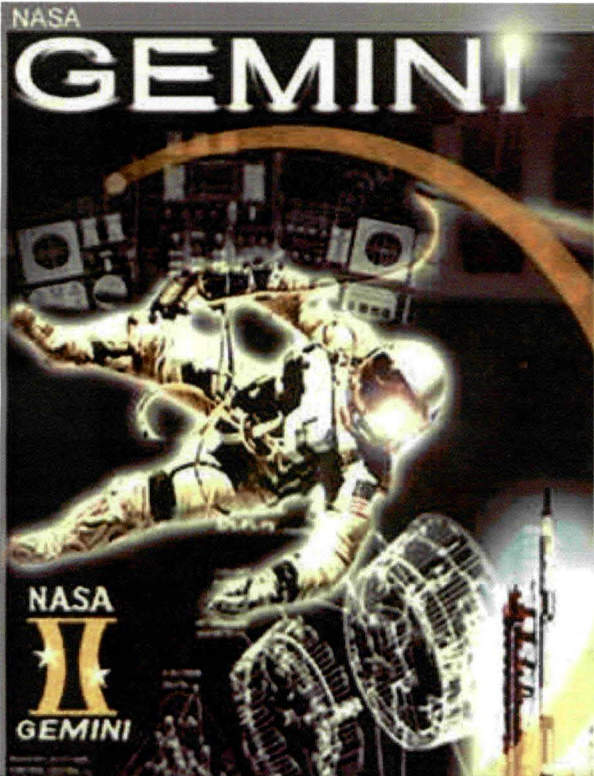
May 25, 1961





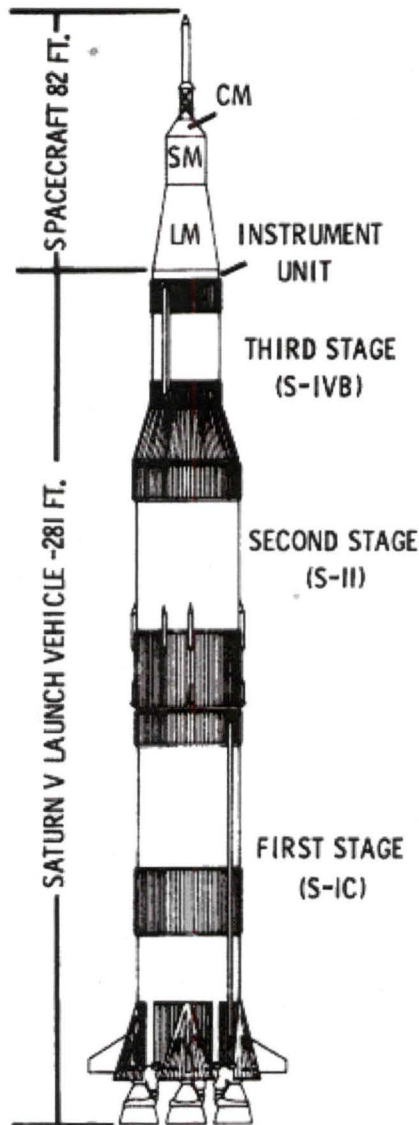
**1962**

- Property acquisition for NASA Launch Operations Center
- Also called Merritt Island Launch Area (MILA)
- Later named John F. Kennedy Space Center





# SATURN V LAUNCH VEHICLE



## FIRST STAGE (S-IC)

DIAMETER \_\_\_\_\_ 33 FEET  
 HEIGHT \_\_\_\_\_ 138 FEET  
 WEIGHT \_\_\_\_\_ 5,031,023 LBS. FUELED  
 294,200 LBS. DRY  
 ENGINES \_\_\_\_\_ FIVE F-1  
 PROPELLANTS \_\_\_\_\_ LIQUID OXYGEN (3,258,280  
 LBS.) RP-1 (KEROSENE) -  
 (1,417,334 LBS.)  
 THRUST \_\_\_\_\_ 7,680,982 LBS.

## SECOND STAGE (S-II)

DIAMETER \_\_\_\_\_ 33 FEET  
 HEIGHT \_\_\_\_\_ 81.5 FEET  
 WEIGHT \_\_\_\_\_ 1,074,590 LBS. FUELED  
 84,367 LBS. DRY  
 ENGINES \_\_\_\_\_ FIVE J-2  
 PROPELLANTS \_\_\_\_\_ LIQUID OXYGEN (829,114  
 LBS.) LIQUID HYDROGEN  
 (158,231 LBS.)  
 THRUST \_\_\_\_\_ 1,163,854 LBS.  
 INTERSTAGE \_\_\_\_\_ 8,890 LBS.

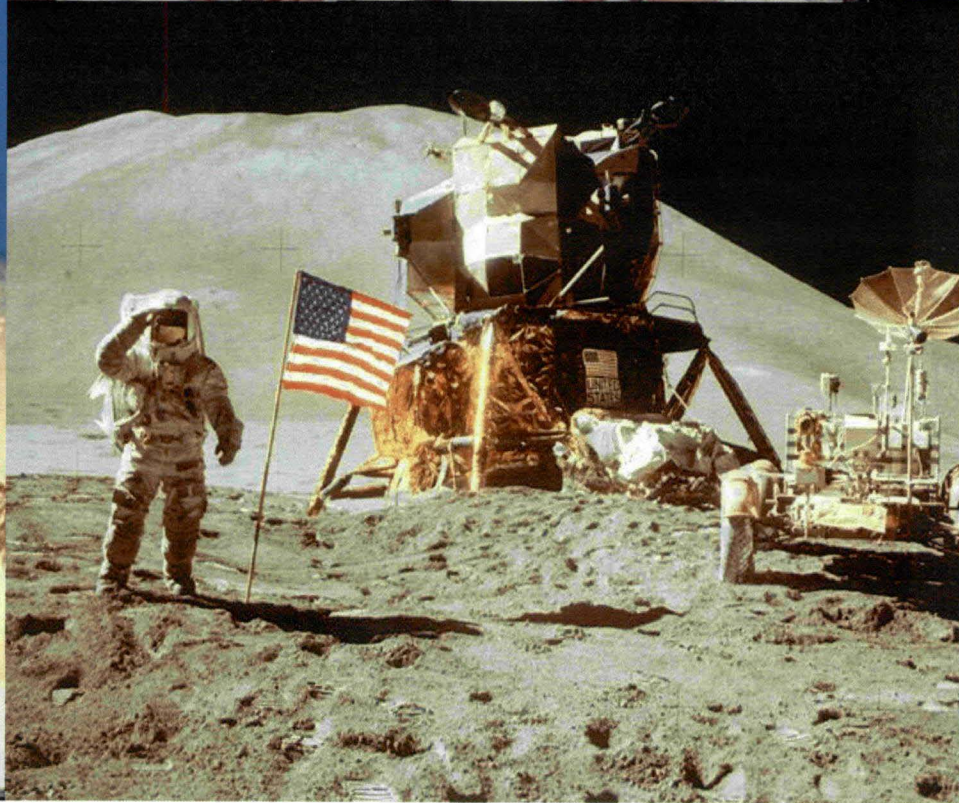
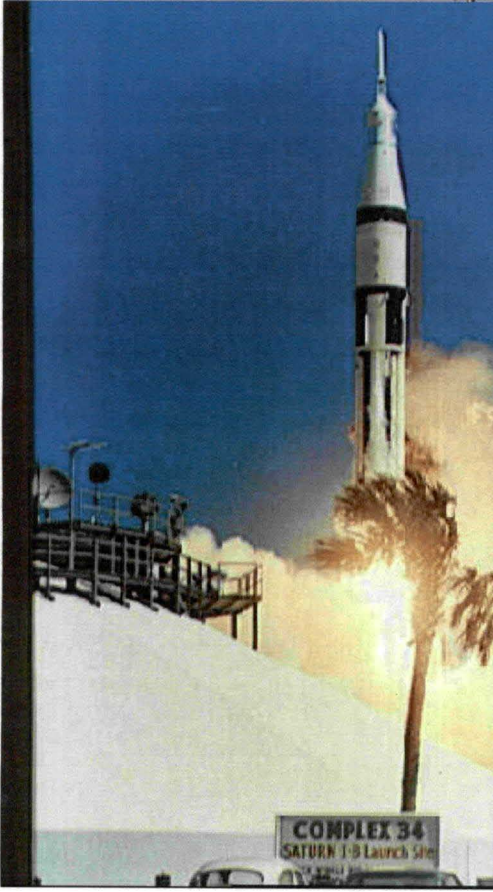
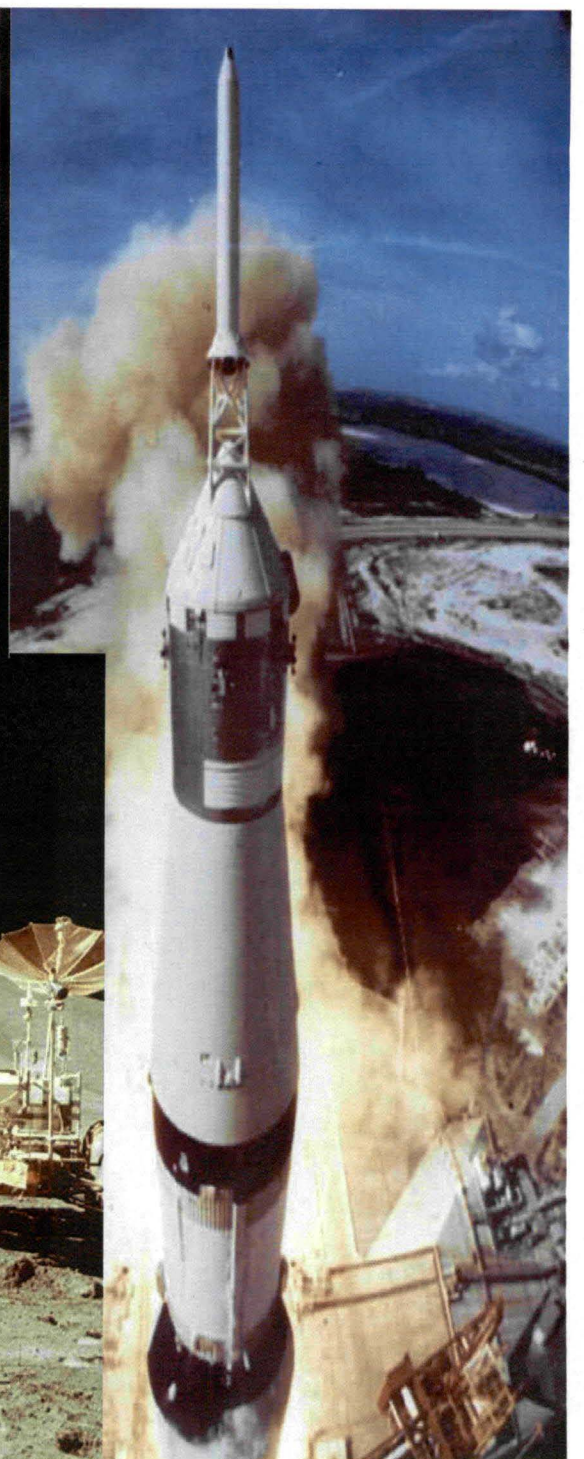
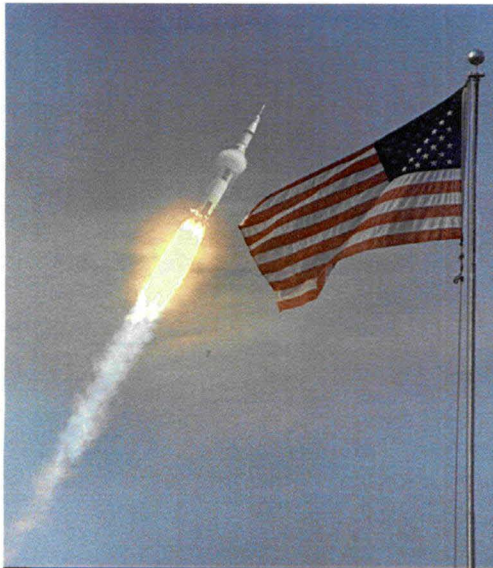
## THIRD STAGE (S-IVB)

DIAMETER \_\_\_\_\_ 21.7 FEET  
 HEIGHT \_\_\_\_\_ 58.3 FEET.  
 WEIGHT \_\_\_\_\_ 261,836 LBS. FUELED  
 25,750 LBS. DRY  
 ENGINES \_\_\_\_\_ ONE J-2  
 PROPELLANTS \_\_\_\_\_ LIQUID OXYGEN (190,785  
 LBS.) LIQUID HYDROGEN  
 (43,452 LBS.)  
 THRUST \_\_\_\_\_ 203,615 LBS.  
 INTERSTAGE \_\_\_\_\_ 8,081 LBS.

## INSTRUMENT UNIT

DIAMETER \_\_\_\_\_ 21.7 FEET  
 HEIGHT \_\_\_\_\_ 3 FEET  
 WEIGHT \_\_\_\_\_ 4,254 LBS.

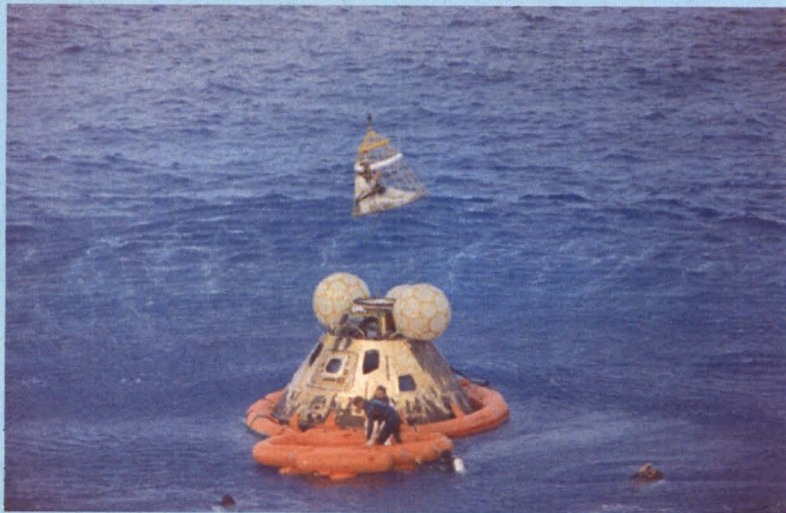
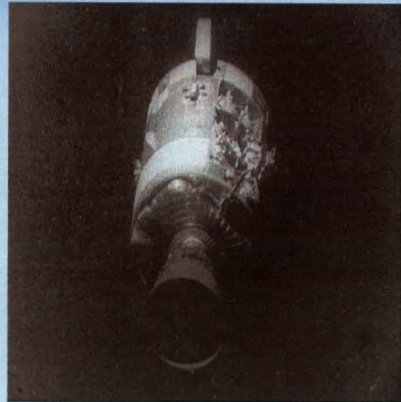
NOTE: WEIGHTS AND MEASURES GIVEN ABOVE ARE FOR THE NOMINAL VEHICLE CONFIGURATION FOR APOLLO 10. THE FIGURES MAY VARY SLIGHTLY DUE TO CHANGES BEFORE LAUNCH TO MEET CHANGING CONDITIONS.



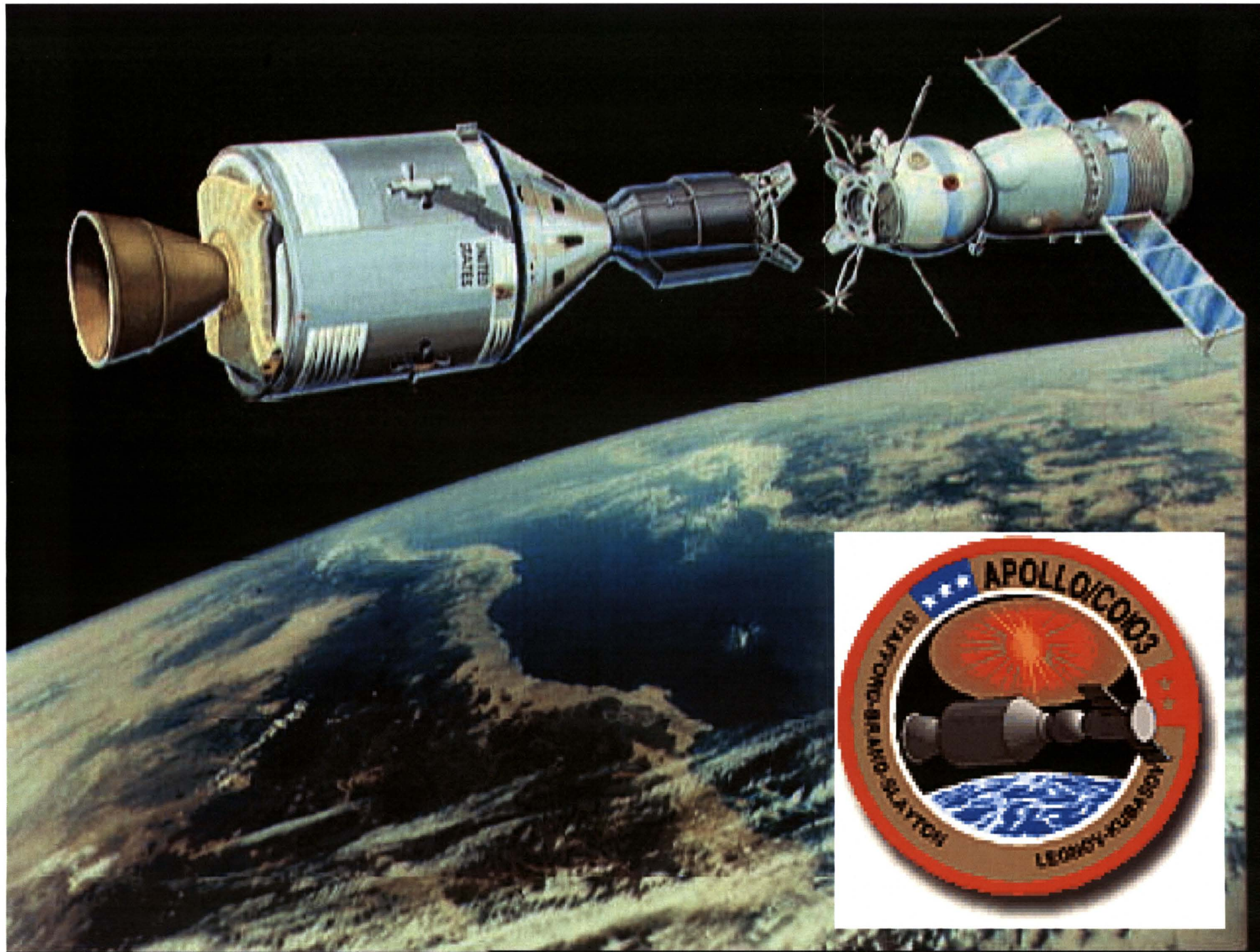
# Apollo 1 Fire

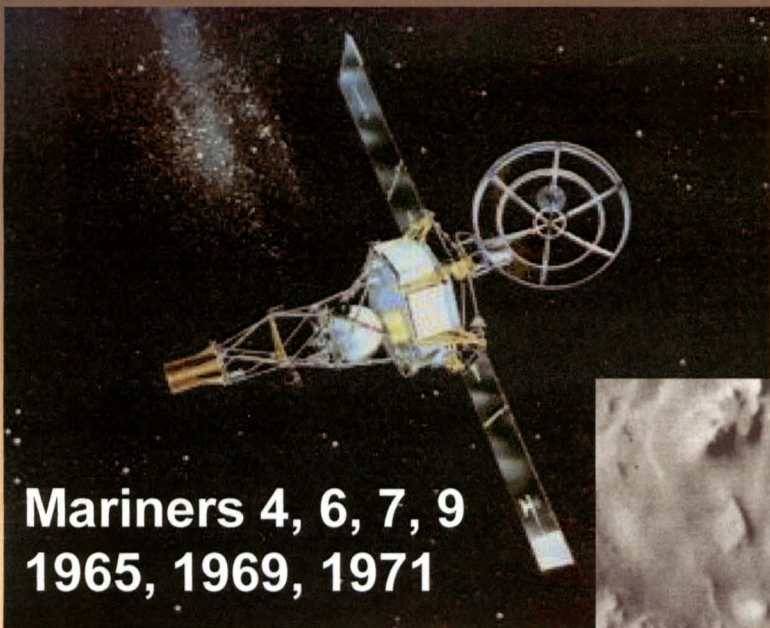


# Apollo 13

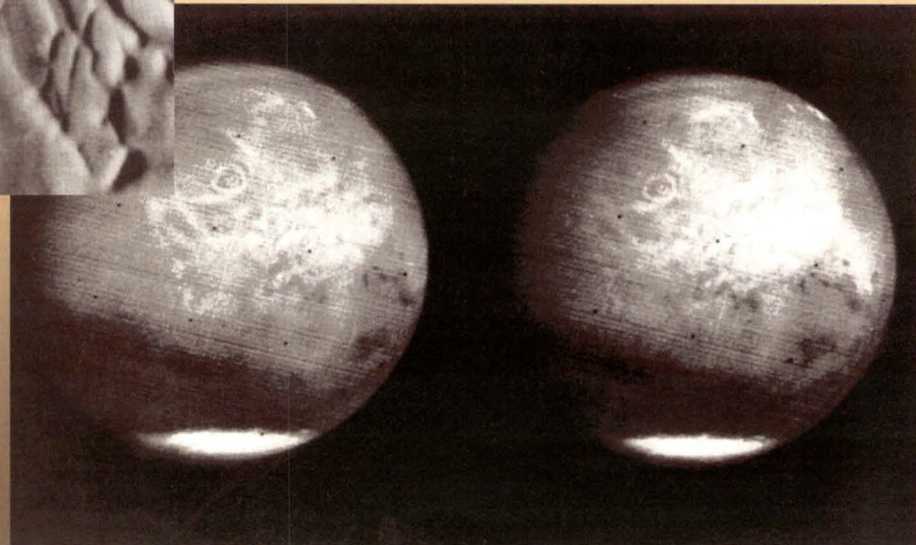
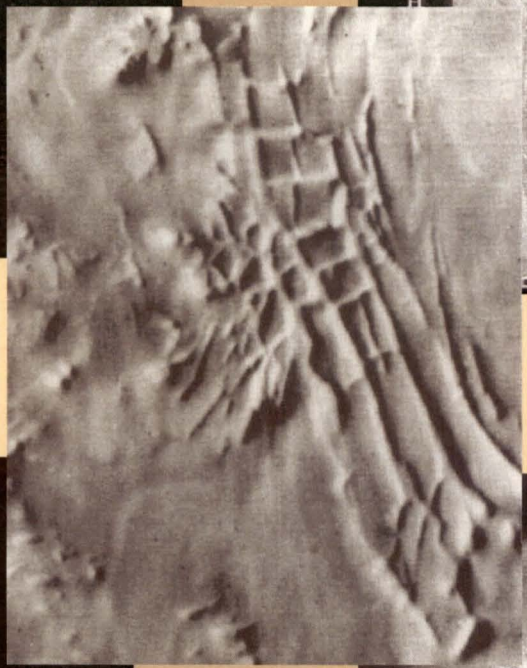


