

National Aeronautics and Space Administration

Origins and History of NASA

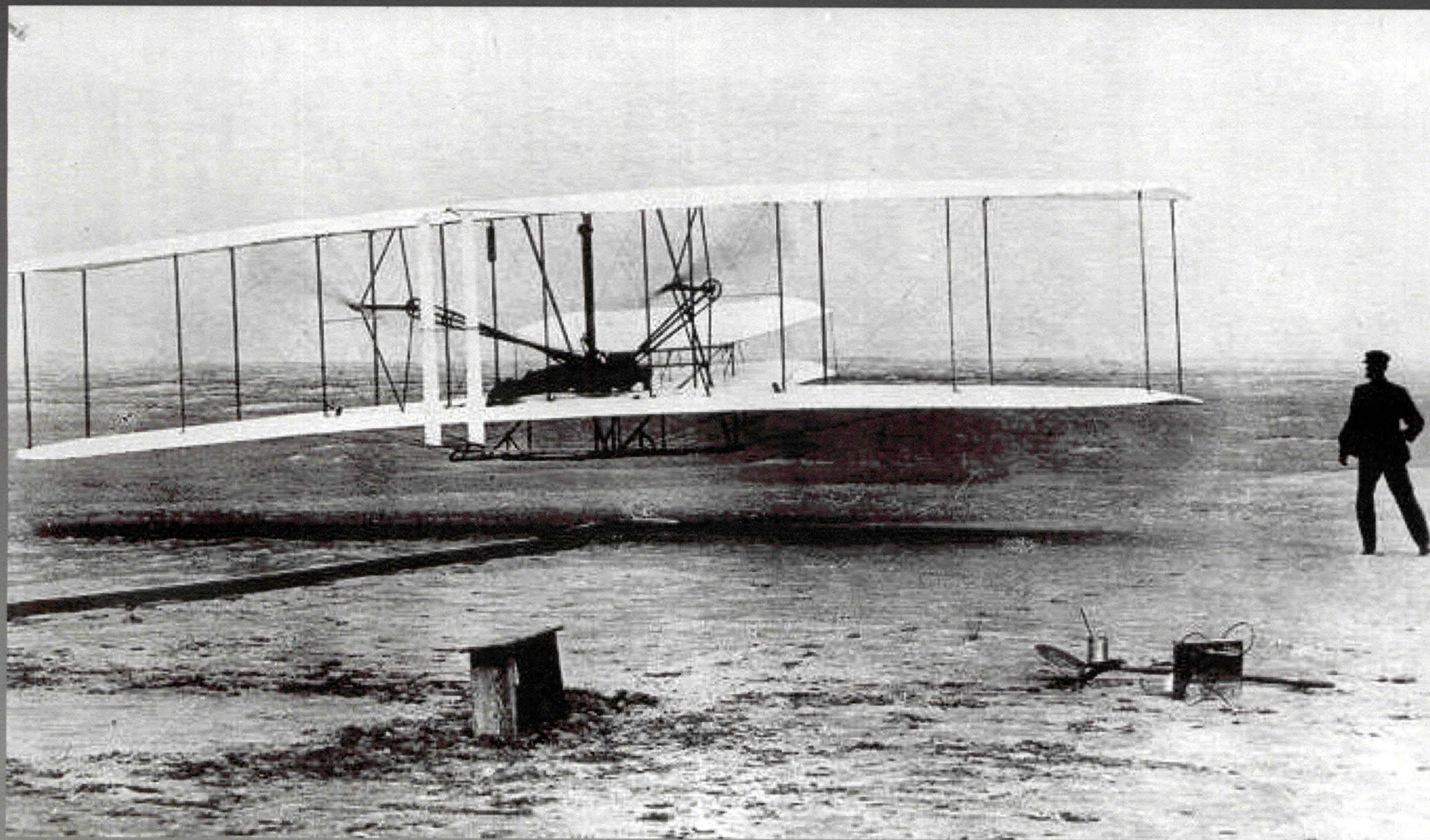
18 June 2012

Jack Fox

jack.j.fox@nasa.gov

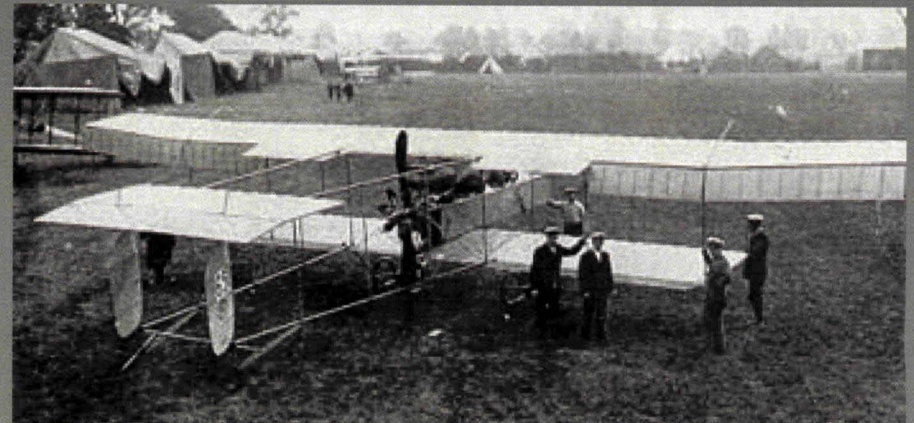
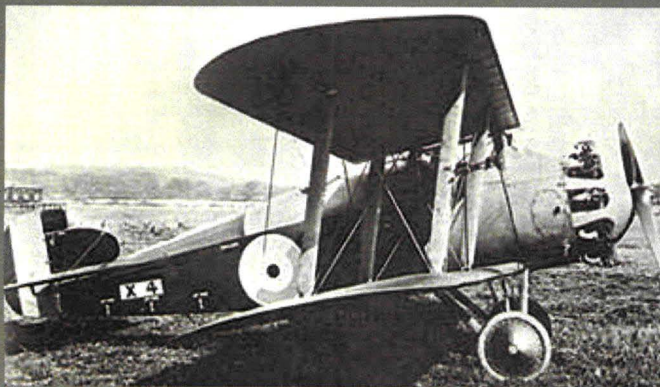
John F. Kennedy Space Center





December 17, 1903

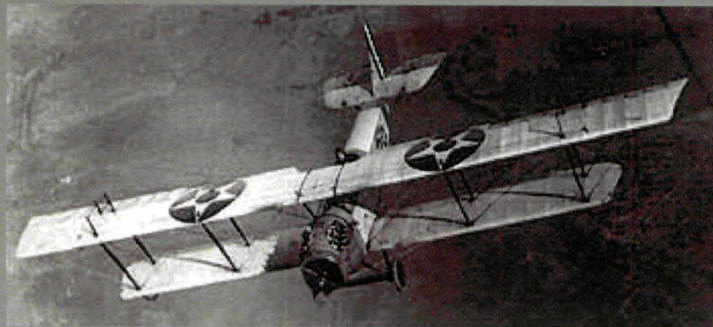
- **1913 - Europeans prepared for war, passed U.S. in land, sea and air weapon technology**
 - France
 - Austria-Hungary
 - Germany
 - Great Britain
 - Italy
 - Russia



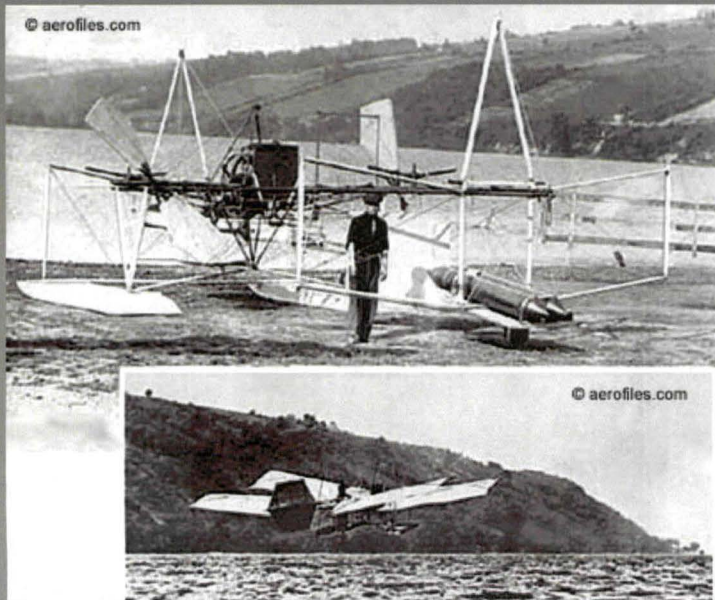
- **1915 – National Advisory Committee for Aeronautics (NACA) chartered by President Woodrow Wilson**

- “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**

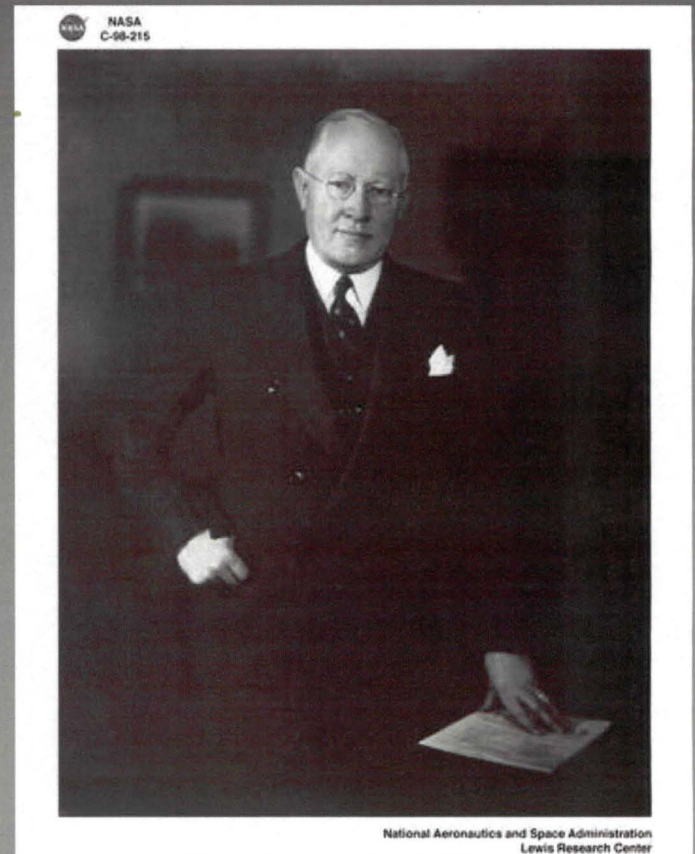
- **Authorized in 1939 at Navy's Moffett Field in California**