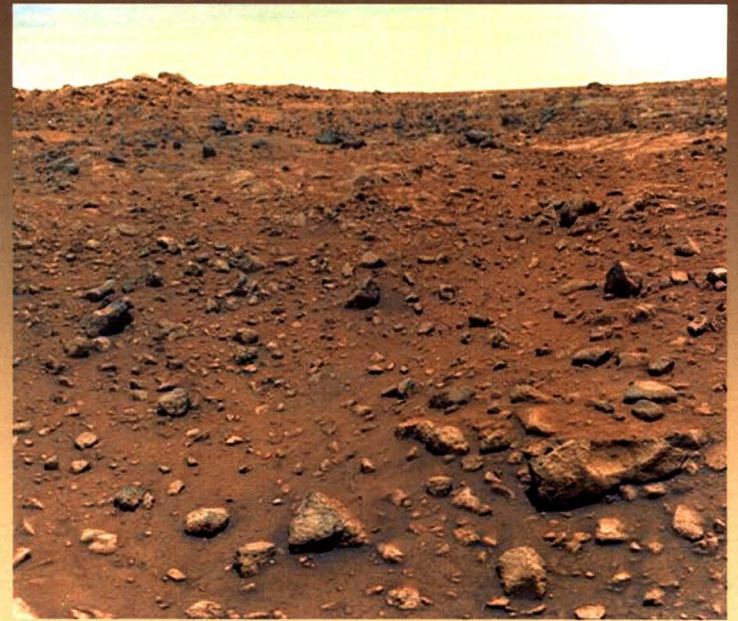




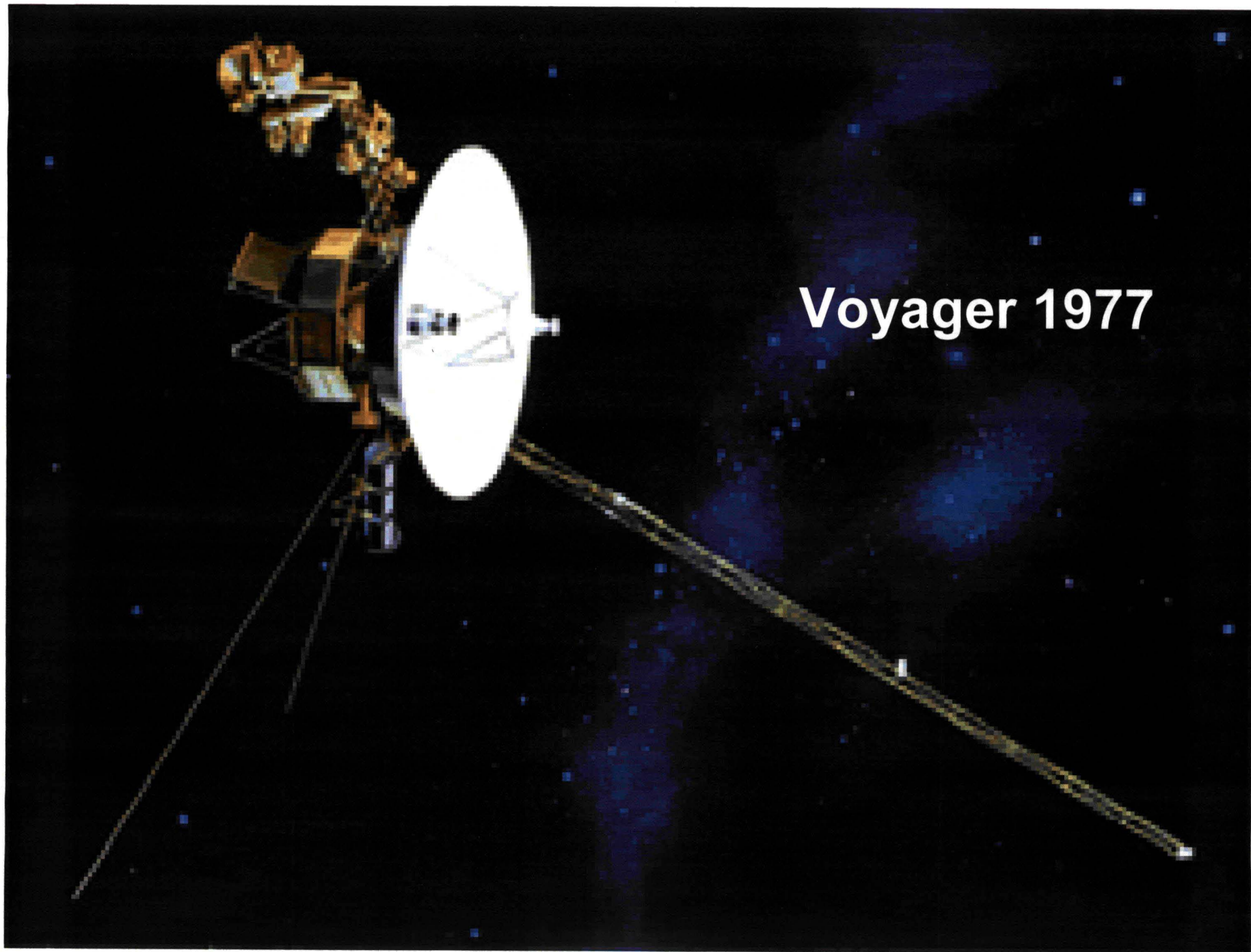


**Mariners 4, 6, 7, 9  
1965, 1969, 1971**

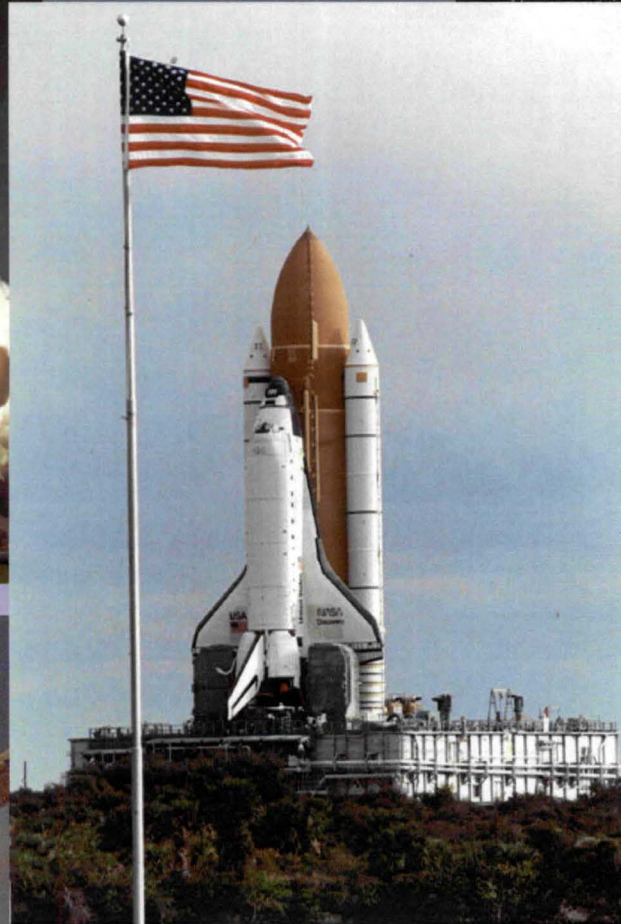
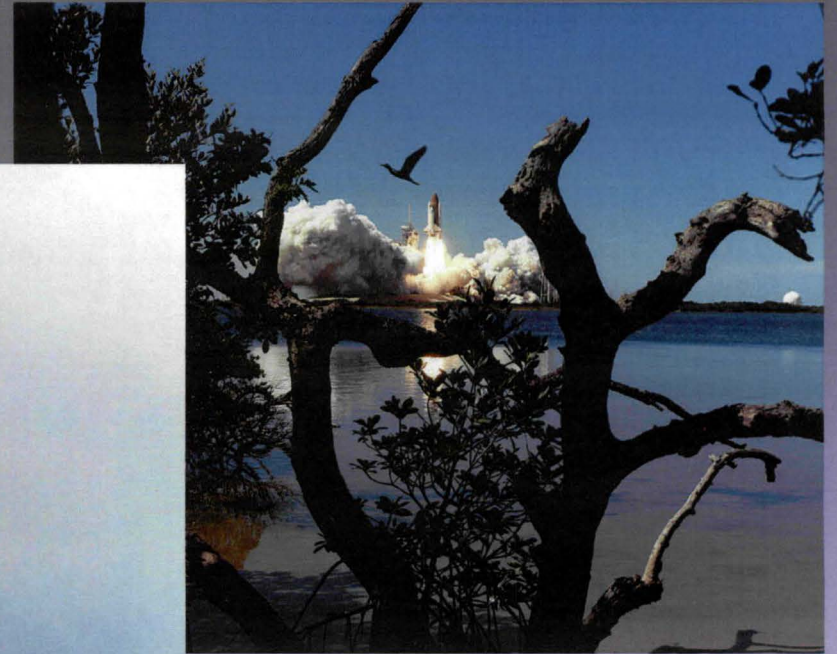


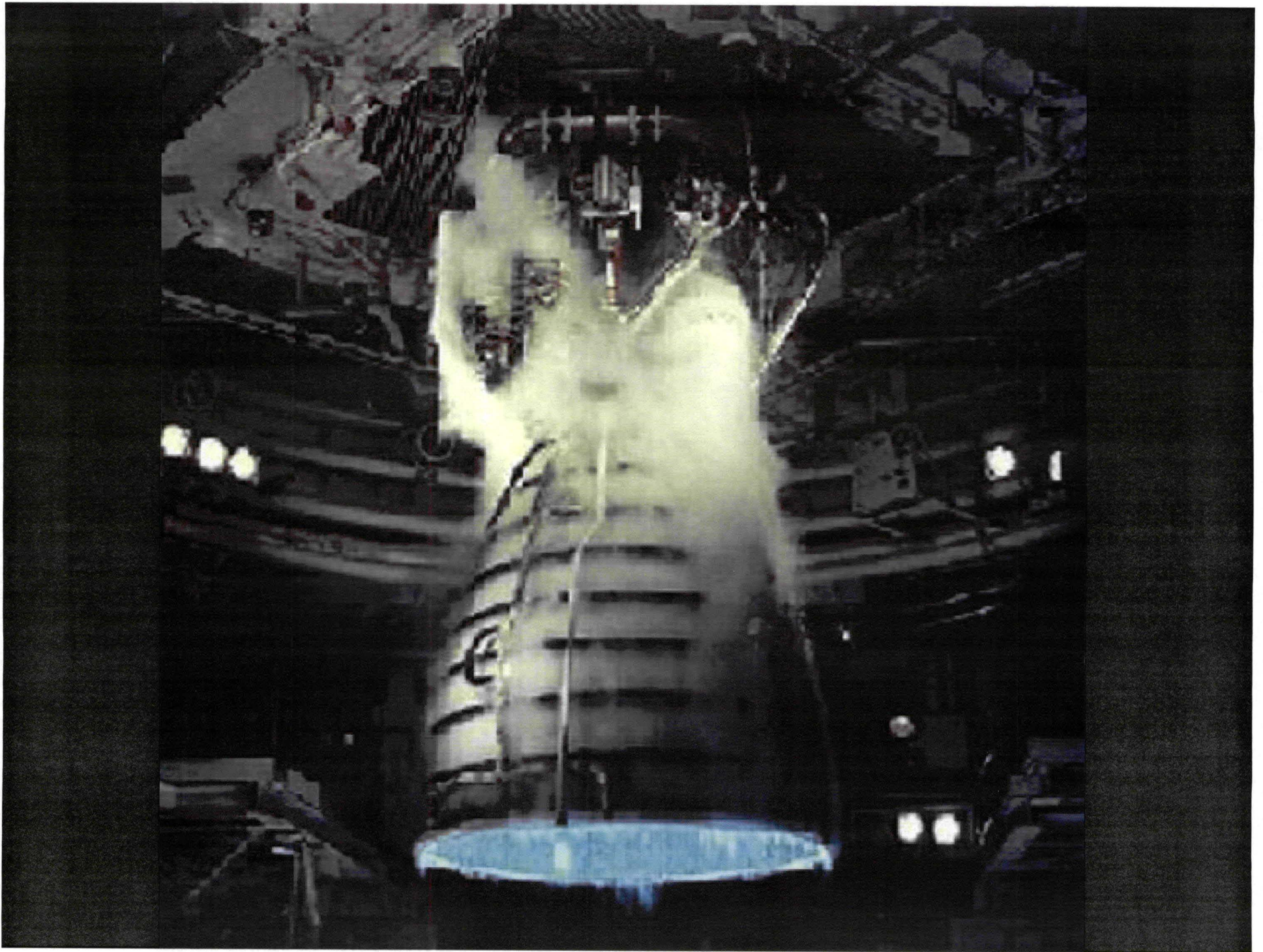


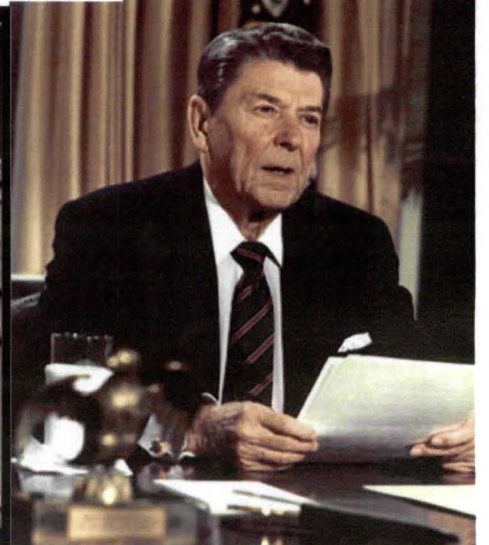
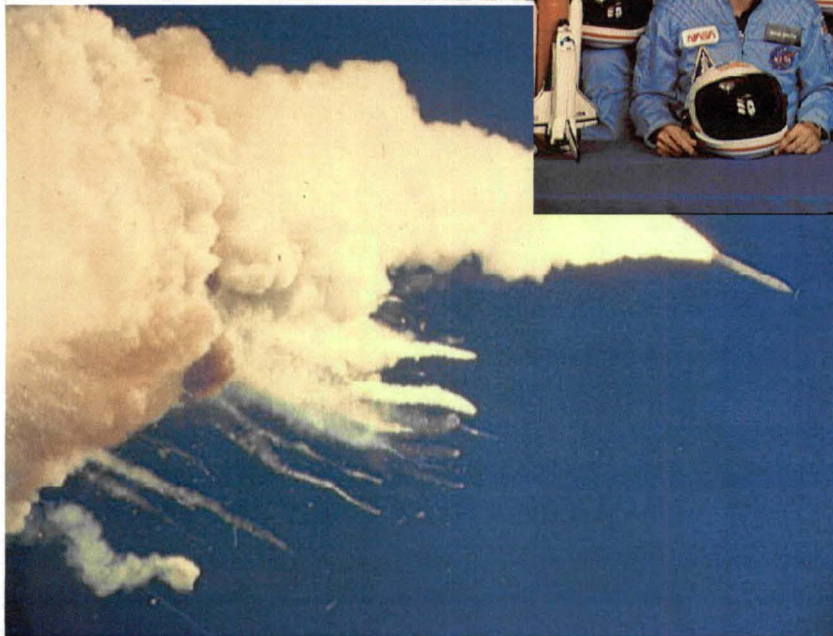
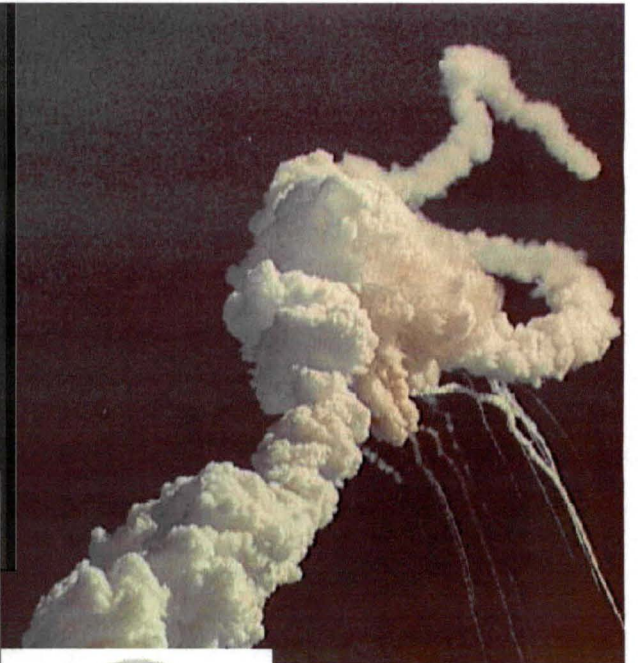
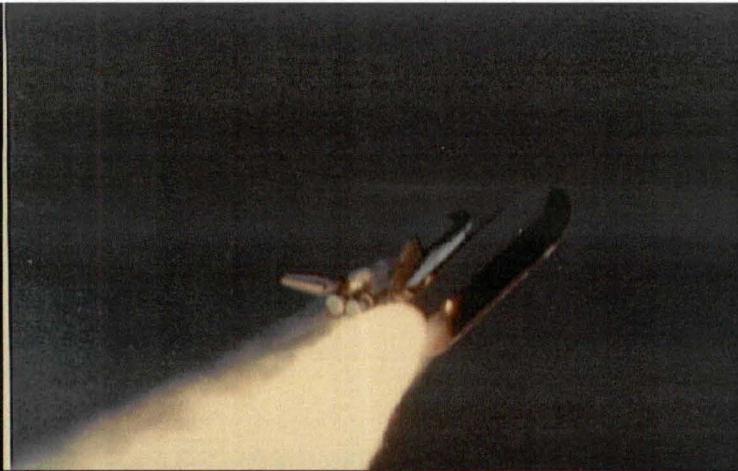
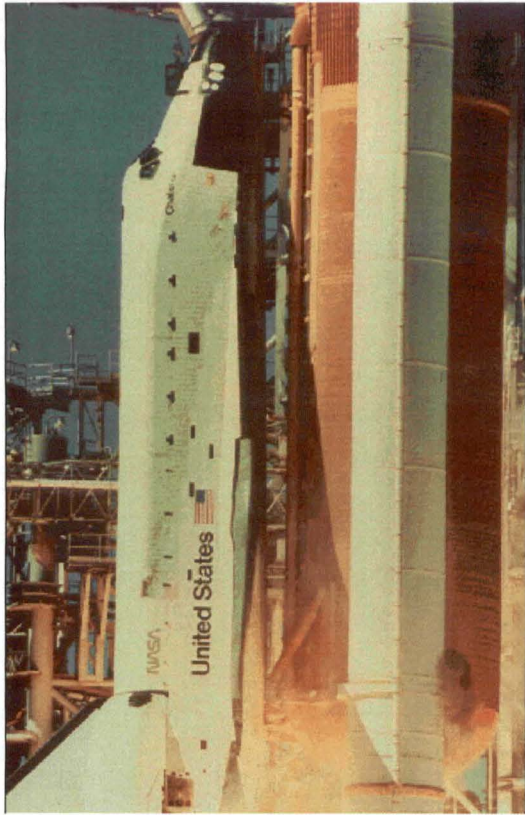




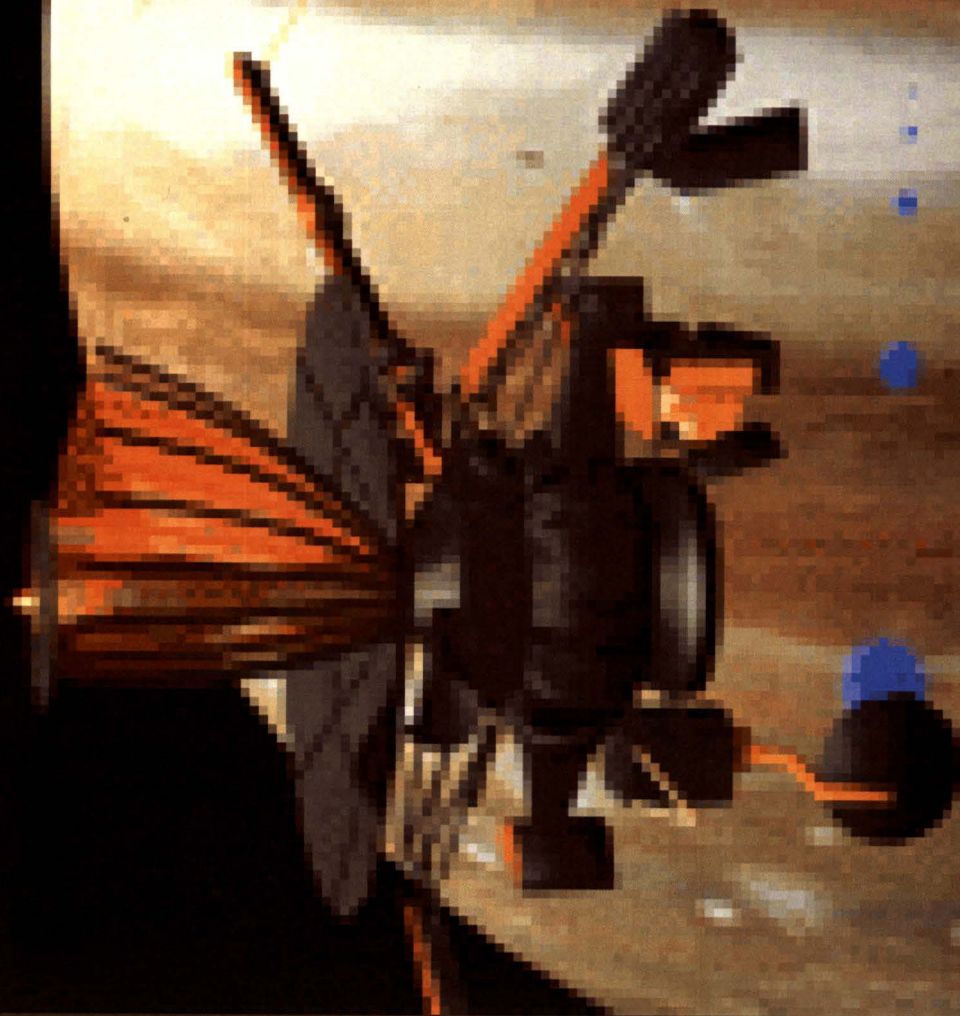
Voyager 1977

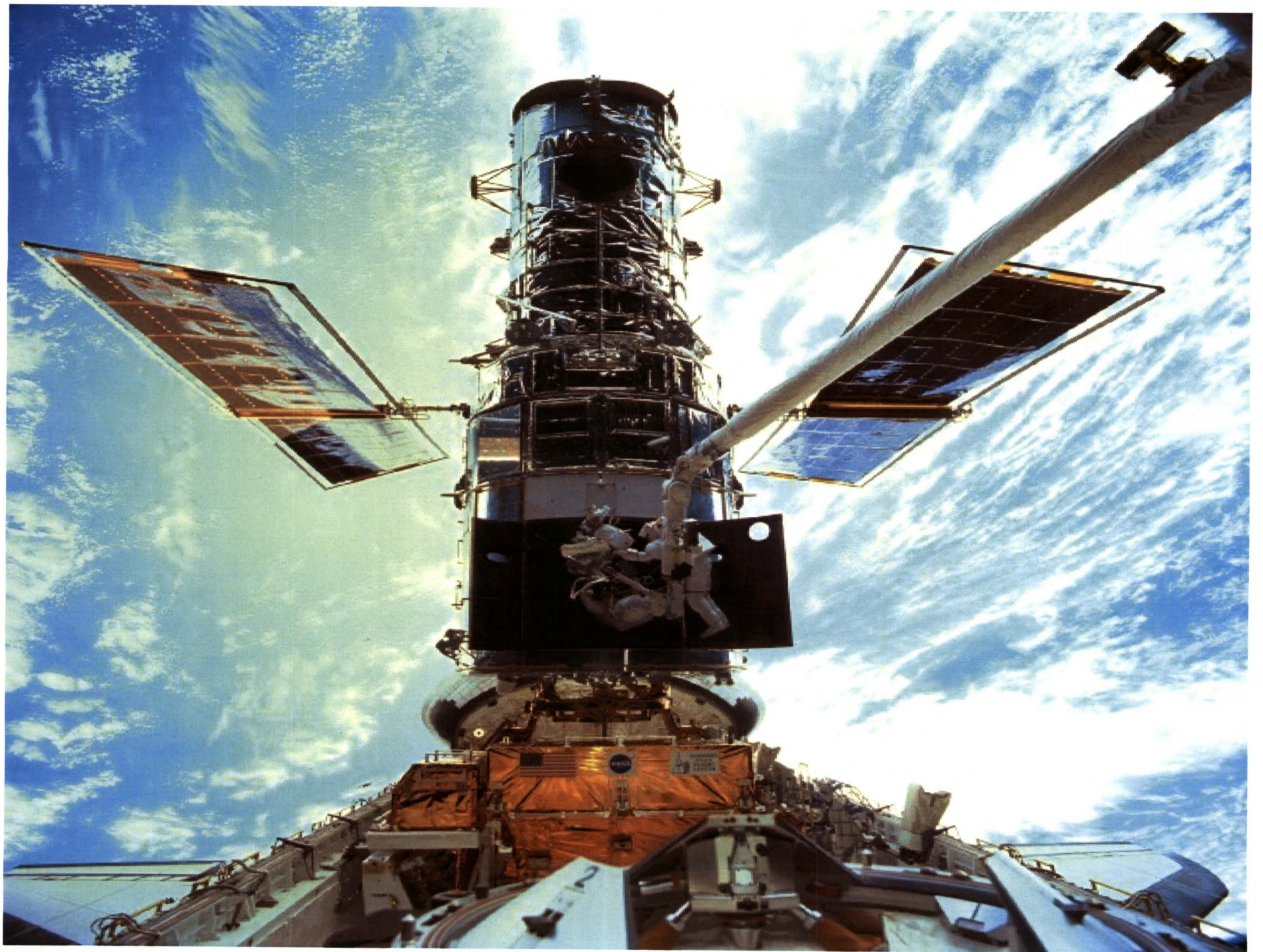




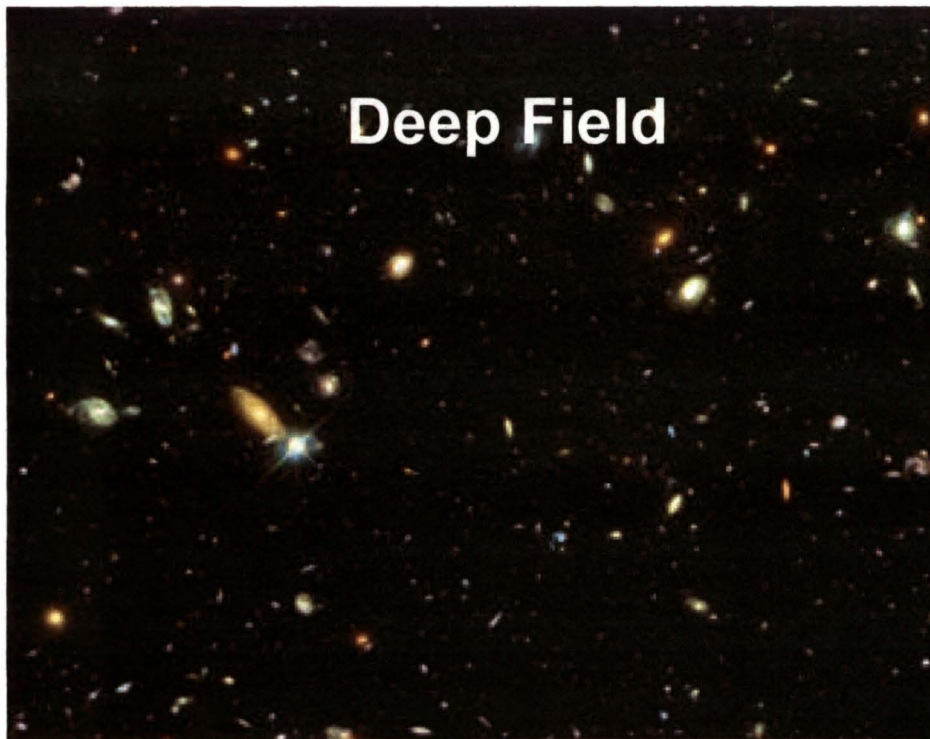


**Galileo 1989**

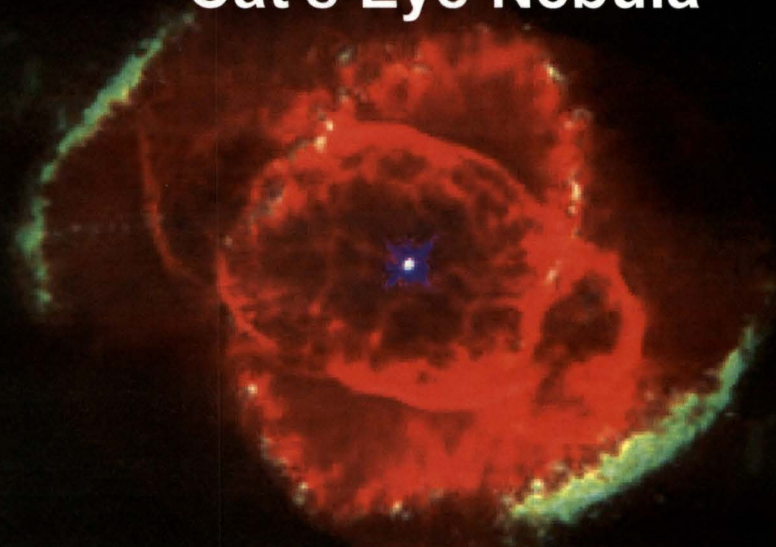




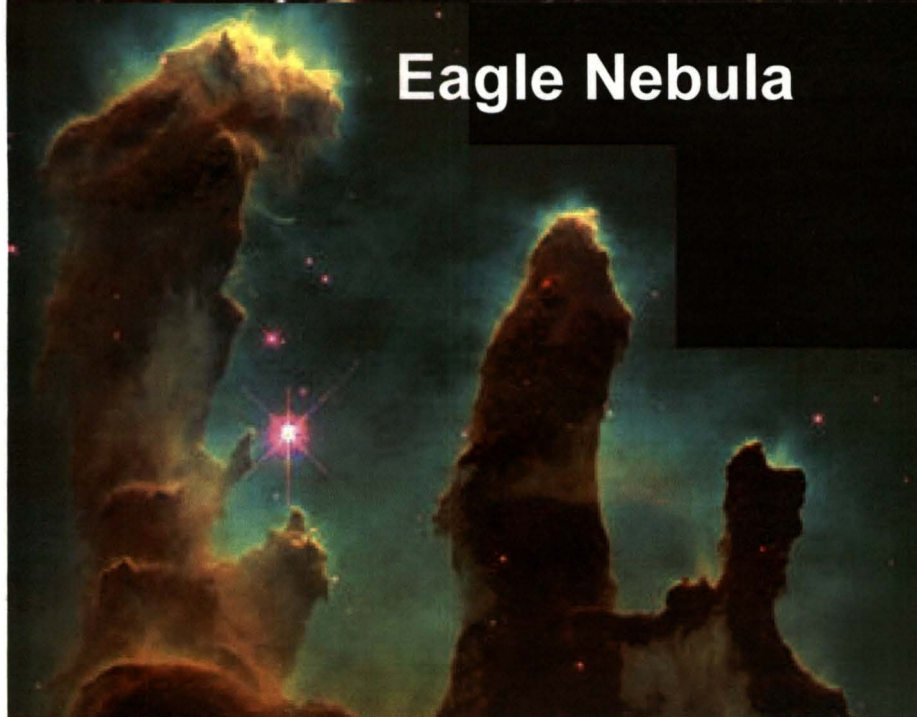
**Deep Field**



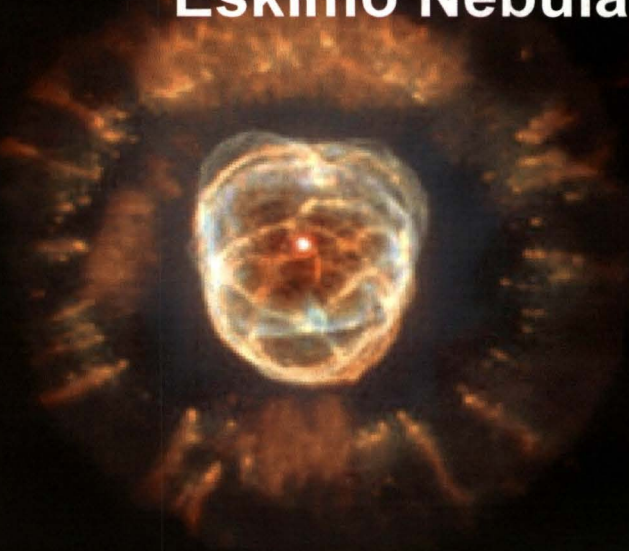
**Cat's Eye Nebula**



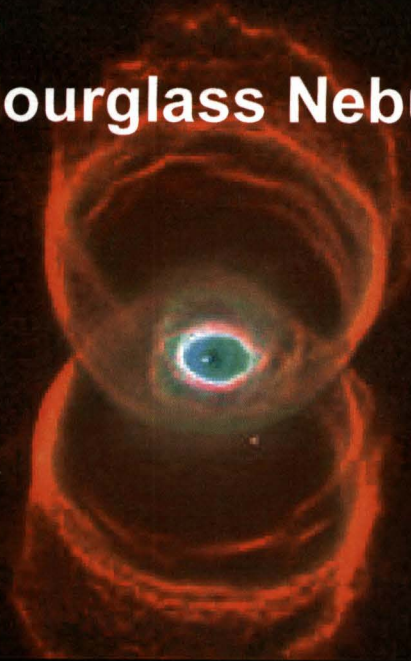
**Eagle Nebula**



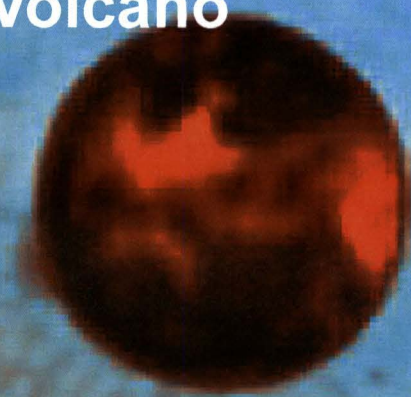
**Eskimo Nebula**



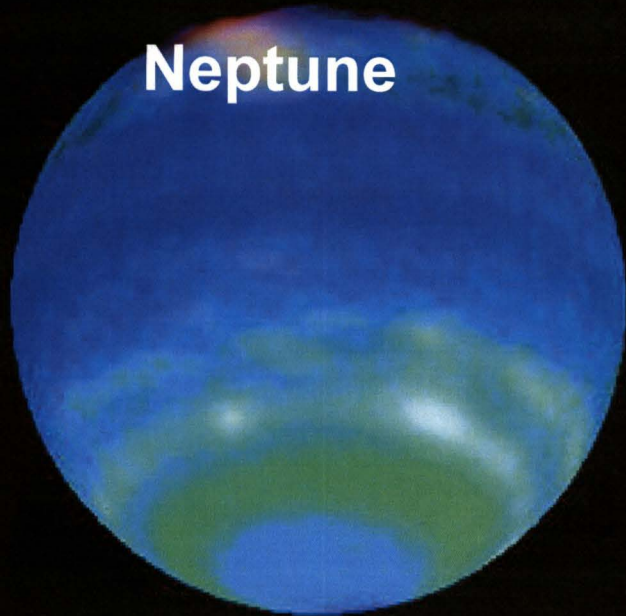
**Hourglass Nebula**



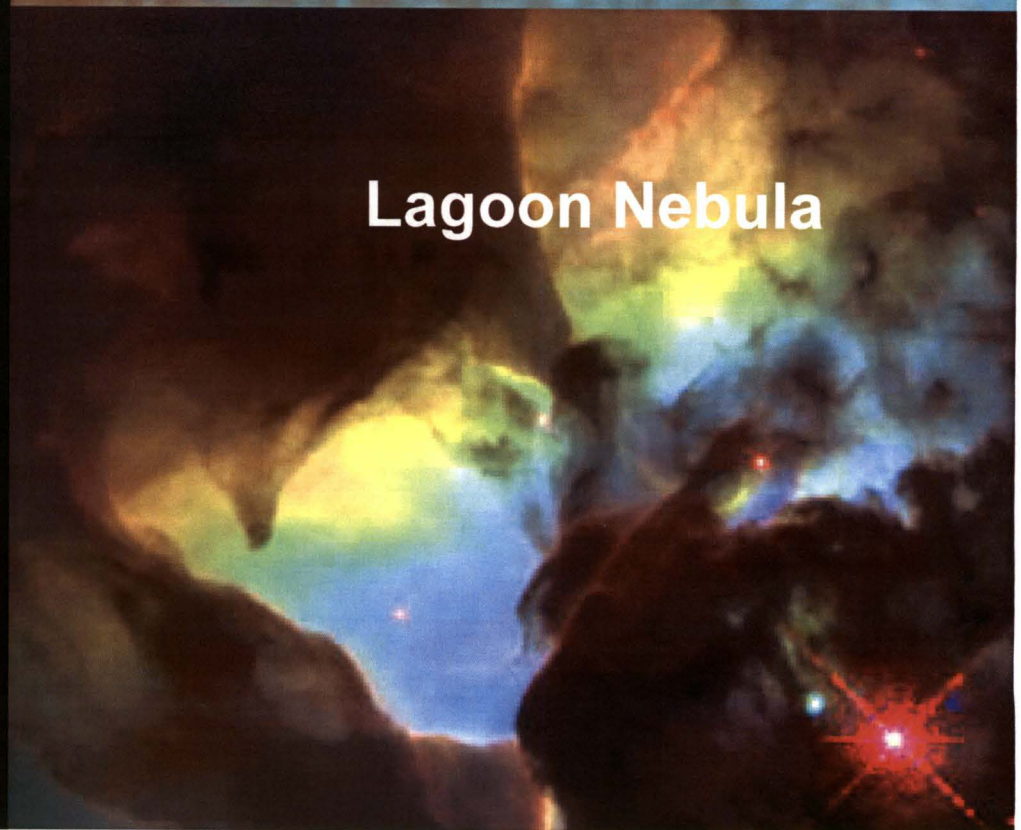