- **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**

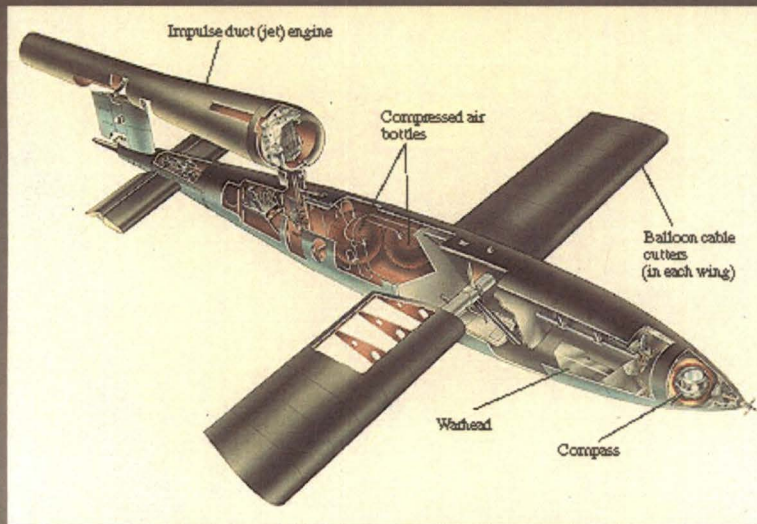


1936

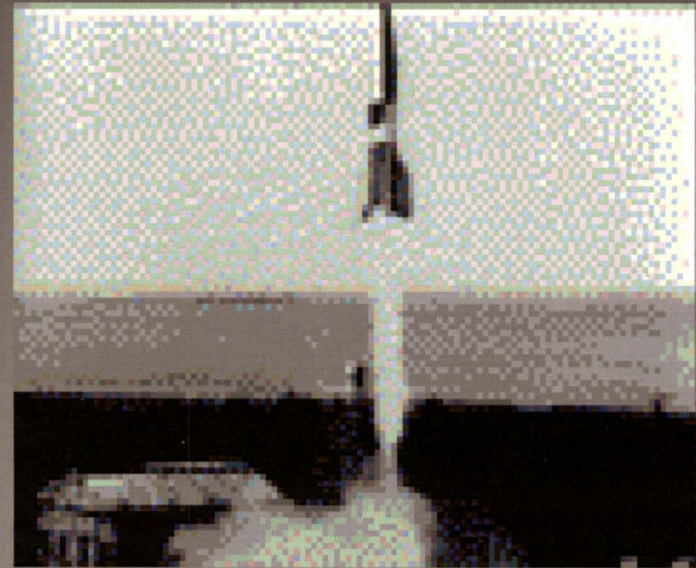
- Europeans begin investigating in rocketry, Germans obtain major funding for lab research

1944

- Hitler moves toward rocket use after Battle of Bulge



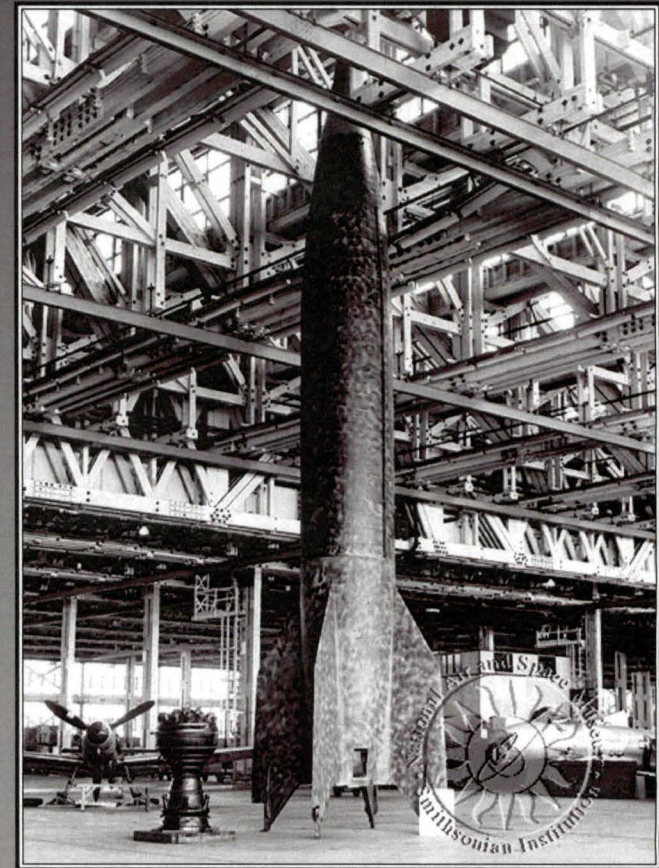
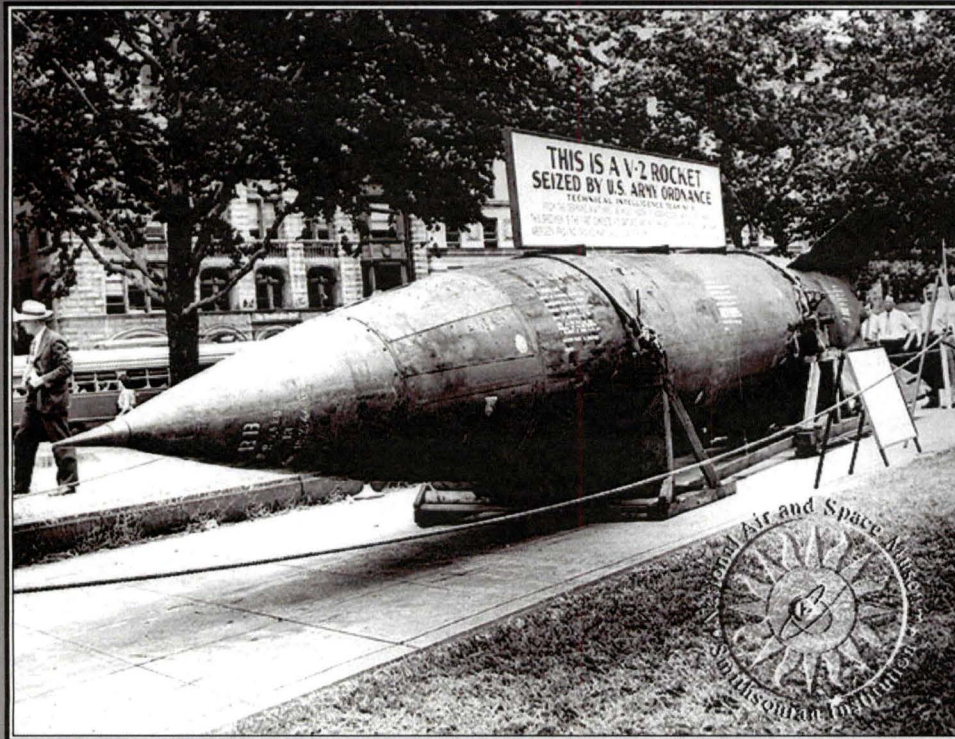
**V-1 (Vengeance
Weapon) developed;
360 mph**



**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

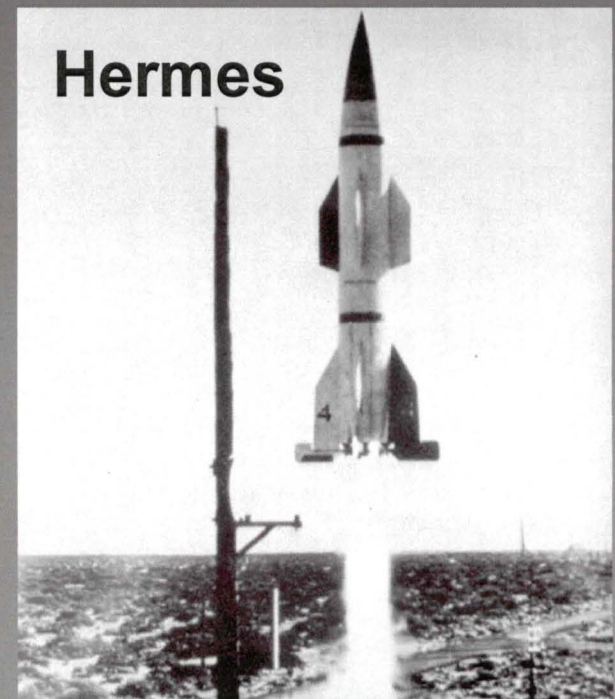
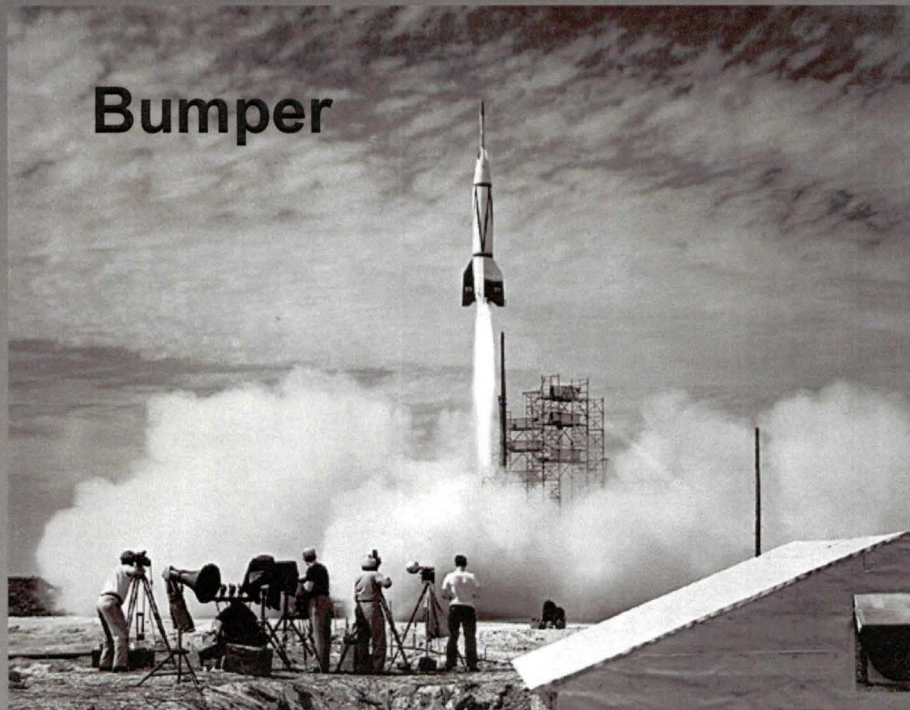
- **Joint Long Range Proving Ground established at Cape Canaveral**