**Io Volcano**



**Neptune**



**Lagoon Nebula**

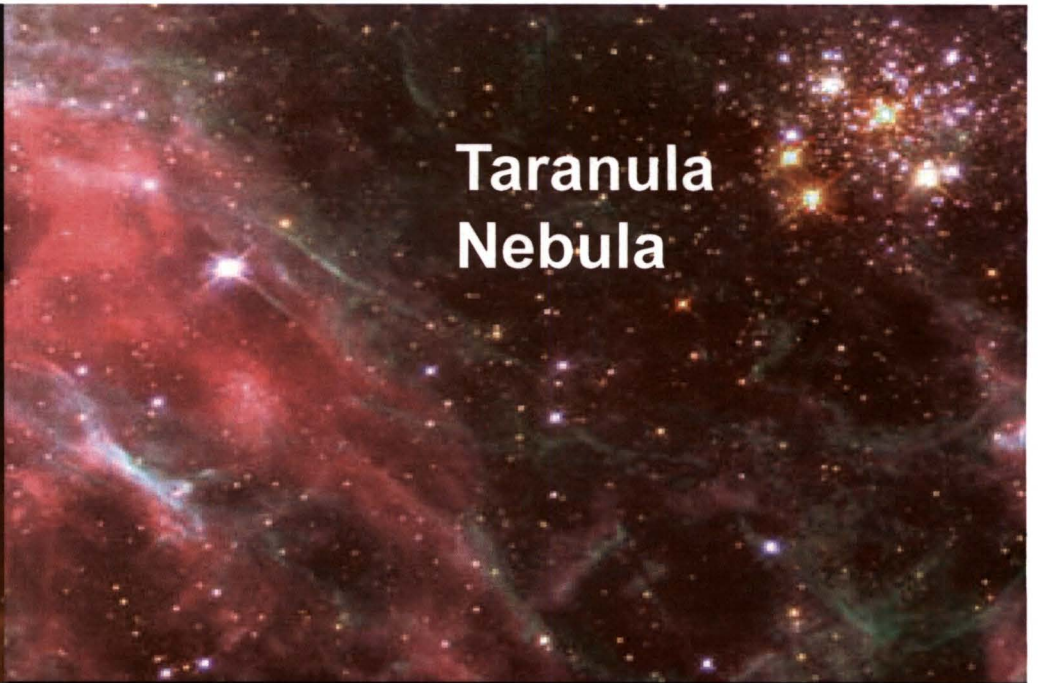




**Young Star Cluster**



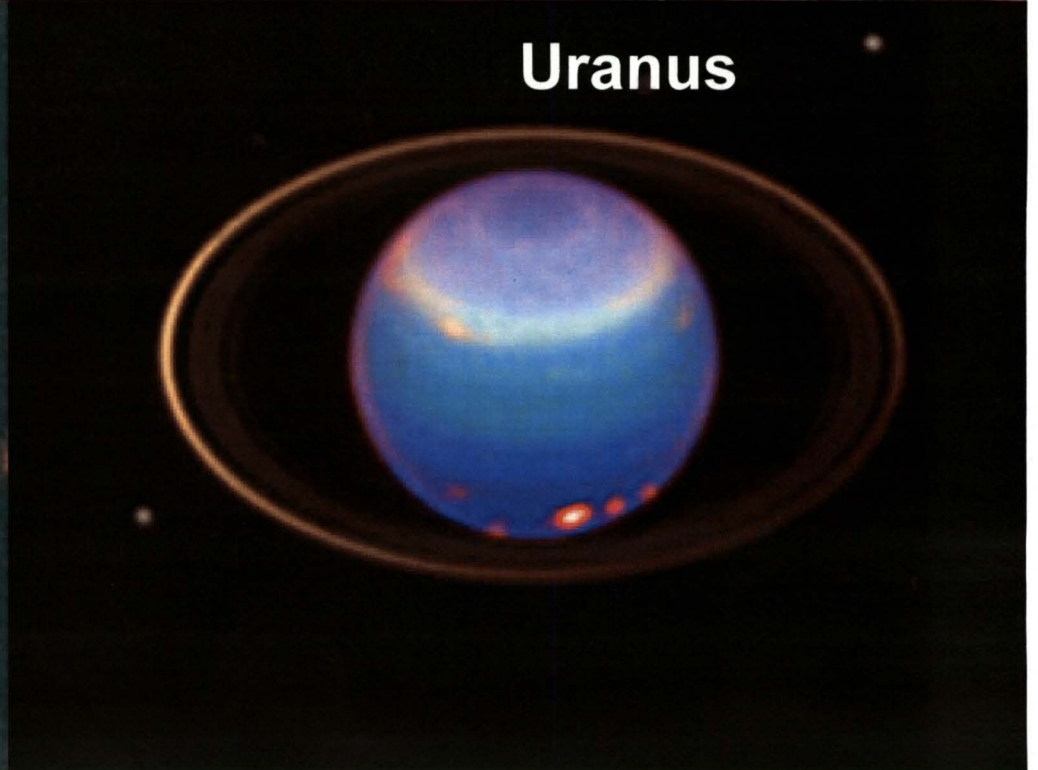
**Taranula Nebula**



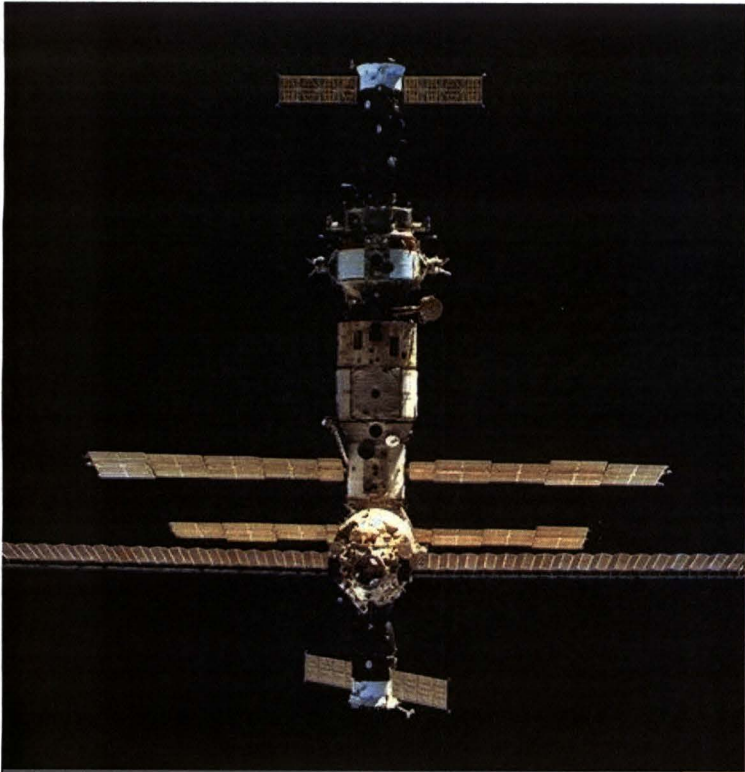
**Stellar Jet**

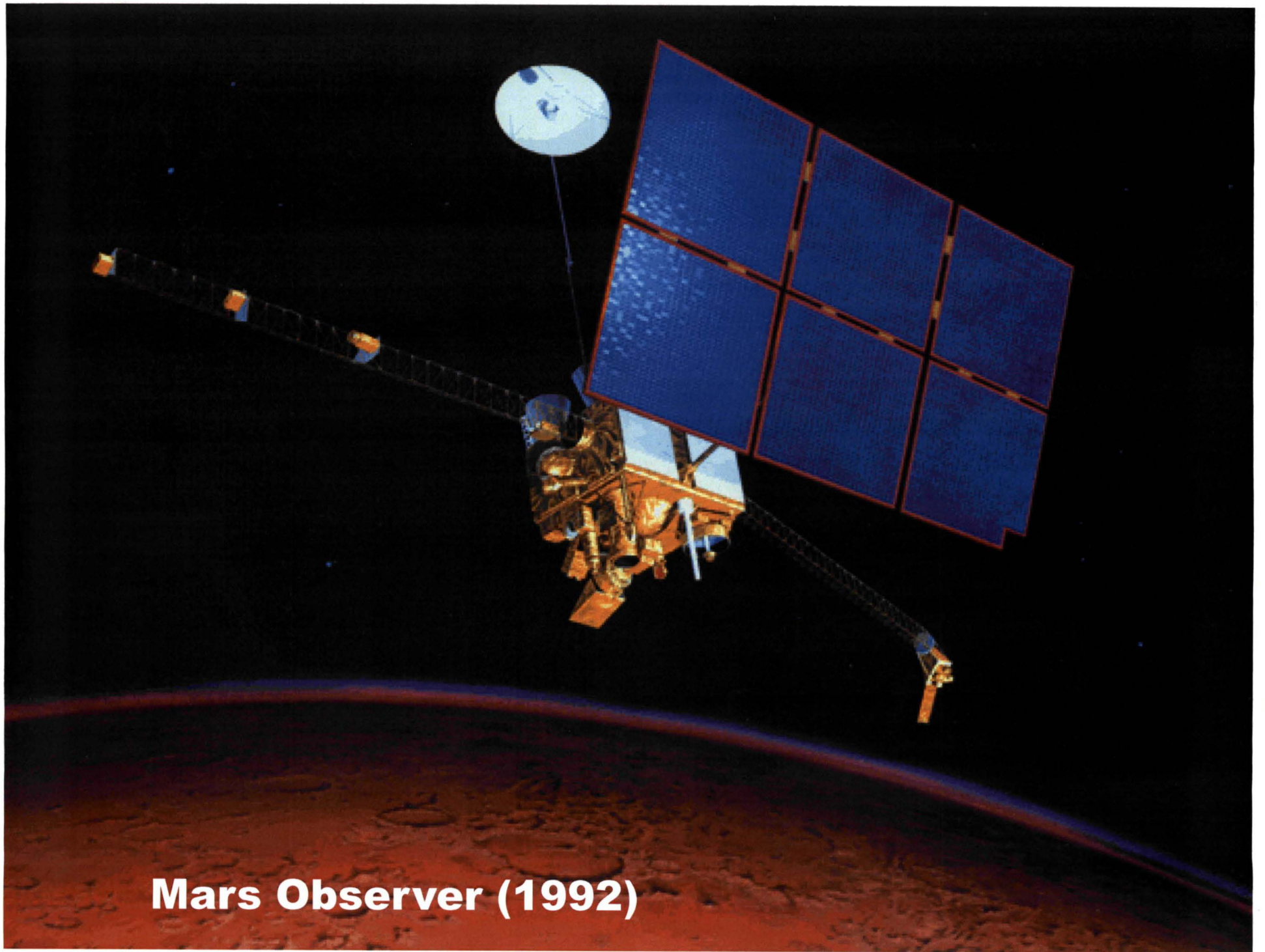


**Uranus**

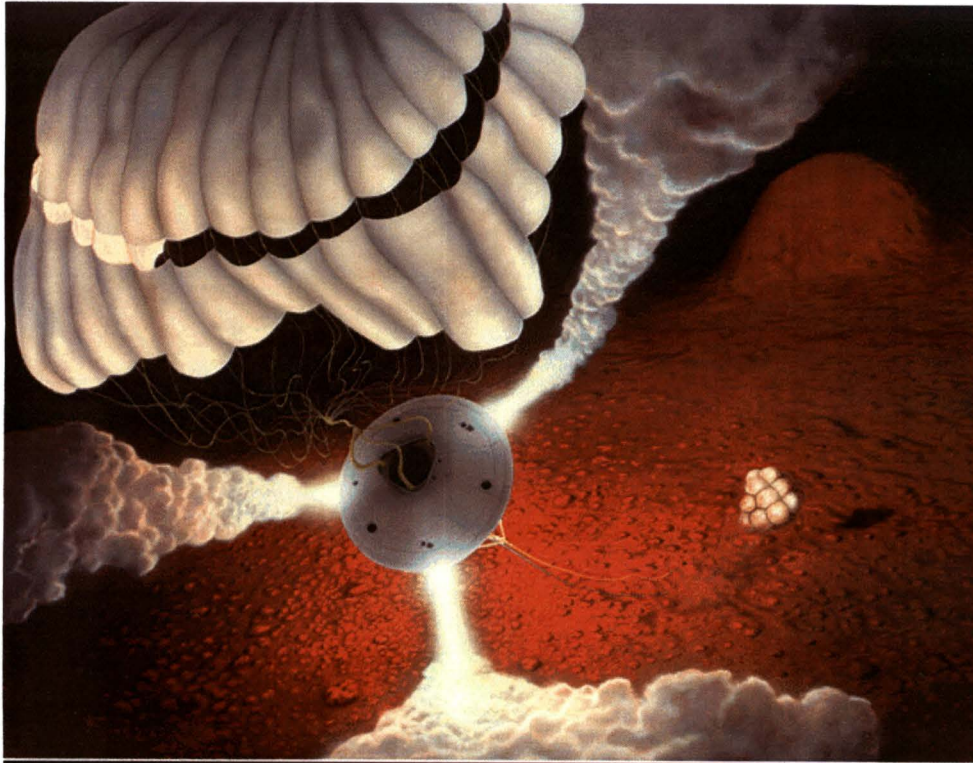


# Mir Space Station



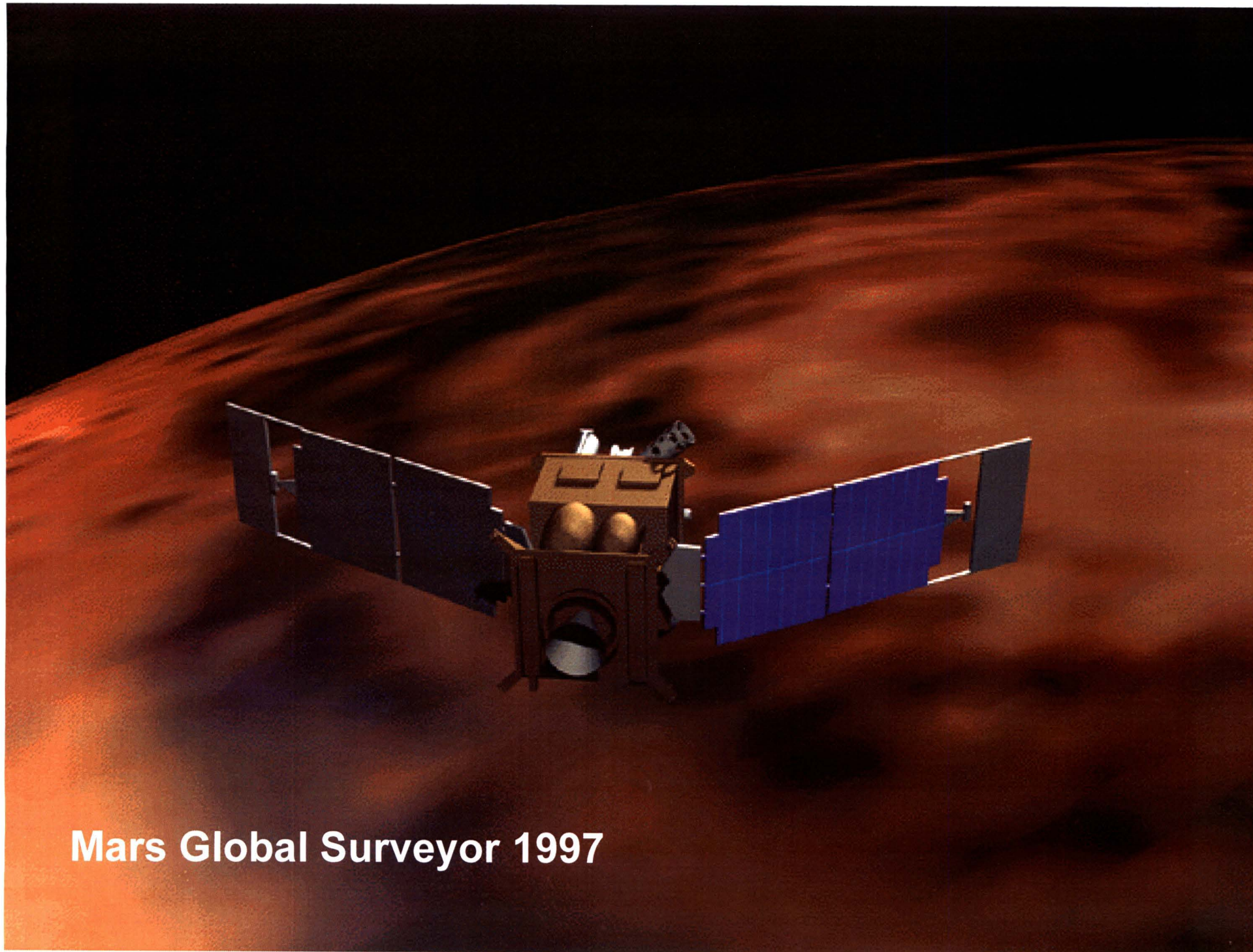


**Mars Observer (1992)**

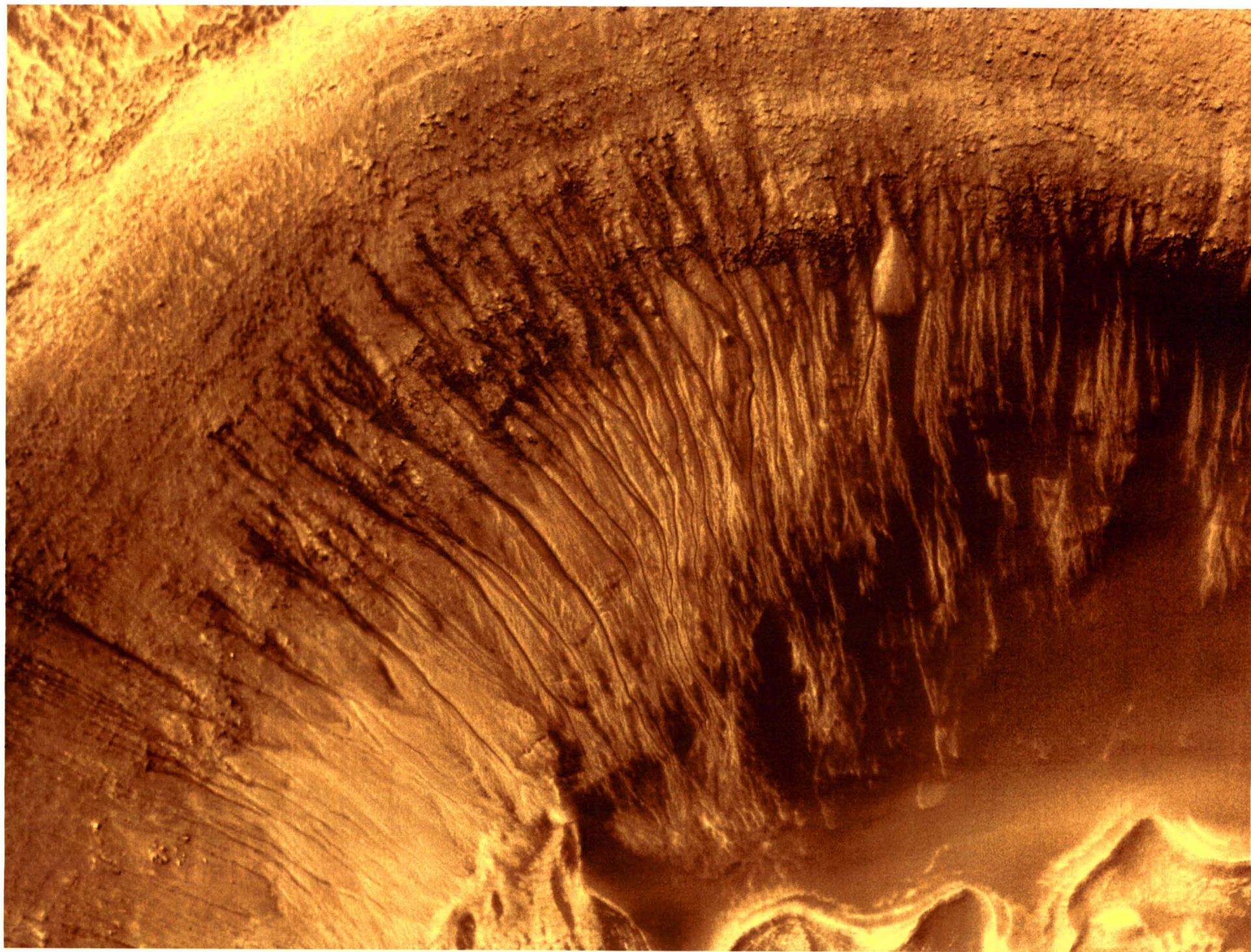


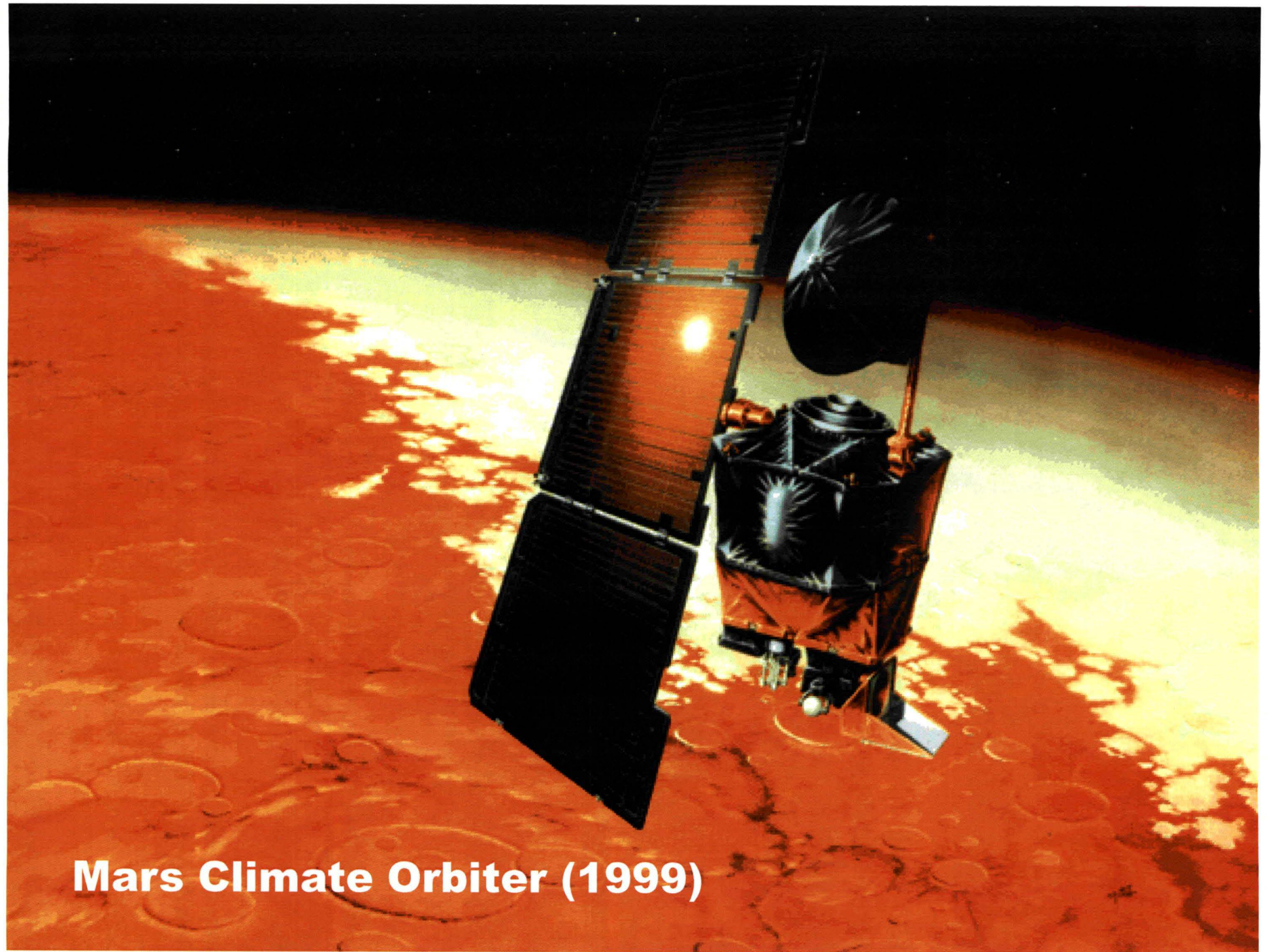
Mars Pathfinder (1997)





**Mars Global Surveyor 1997**

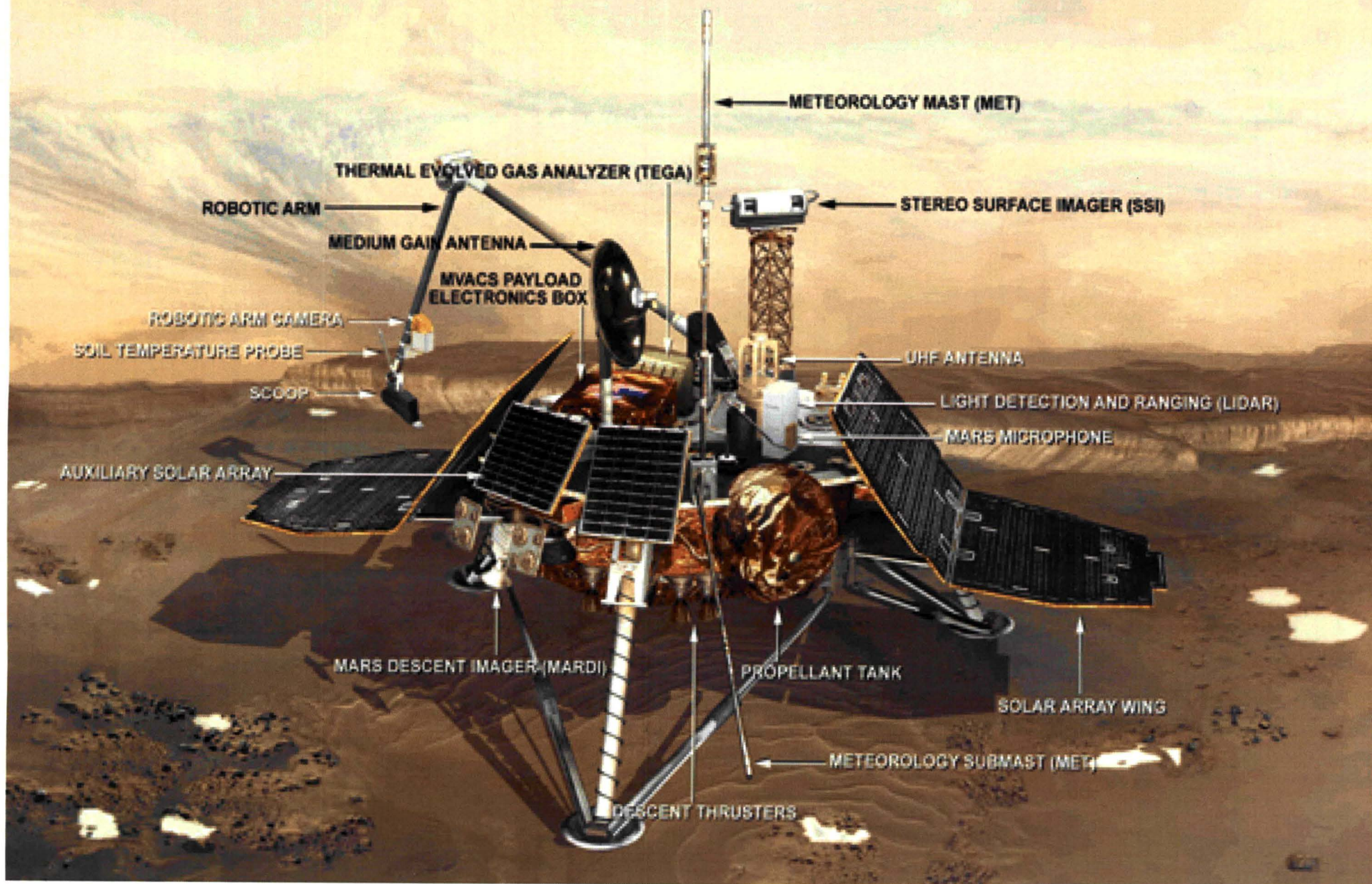




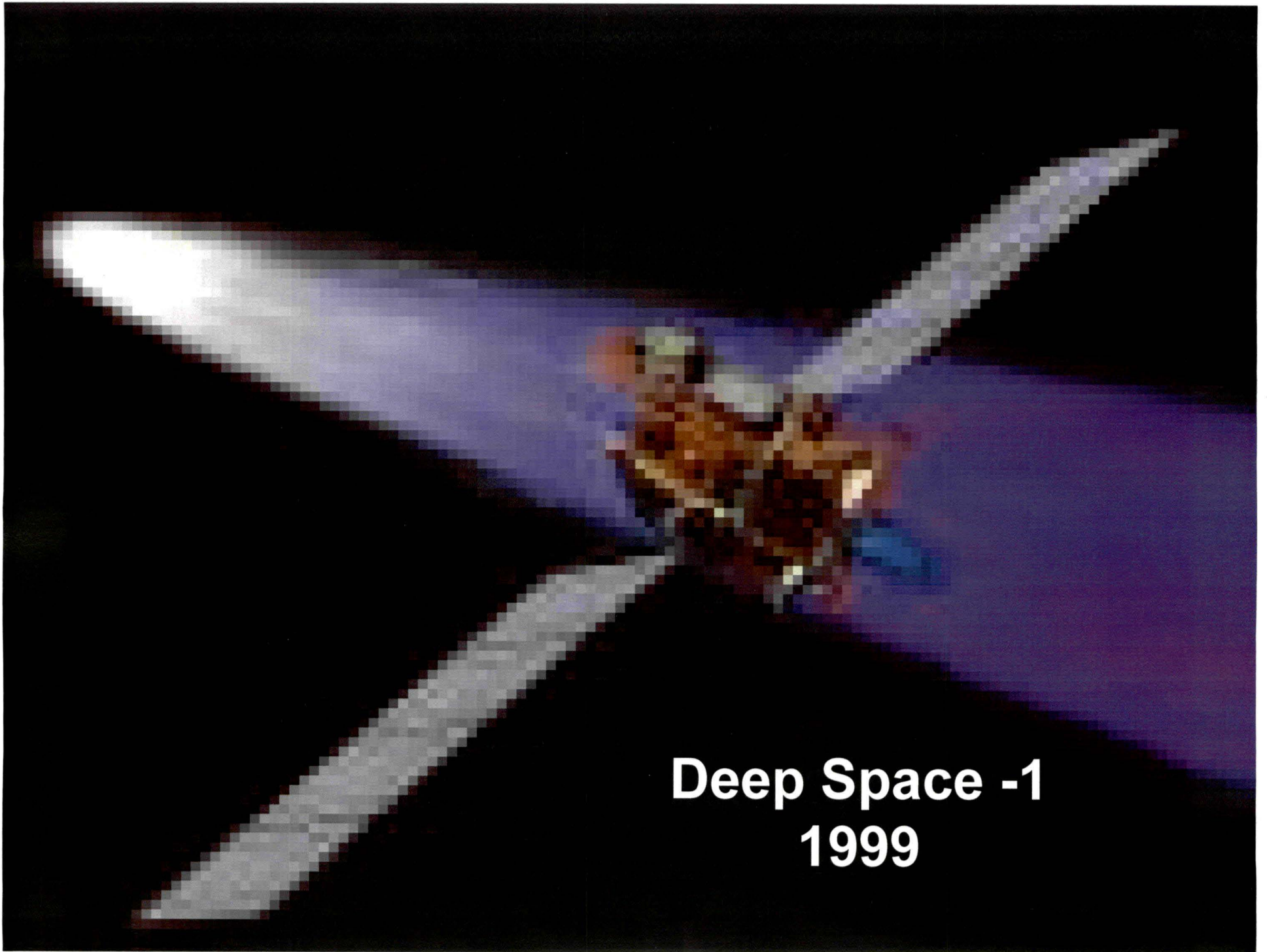
**Mars Climate Orbiter (1999)**

# MARS POLAR LANDER: AN EXPEDITION TO THE SOUTH POLAR REGION

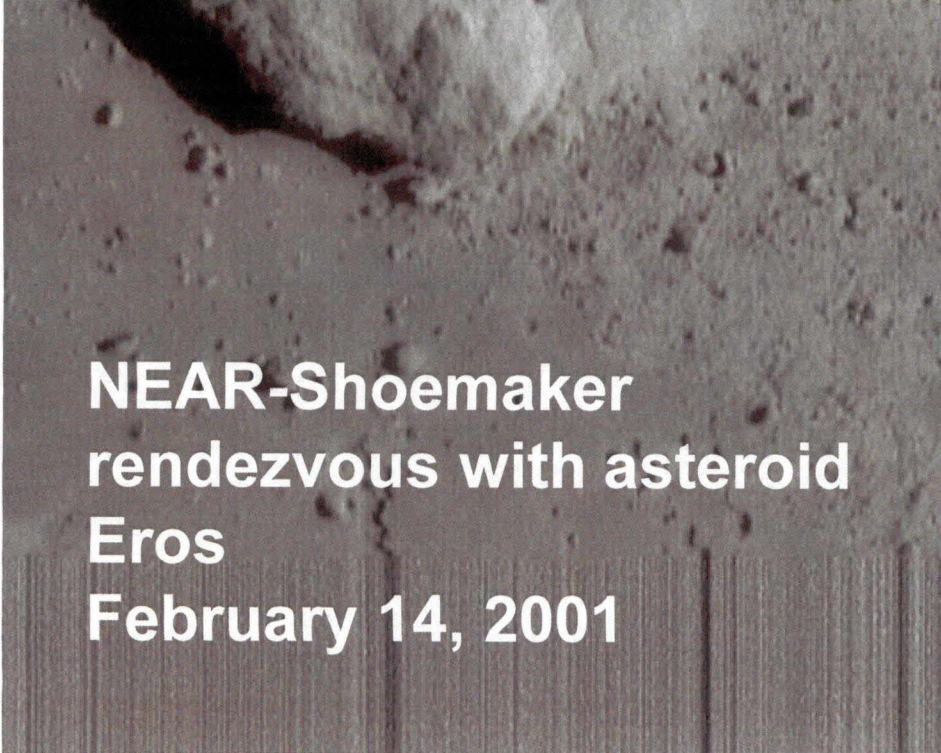
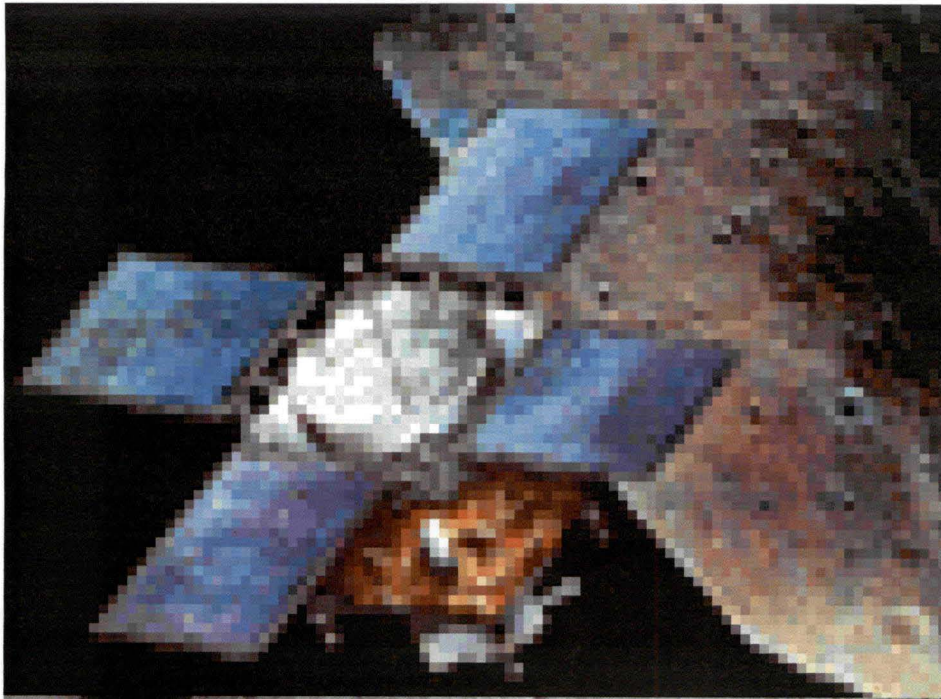
1999





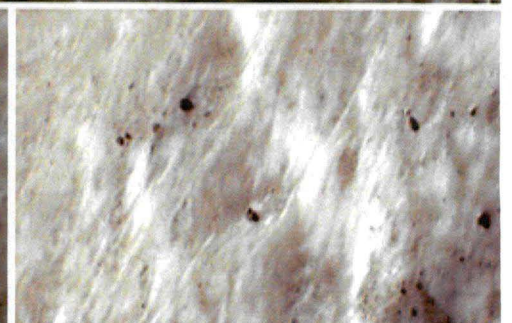
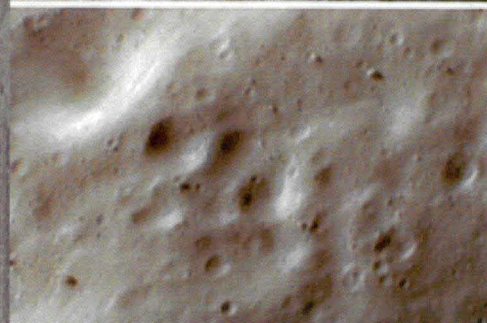
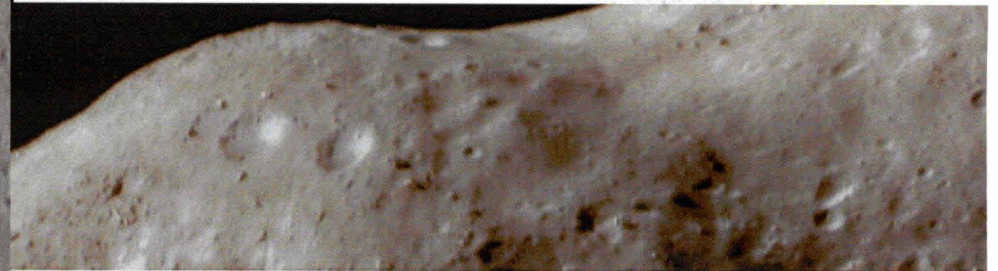
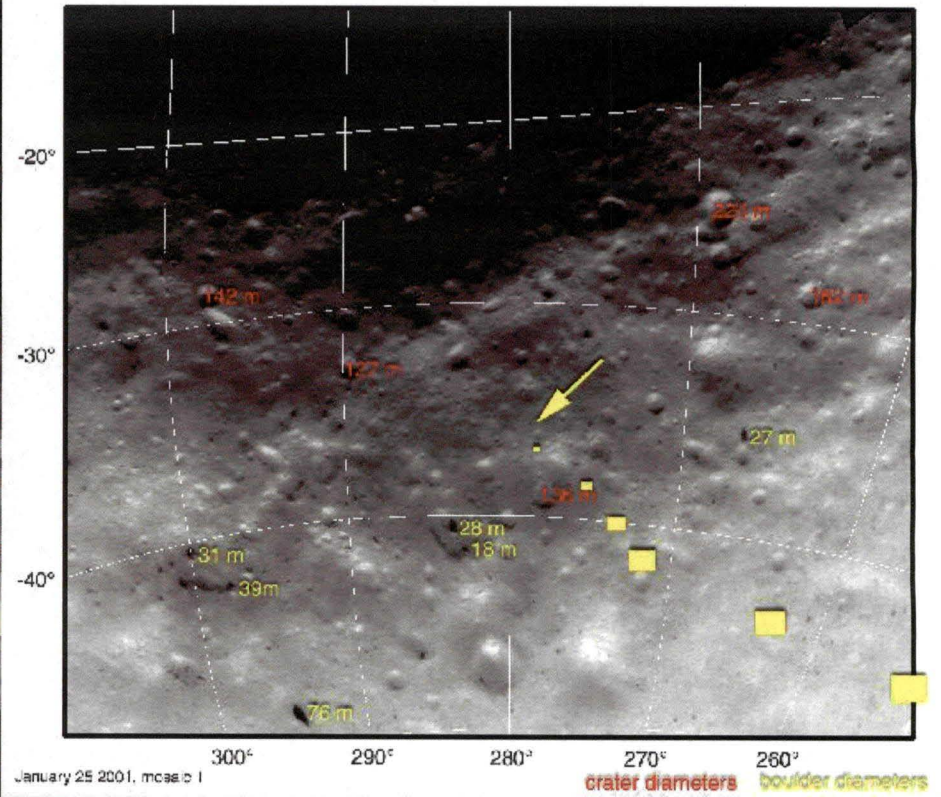