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

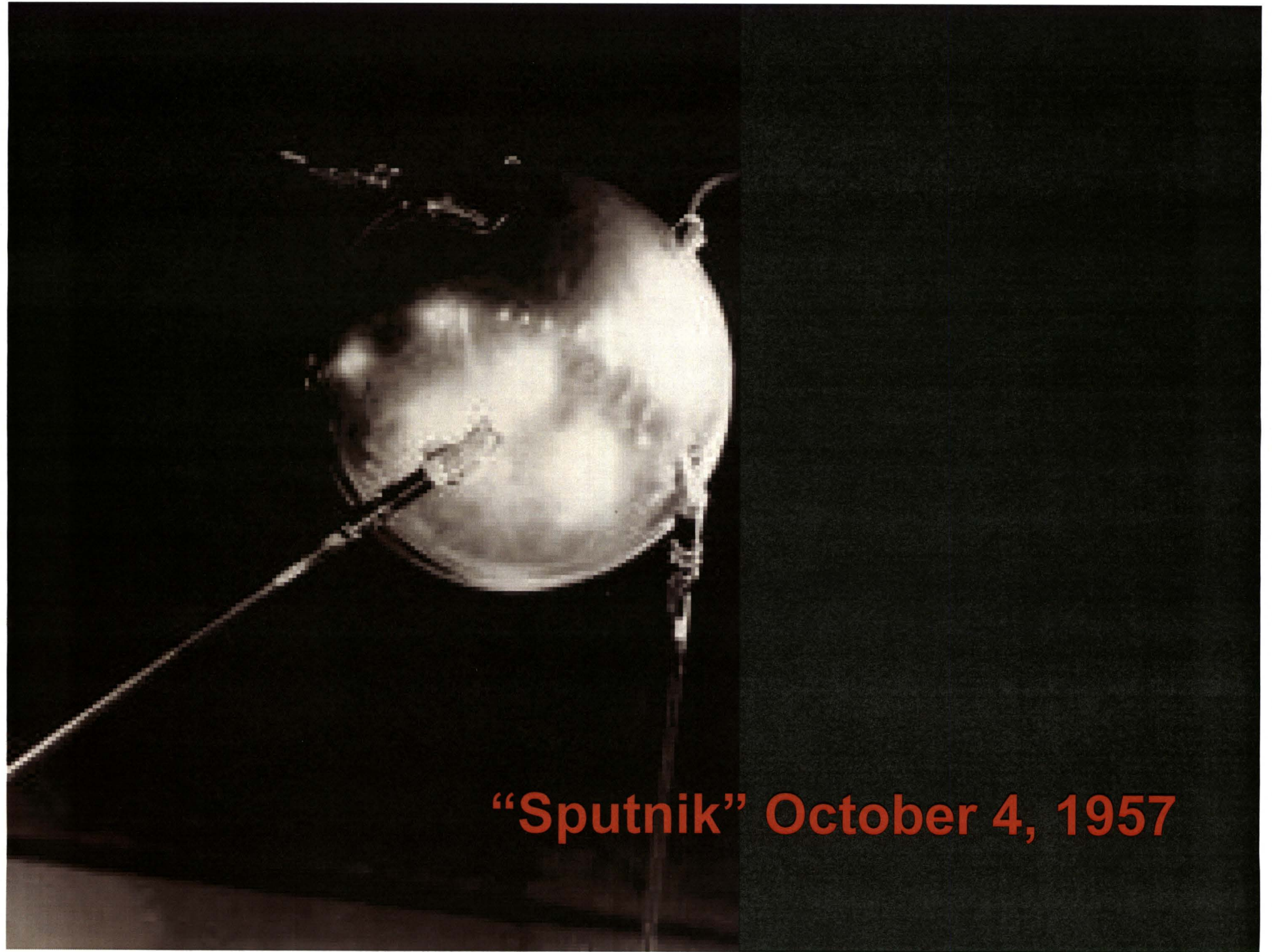
• President Eisenhower announces that United States will orbit a satellite as part of celebration of International Geophysical Year