**Deep Space -1**  
**1999**

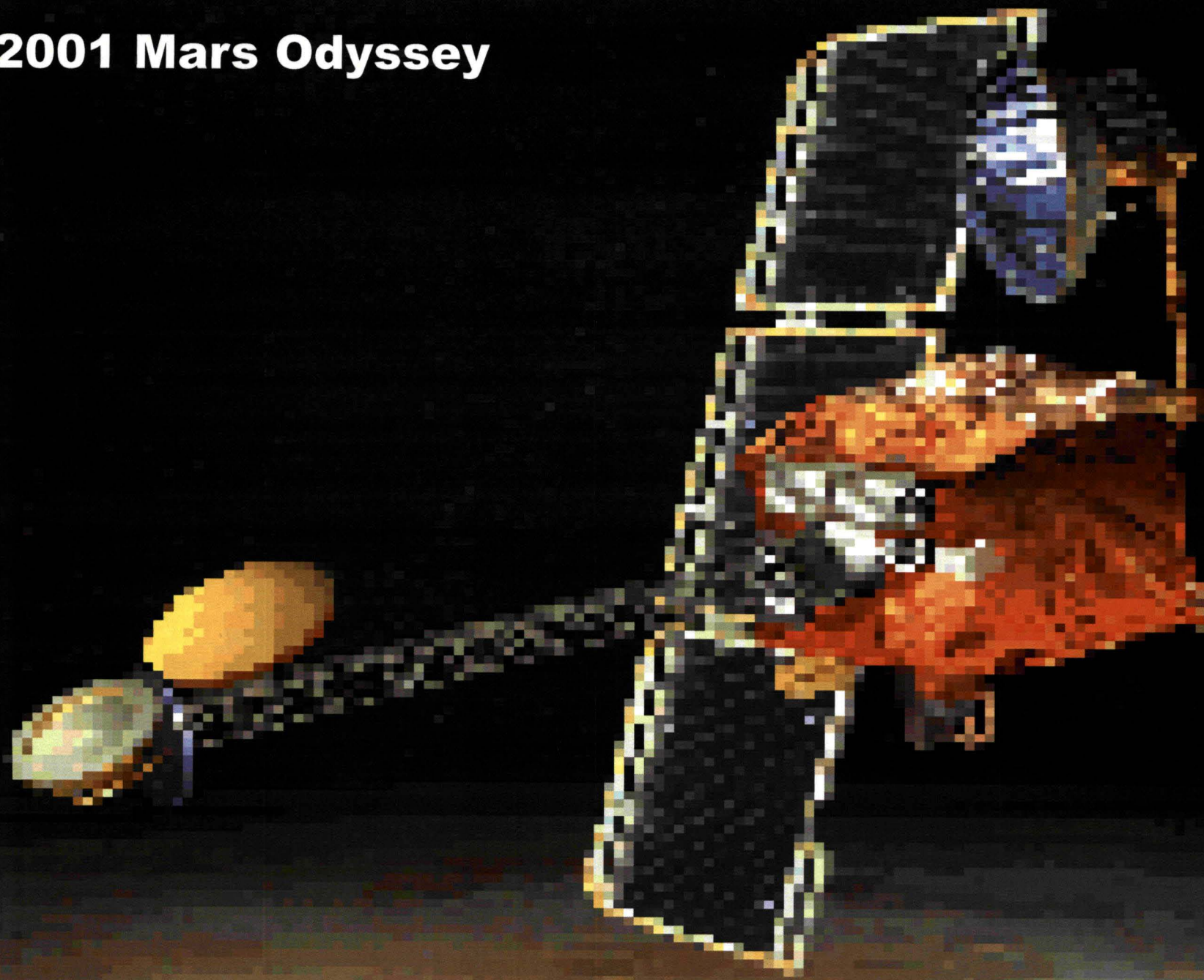


**NEAR-Shoemaker  
rendezvous with asteroid  
Eros  
February 14, 2001**

**NEAR Estimated Impact Site**



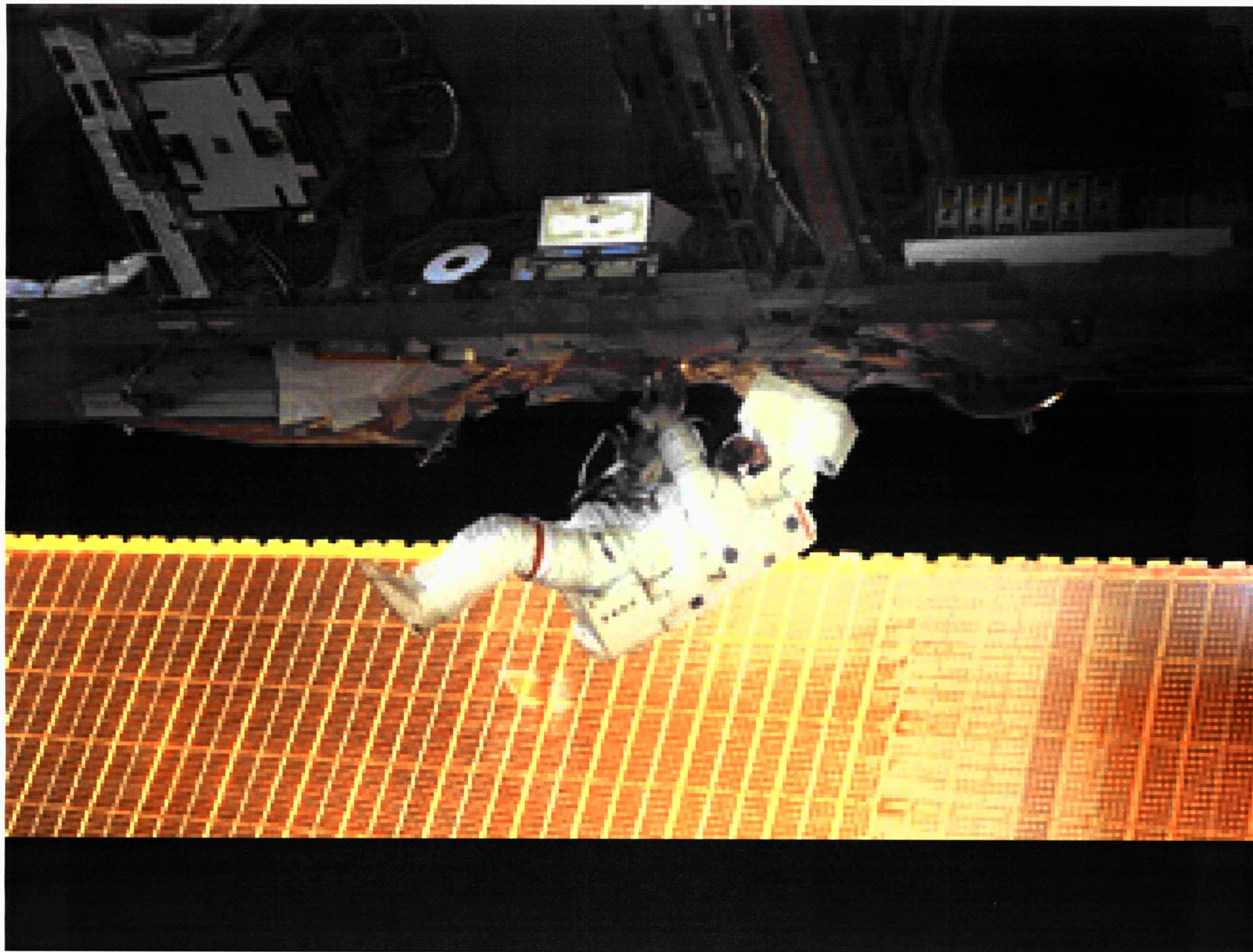
# 2001 Mars Odyssey





**Spitzer Space  
Telescope 2003**





# STS-107



## Crew Members

Commander: Rick Husband  
Pilot: William McCool  
Mission Specialist: Dave Brown  
Mission Specialist: Laurel Clark  
Mission Specialist: Mike Anderson  
Mission Specialist: Ilan Ramon  
Mission Specialist: Kalpana Chawla



## STS-107 Overview

- ◆ Shuttle: *Columbia*
- ◆ Orbital Altitude: 150 nautical miles
- ◆ Duration: 16 days
- ◆ Orbit Inclination: 39.0

## Space Research and You: Conducting 80 Experiments in Space

Crew members will perform more than 80 experiments in space, working two 12-hour shifts, including:

### Life Science Experiments

- ◆ Advanced Respiratory Monitoring System
- ◆ Calcium Kinetics During Spaceflight
- ◆ Flight-induced Changes in Immune System
- ◆ Renal Stone Risk During Spaceflight
- ◆ Spatial Reorientation Following Spaceflight

### Scientific Experiments

- ◆ Floating Flame Balls
- ◆ The Physics of Sandcastles
- ◆ Sowing Seeds in a Magnetic Field
- ◆ Laminar Soot Processes
- ◆ Mechanics of Granular Materials

space Shuttle  
Columbia  
OV-102



# Closure Status

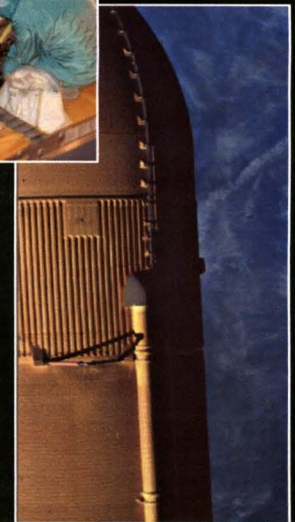
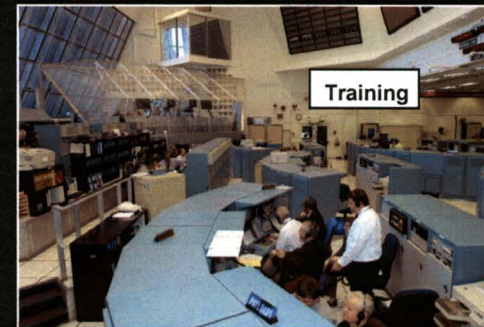
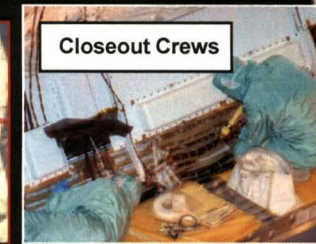
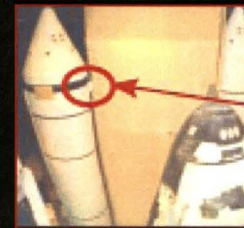
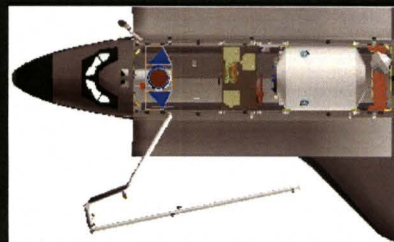
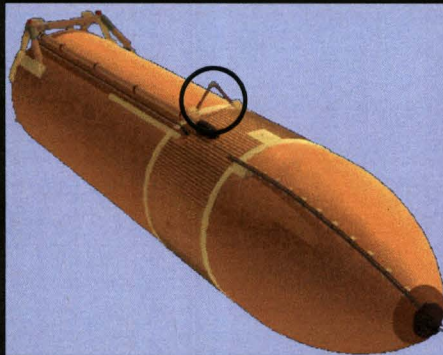
## 15 CAIB RTF Recommendations

June 8, 2005



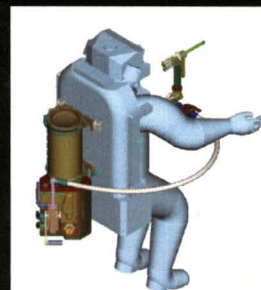
### Approved

- External Tank (ET) Separation Imagery
- Solid Rocket Booster (SRB) Bolt Catcher
- Closeout Inspection
- Foreign Object Debris Program
- On-Orbit Vehicle Assessment
- Digitize Closeout Photographs
- Thermal Protection System (TPS) Nondestructive Inspection
- Ground-Based Imagery
- On-Vehicle Ascent Imagery
- Scheduling and Resources
- Mission Management Team (MMT) Improvements
- Plan for Organizational Change
- SSP-3 – Safe Haven



### Open

- External Tank TPS Modifications
- Orbiter Hardening
- TPS On-Orbit Inspect & Repair

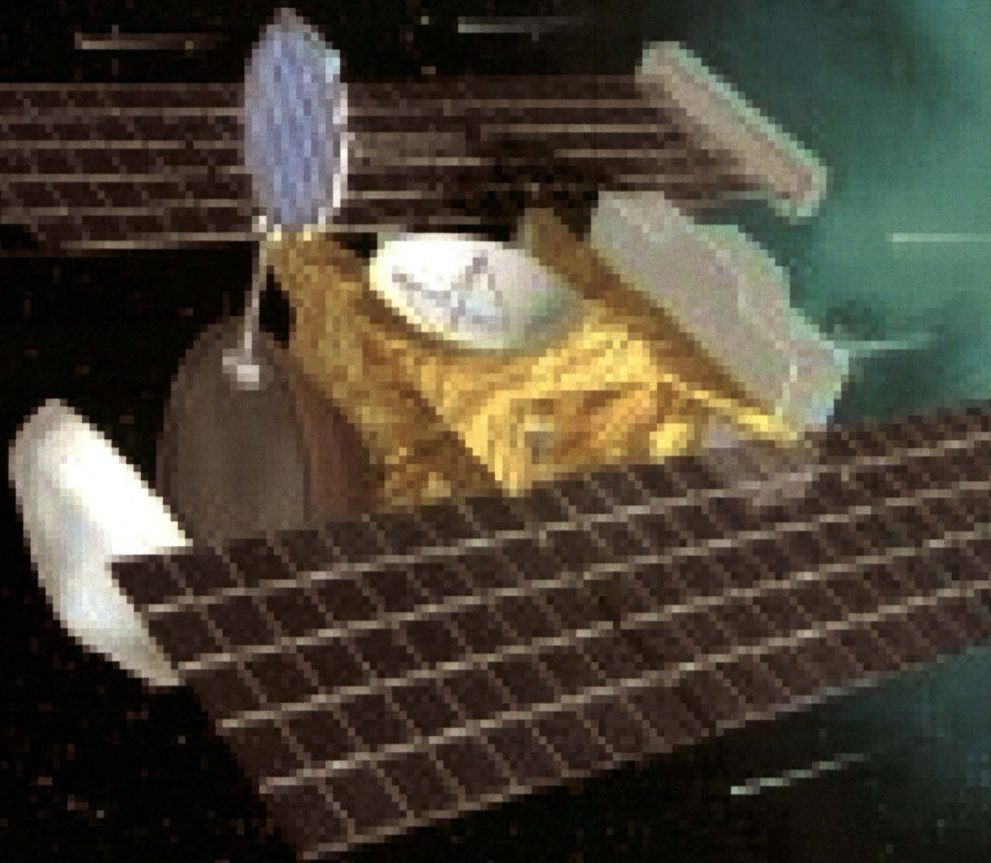




# Protuberance Air Load (PAL) Ramp

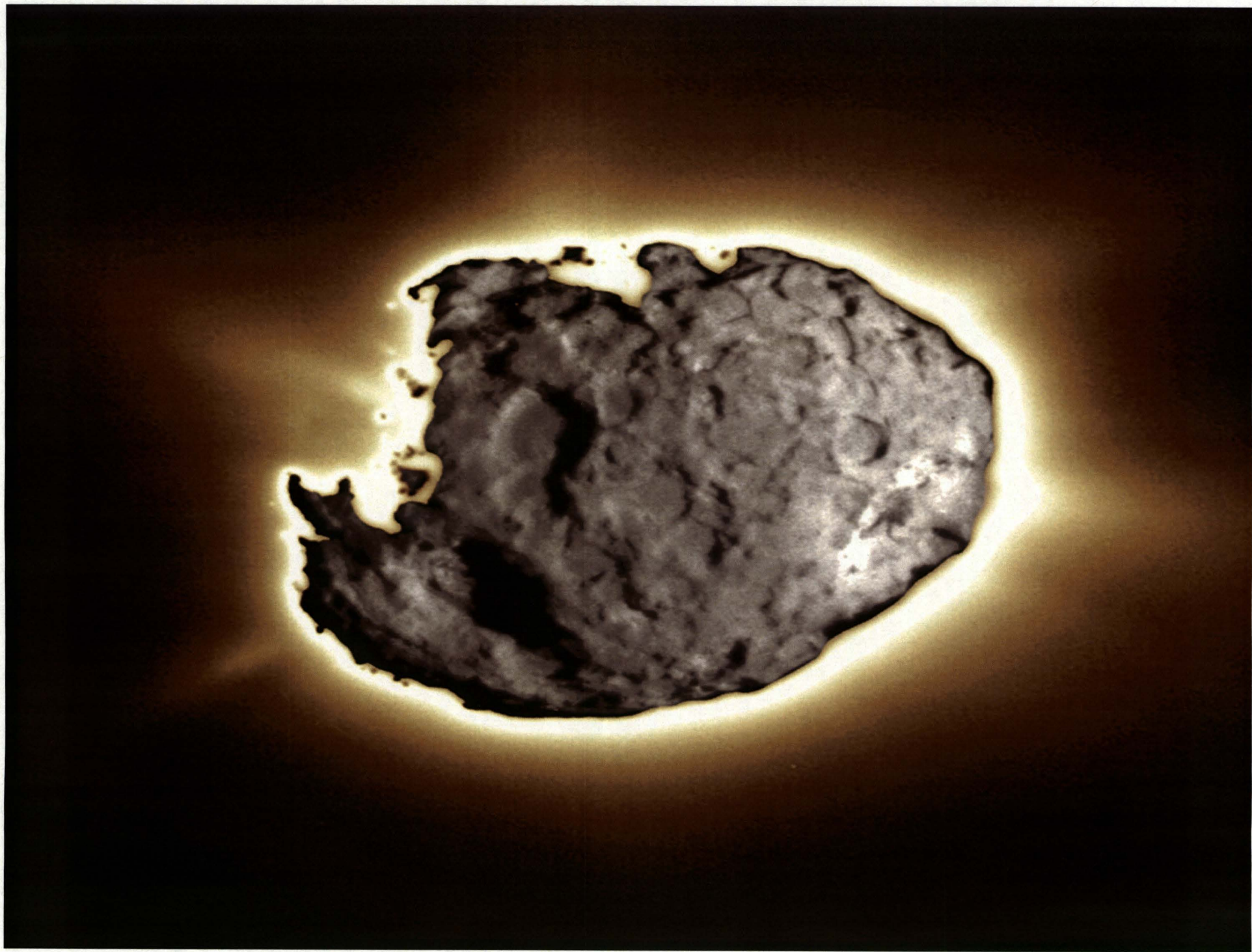


**“Stardust” encounter with comet Wild 2 on Jan. 2, 2004  
which captured interstellar and comet dust particles  
for return to Earth Jan. 2006**



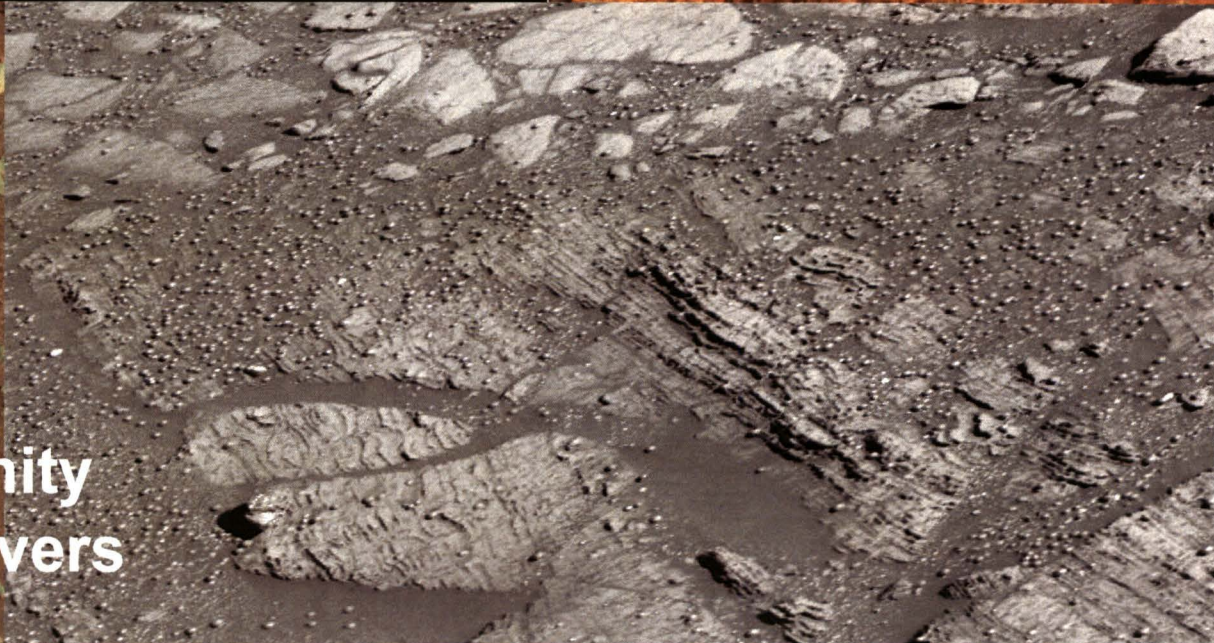
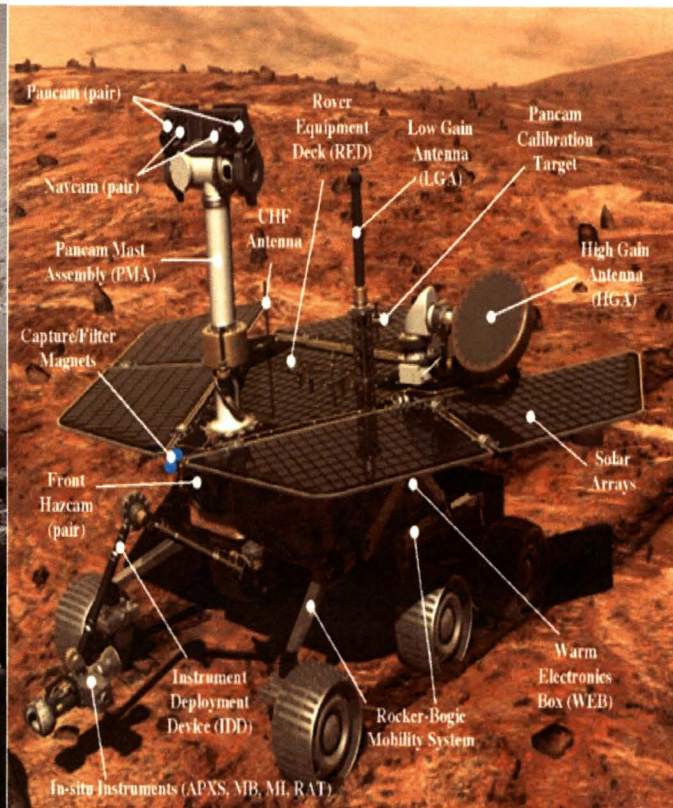
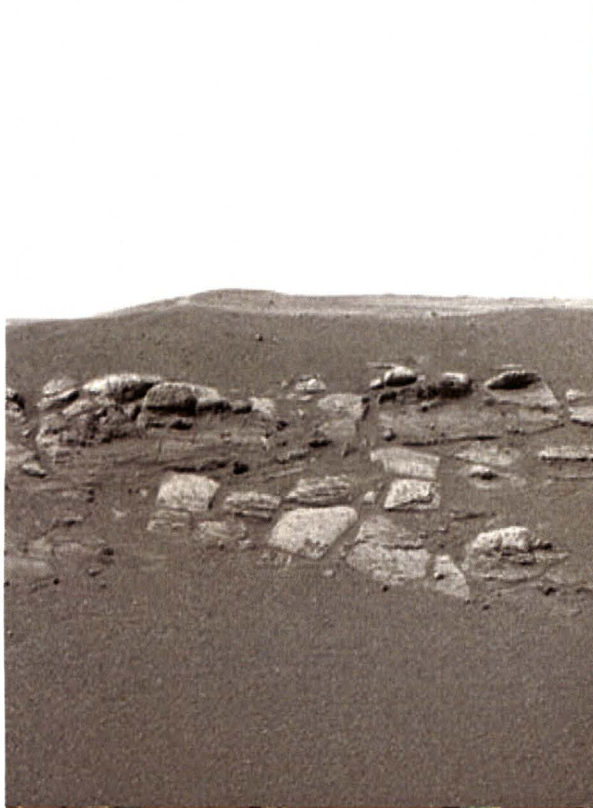
**Photo of comet's nucleus**



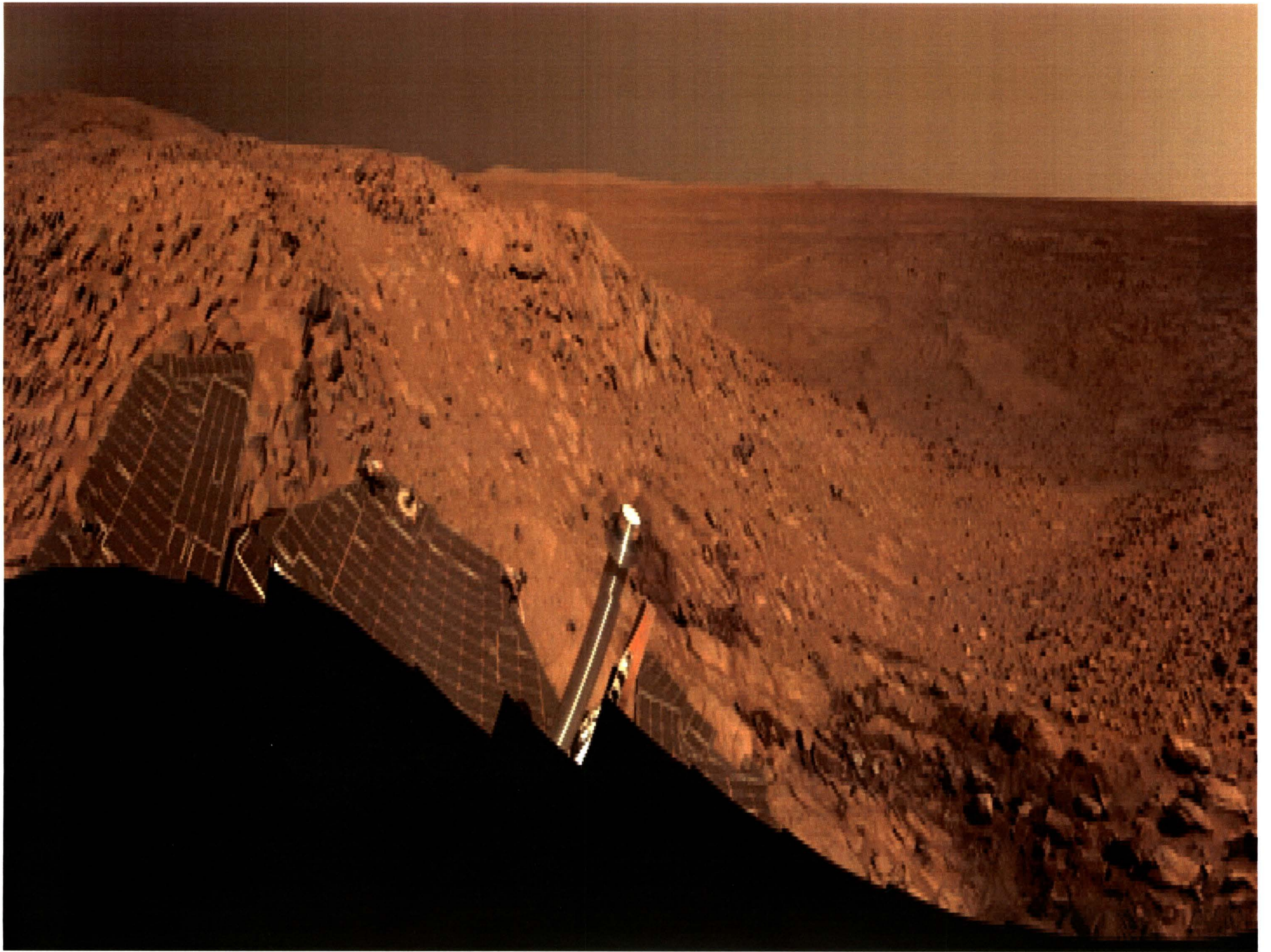


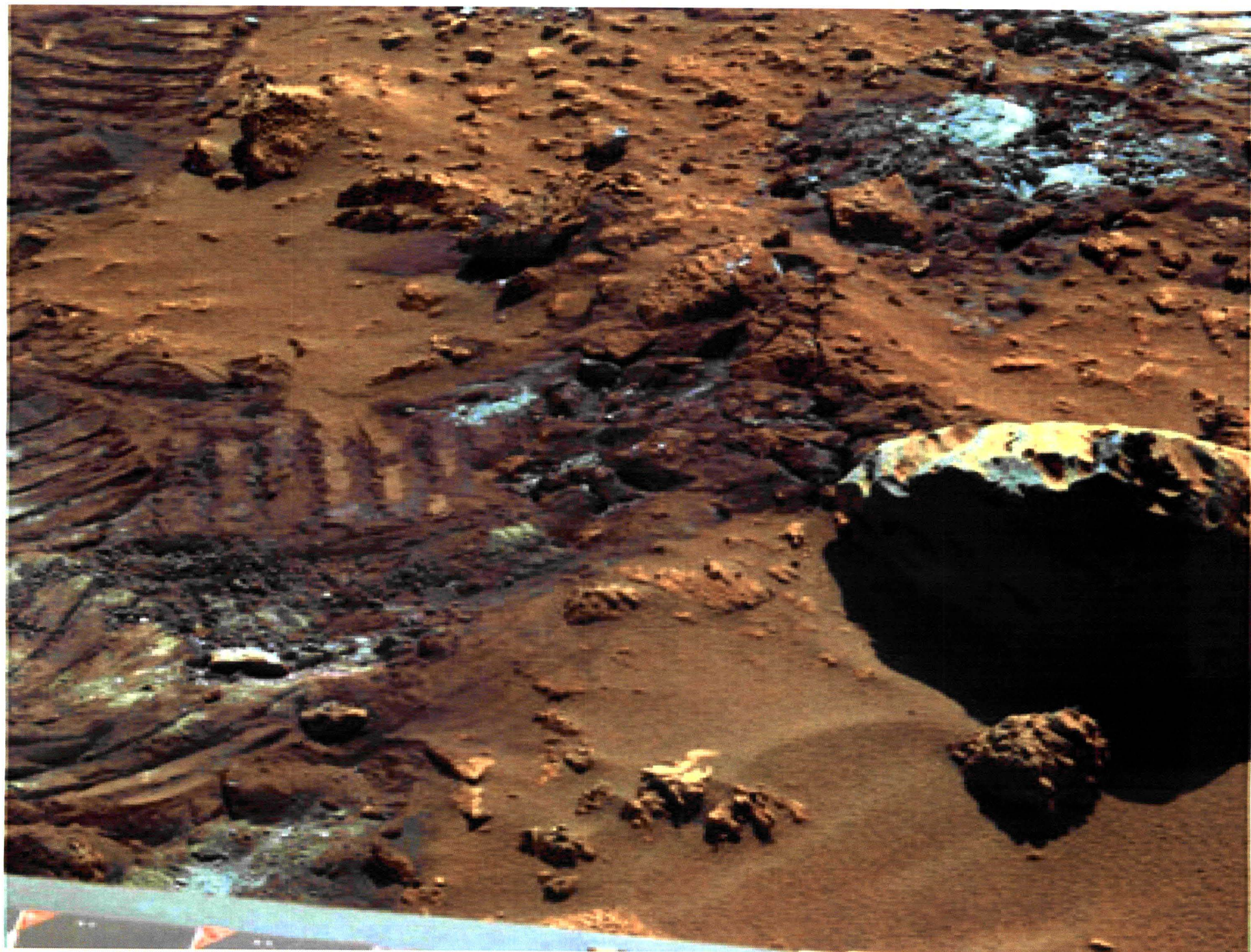


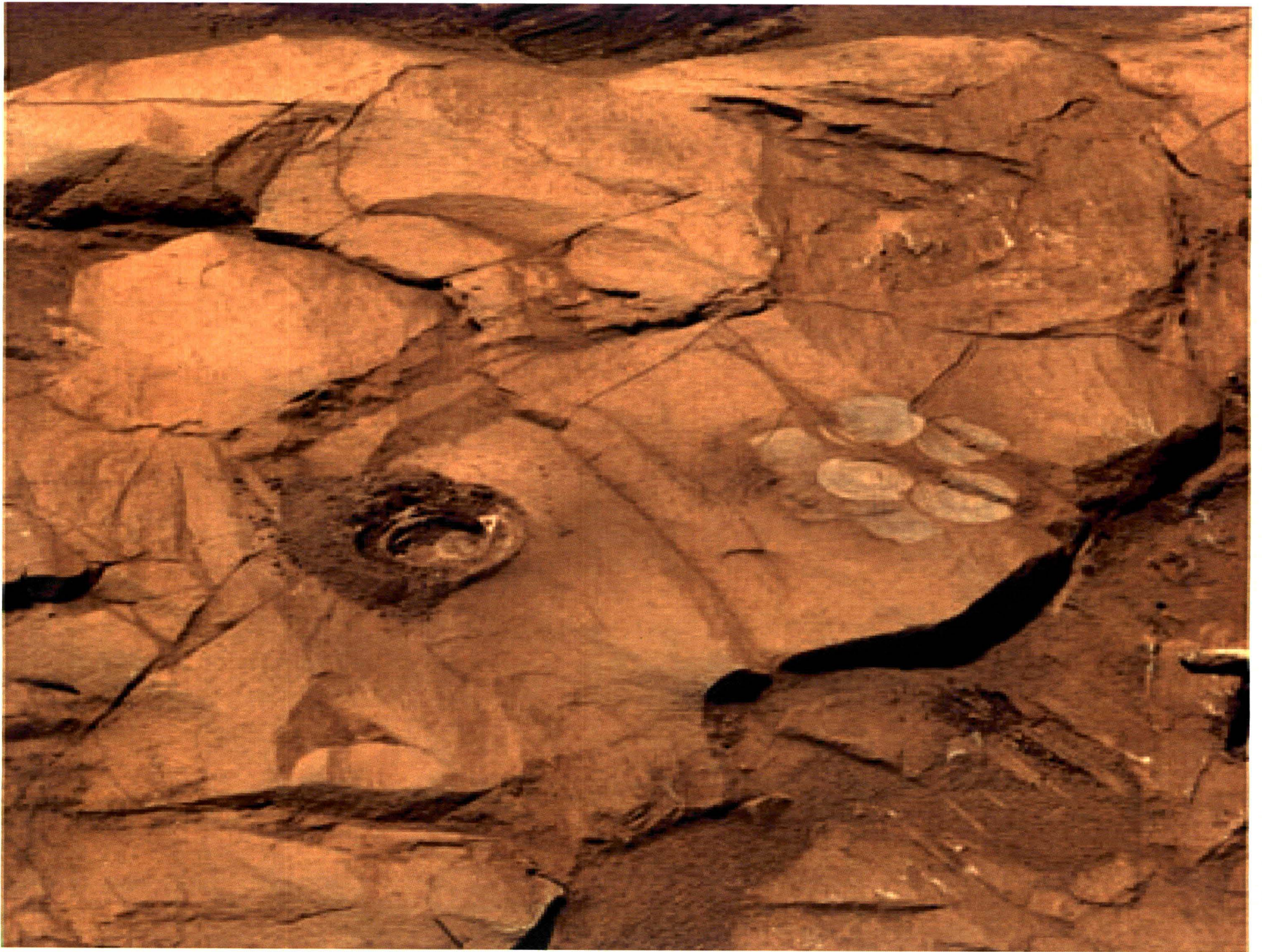
© 2005 www.tennaballs.com



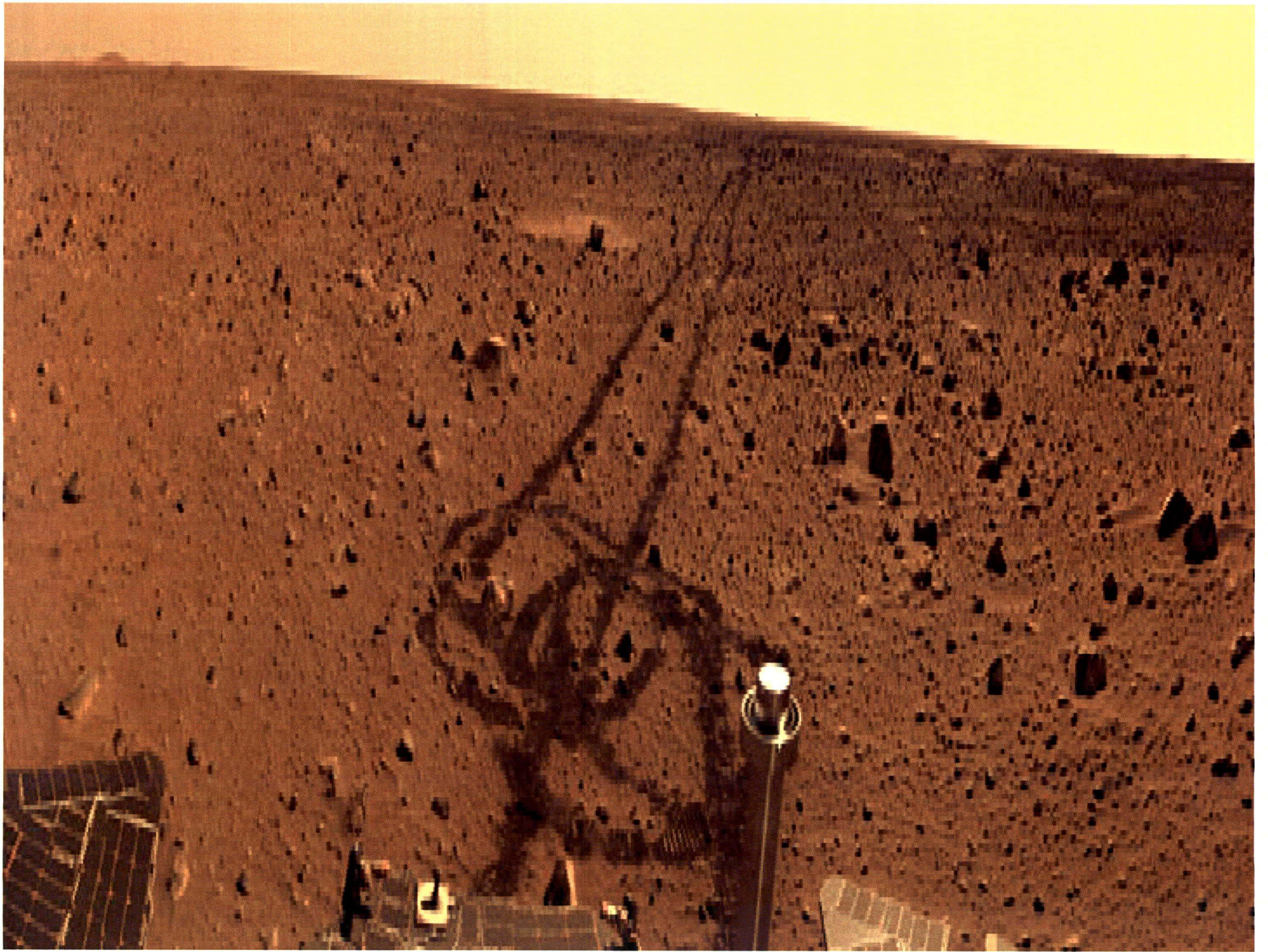
# Spirit and Opportunity Mars Excursion Rovers