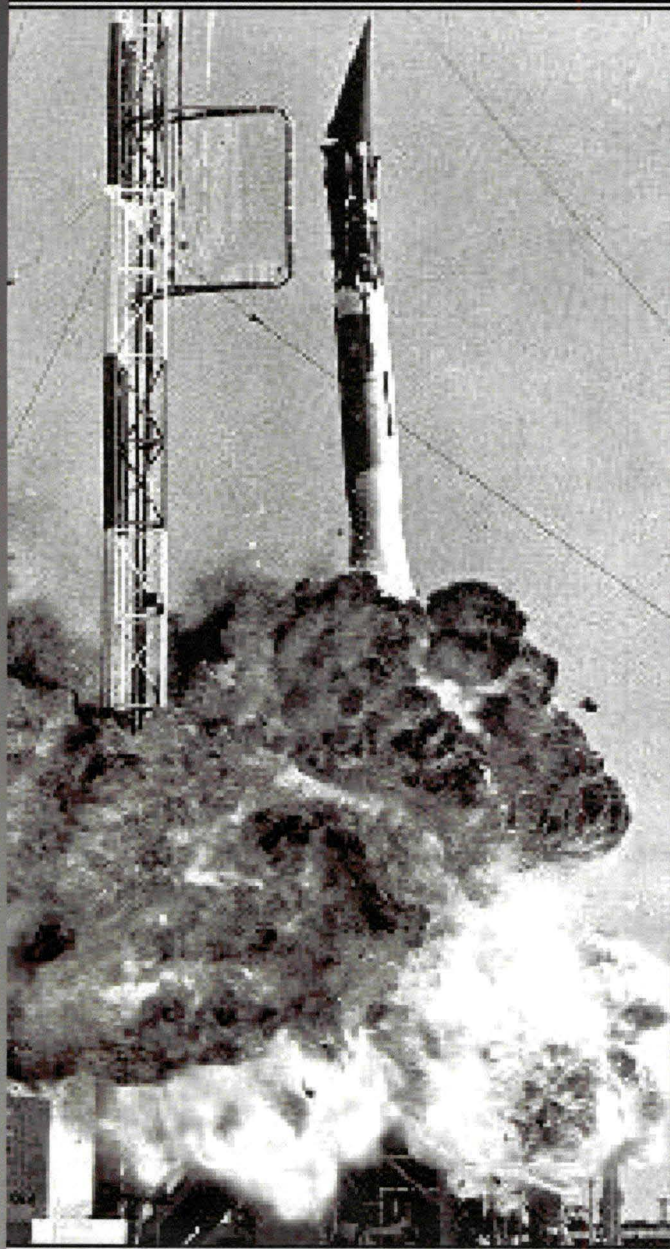
USSR makes similar pledge



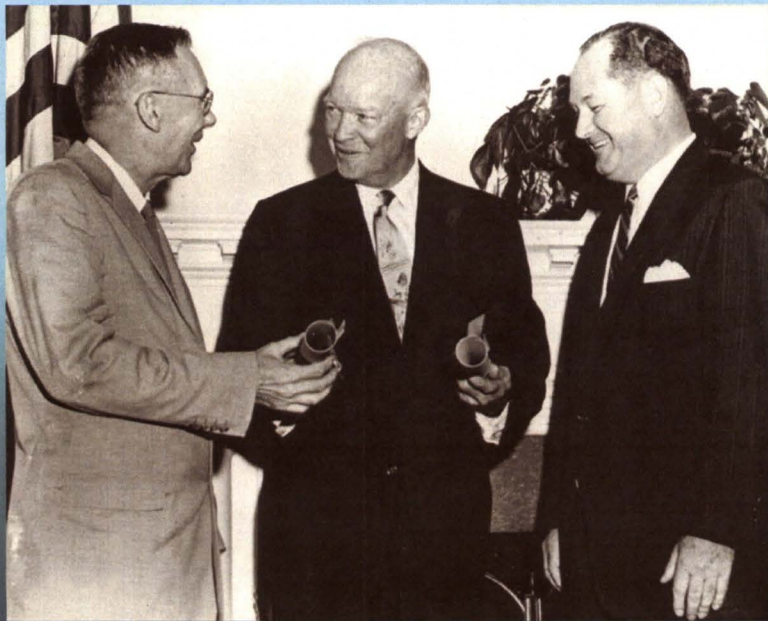


U.S. Navy's "Vanguard"





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



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

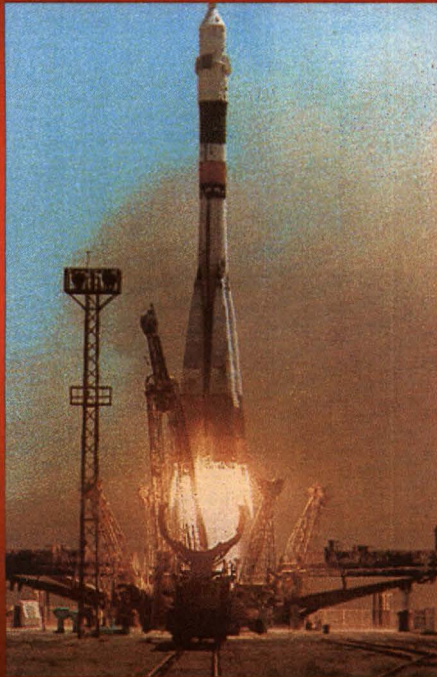


**After 43 years, NACA
ceases to exist**

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**

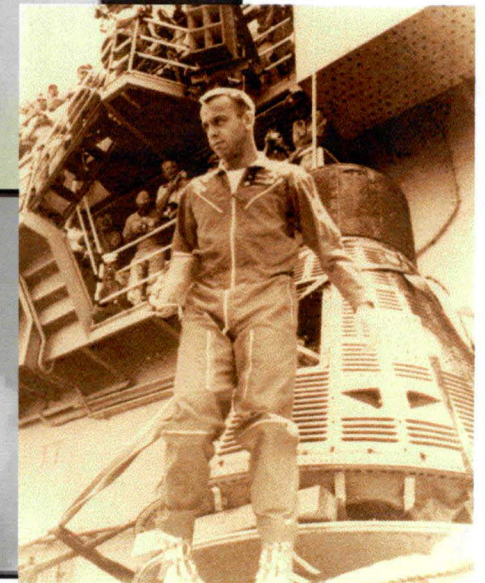
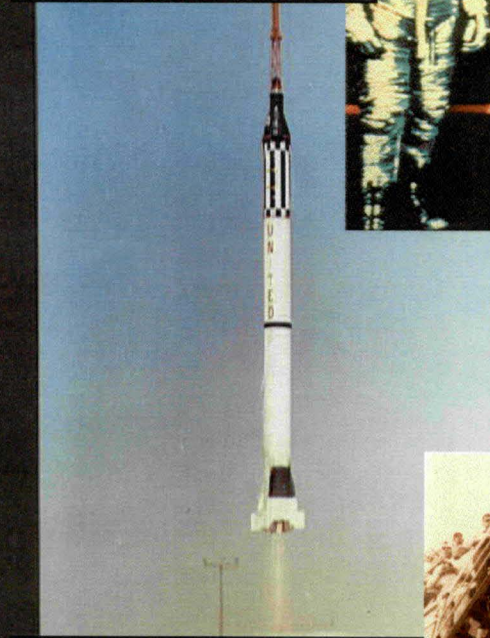
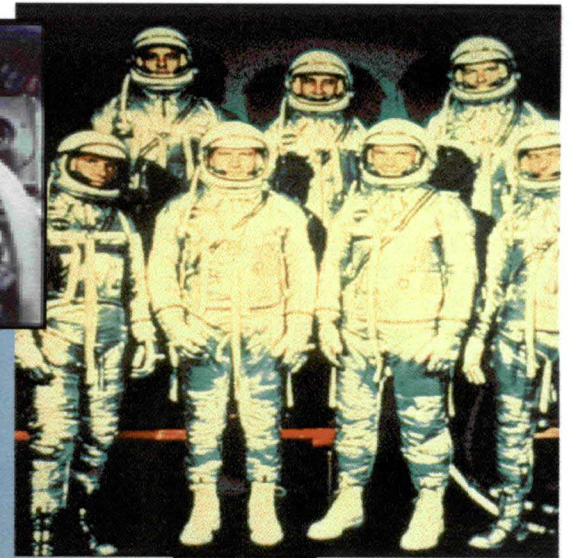
January 31, 1961

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





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



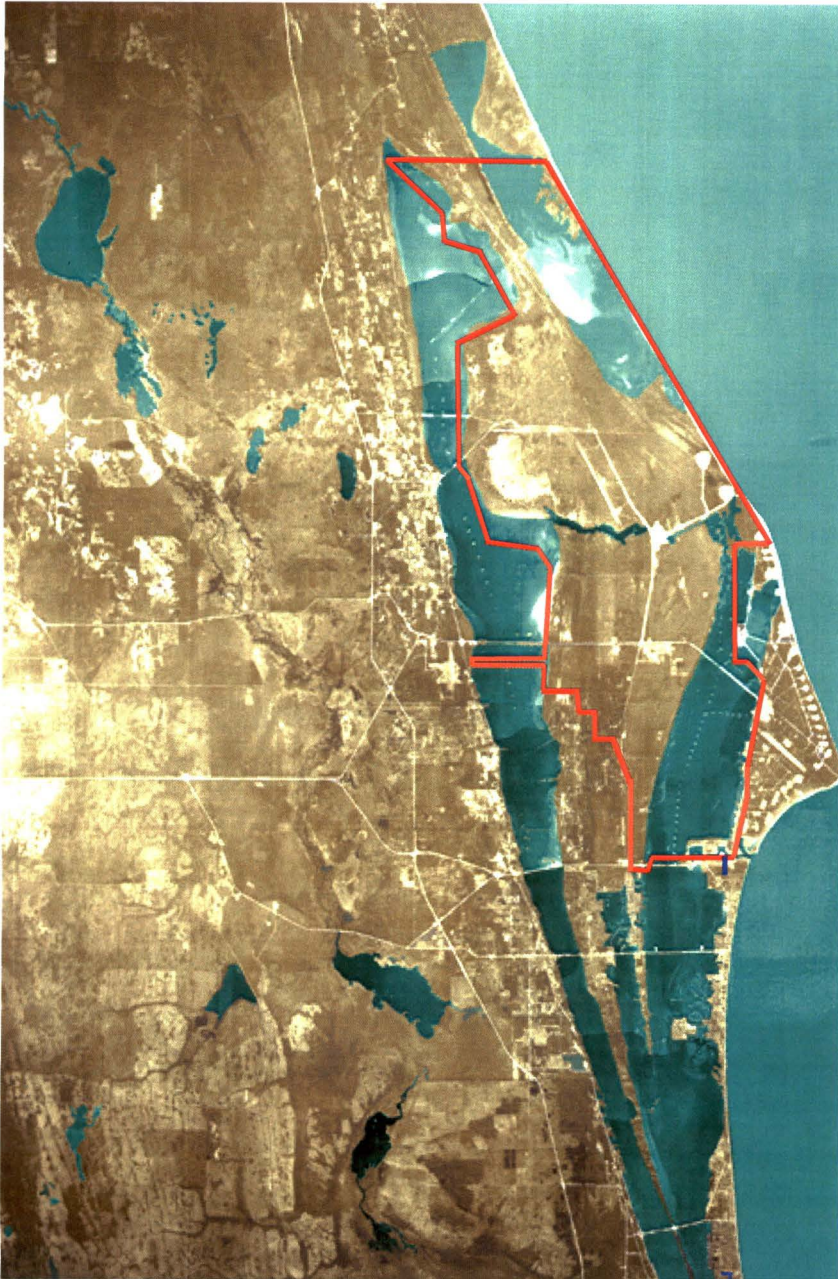
"I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth. No single space project in this period will be more impressive to mankind, or more important in the long-range exploration of space; and none will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