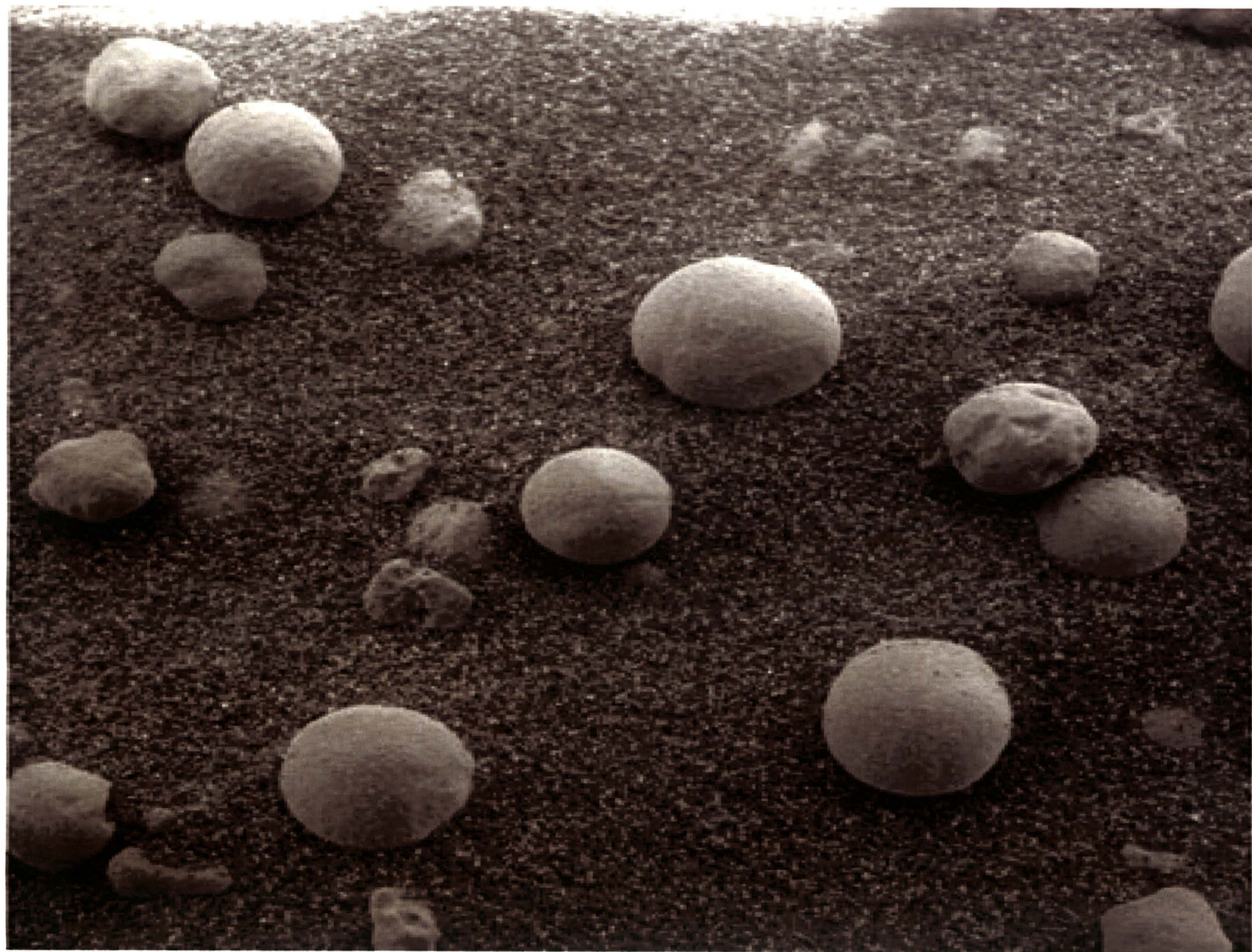








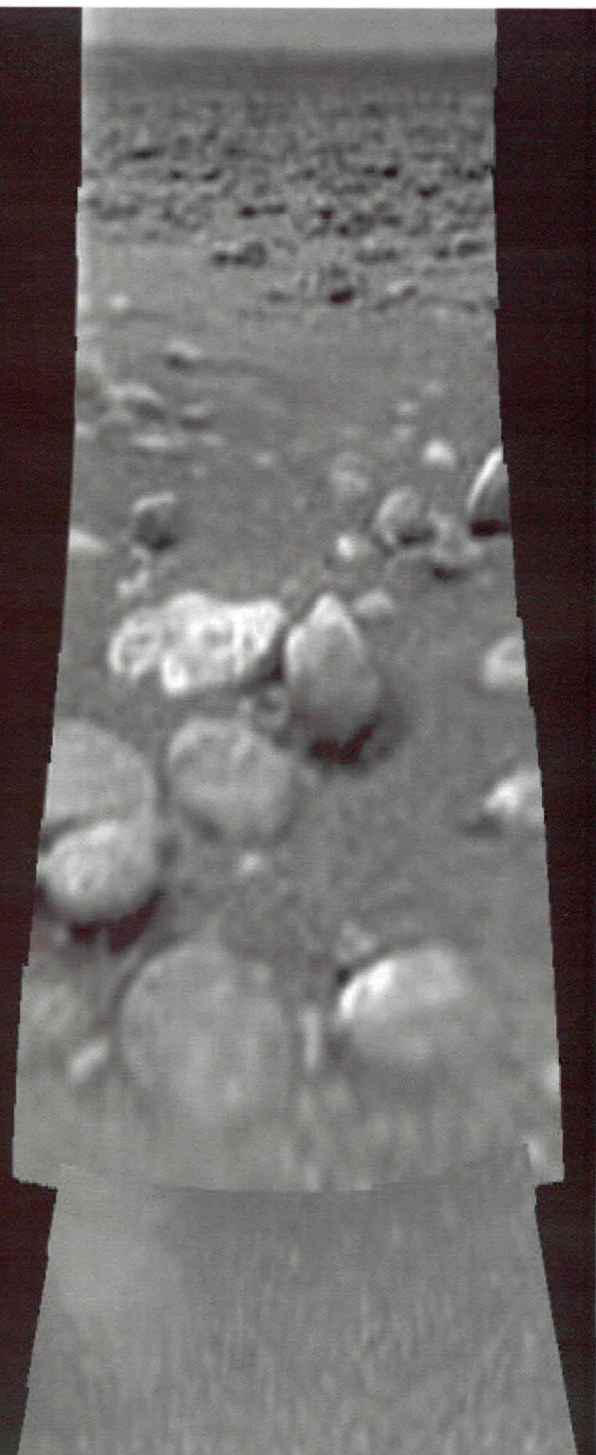
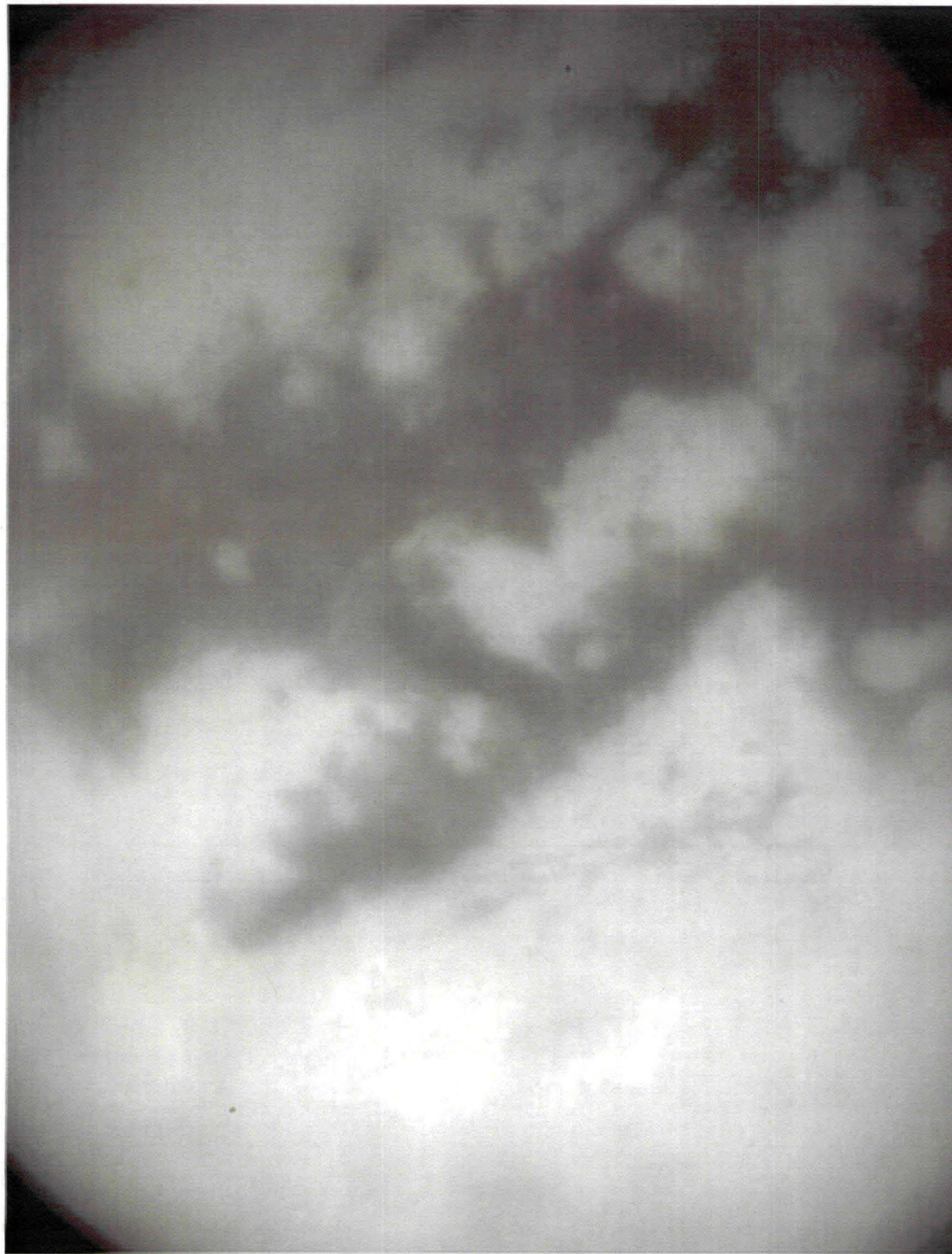


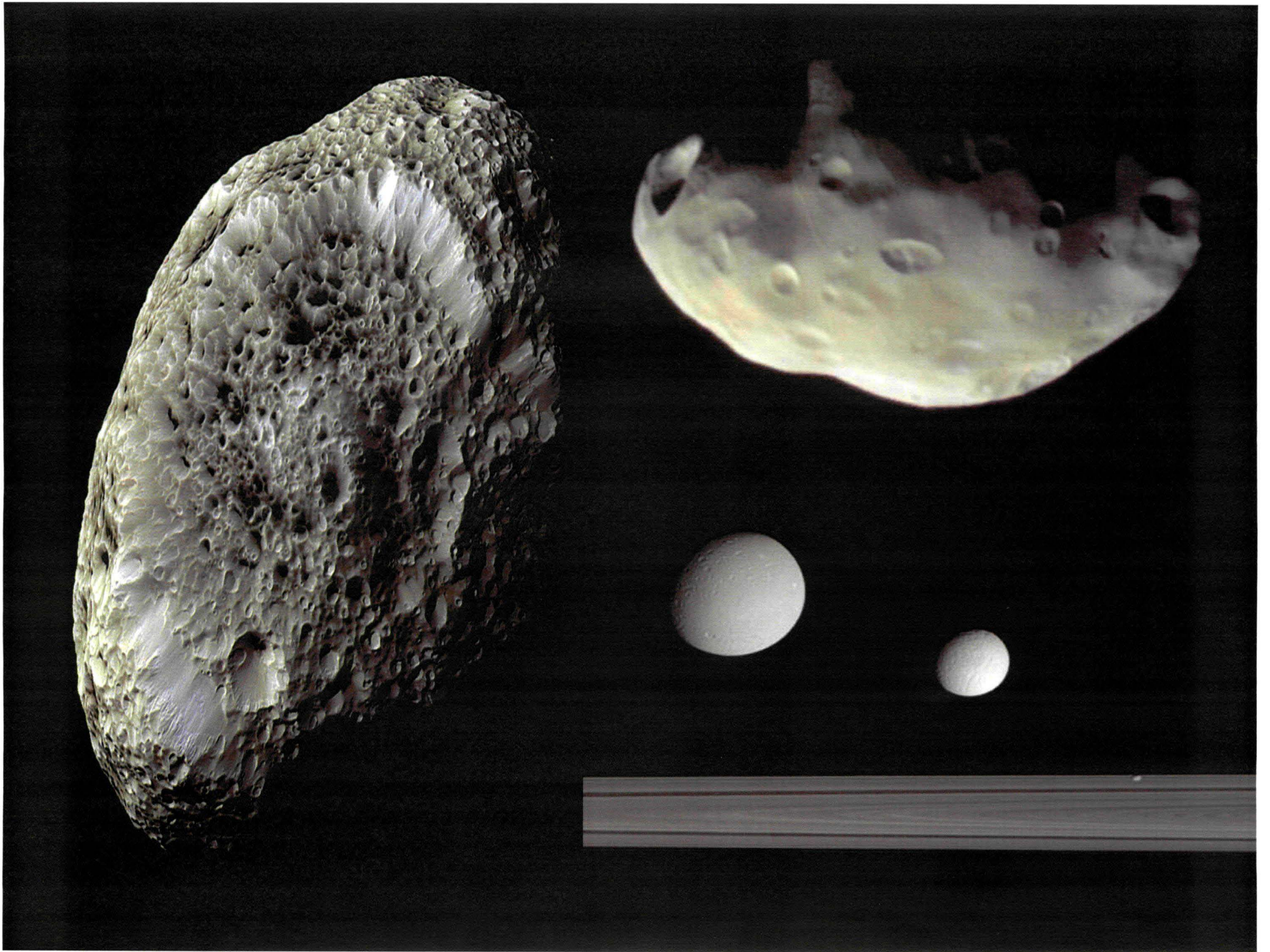


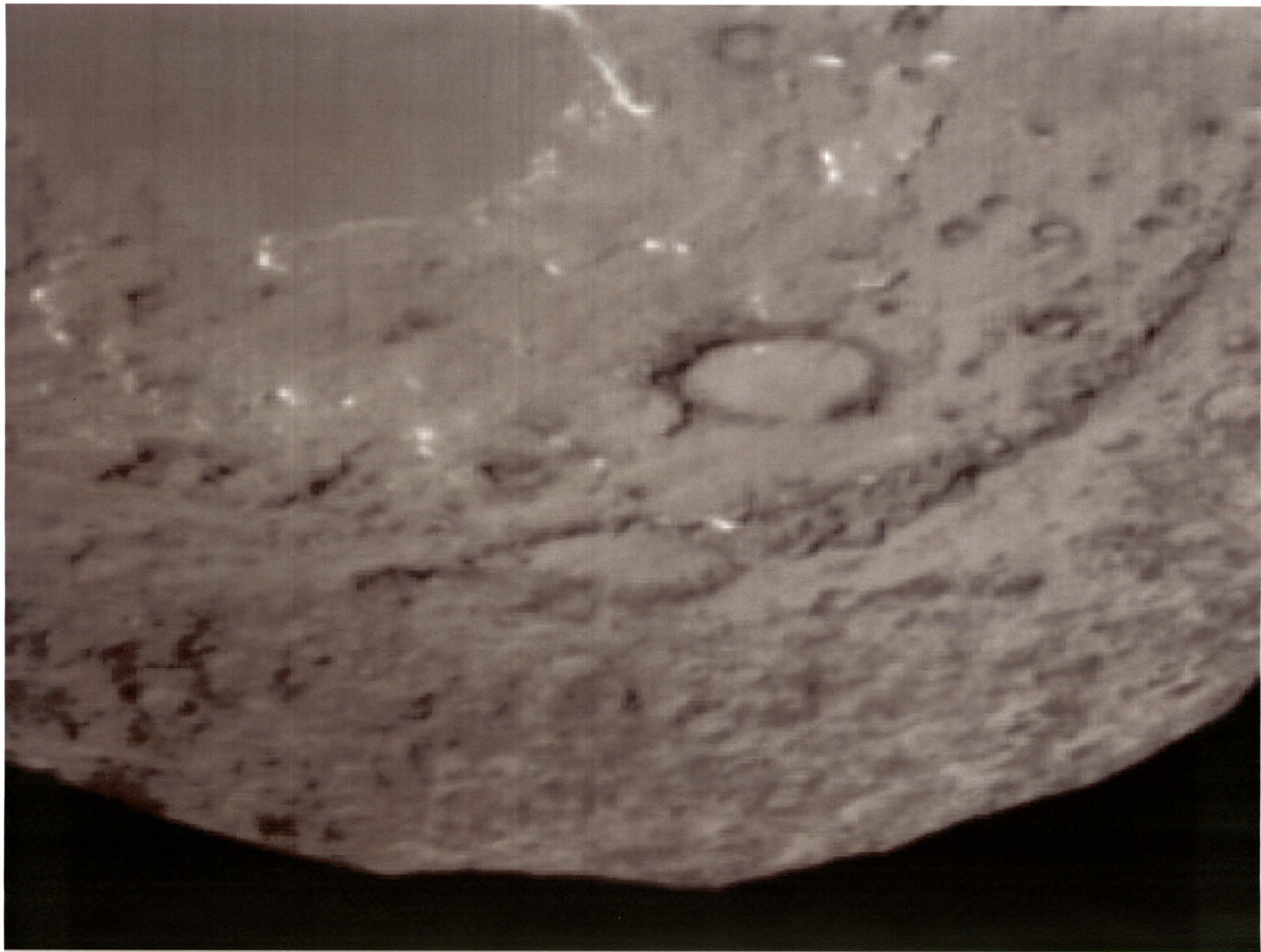


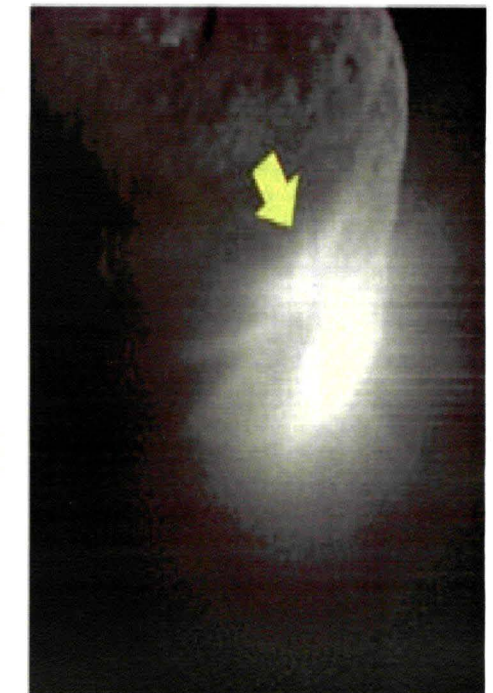
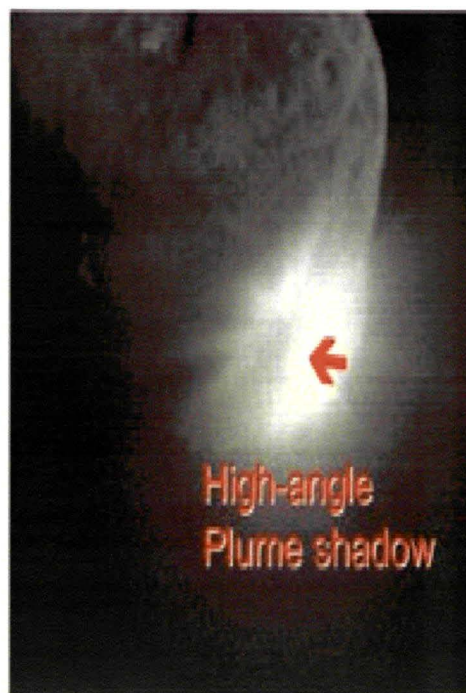
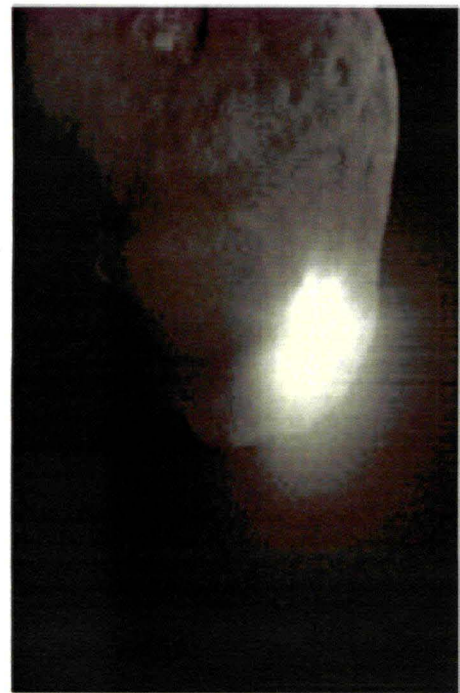
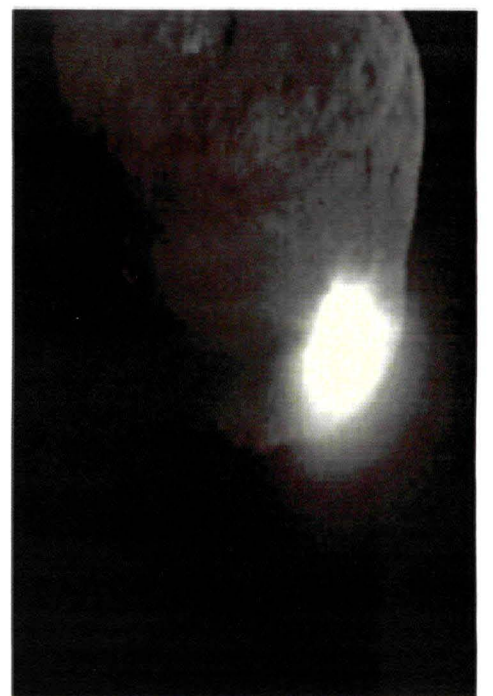
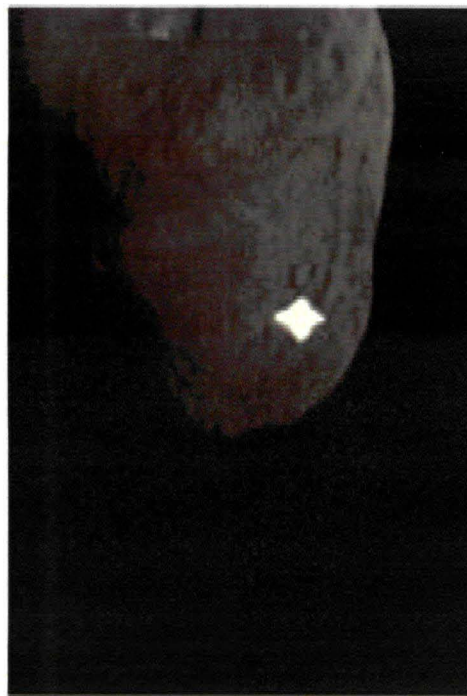
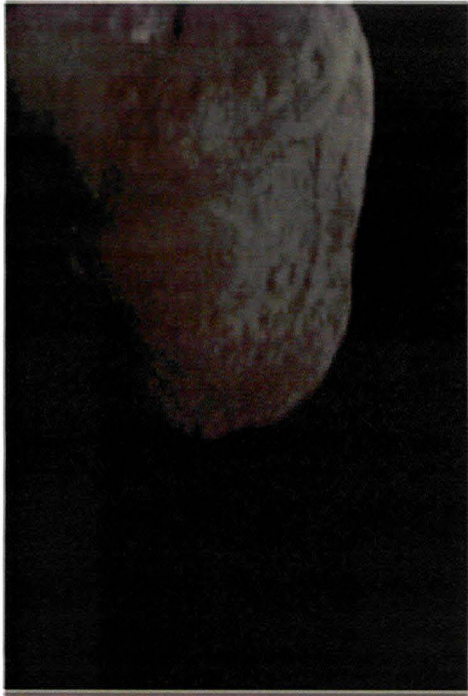
**Cassini Mission  
To Saturn's moon  
Titan**















## A Bold Vision for Space Exploration

- ◆ Complete the International Space Station
- ◆ Safely fly the Space Shuttle until 2010
- ◆ Develop and fly the Crew Exploration Vehicle no later than 2014 (goal of 2012)
- ◆ Return to the Moon no later than 2020
- ◆ Extend human presence across the solar system and beyond
- ◆ Implement a sustained and affordable human and robotic program
- ◆ Develop supporting innovative technologies, knowledge, and infrastructures
- ◆ Promote international and commercial participation in exploration



*"It is time for America to take the next steps.*

*Today I announce a new plan to explore space and extend a human presence across our solar system. We will begin the effort quickly, using existing programs and personnel. We'll make steady progress – one mission, one voyage, one landing at a time"*

*President George W. Bush –  
January 14, 2004*