John F. Kennedy

Special Joint Session of Congress

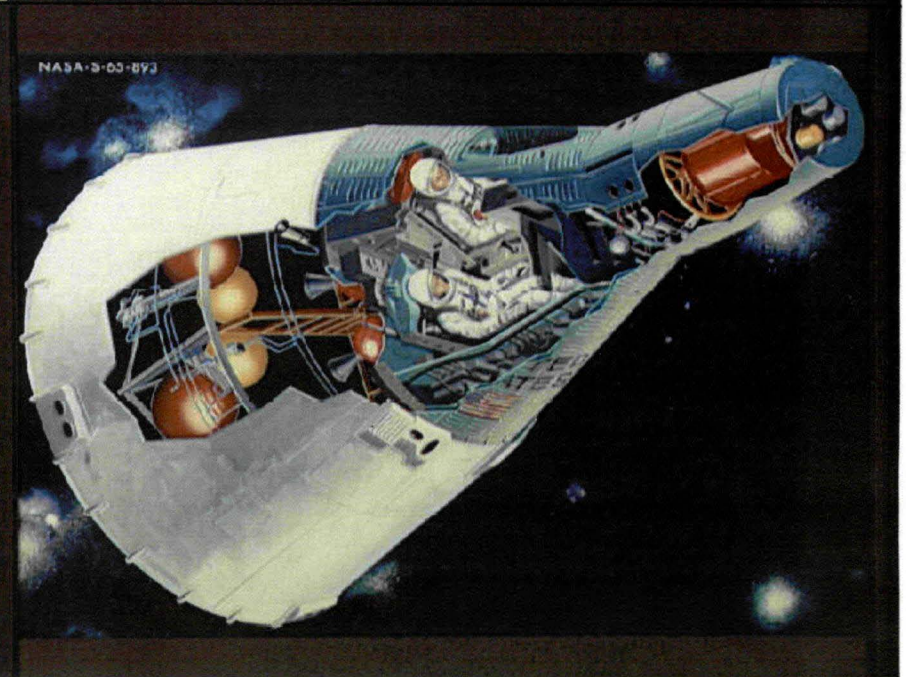
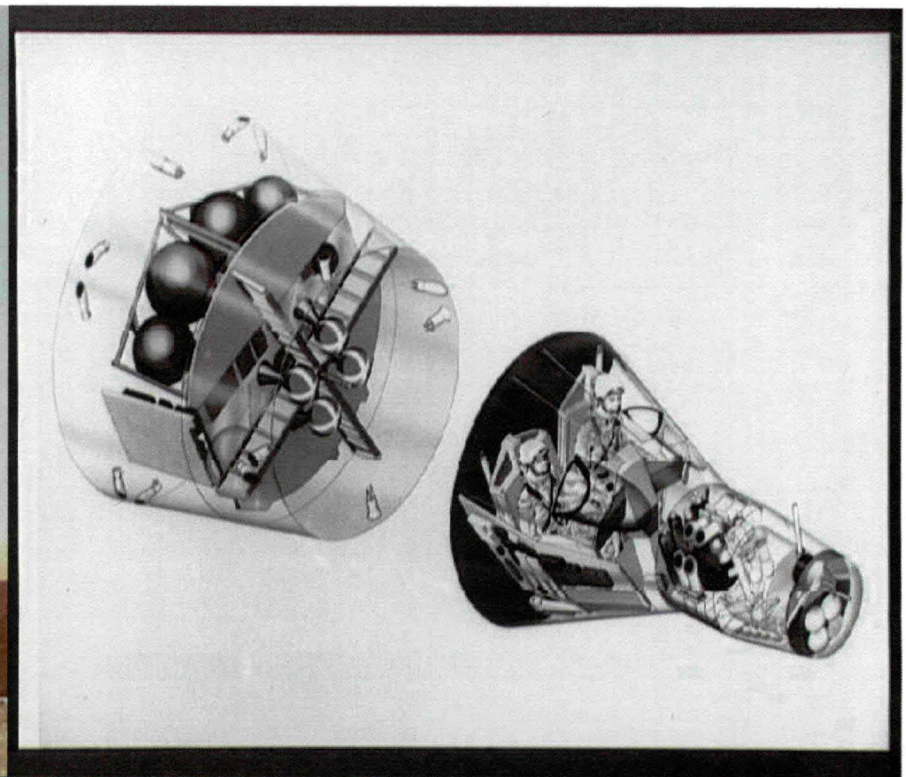
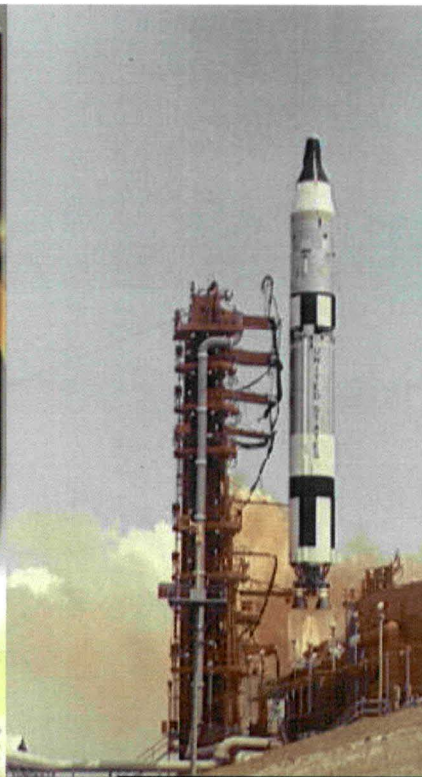
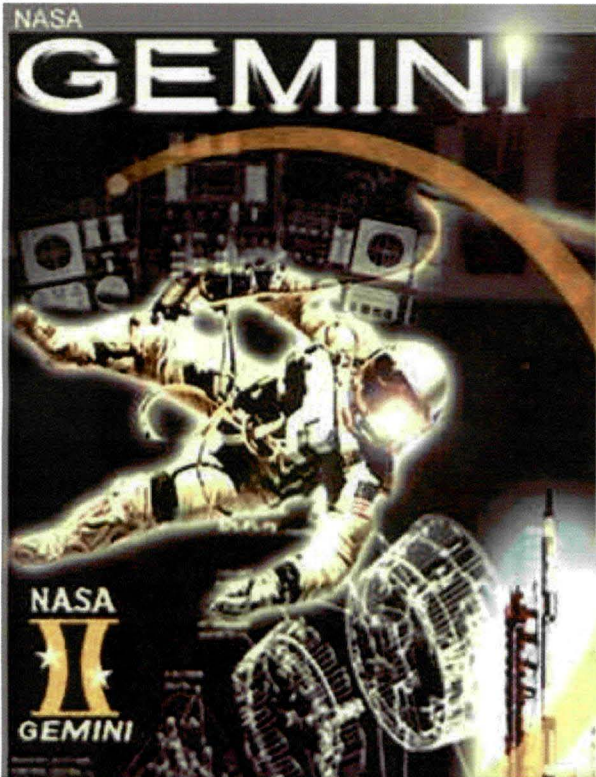
May 25, 1961



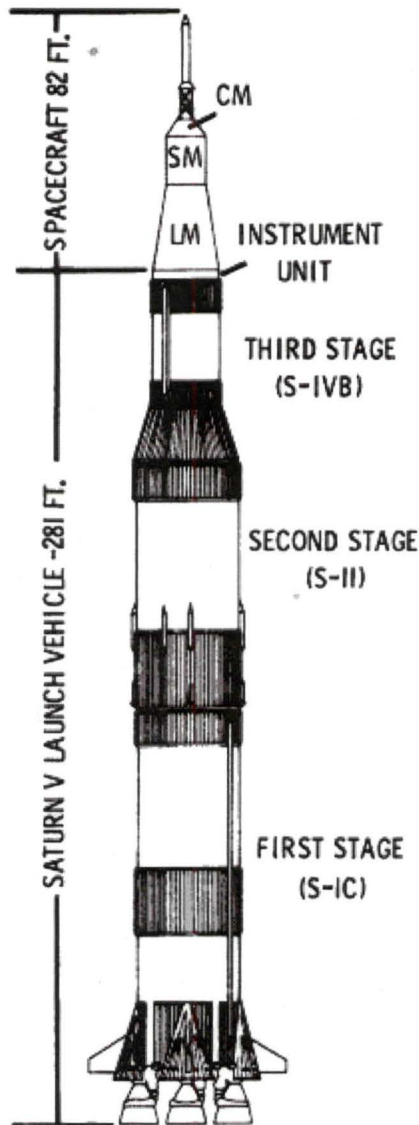


1962

- 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.

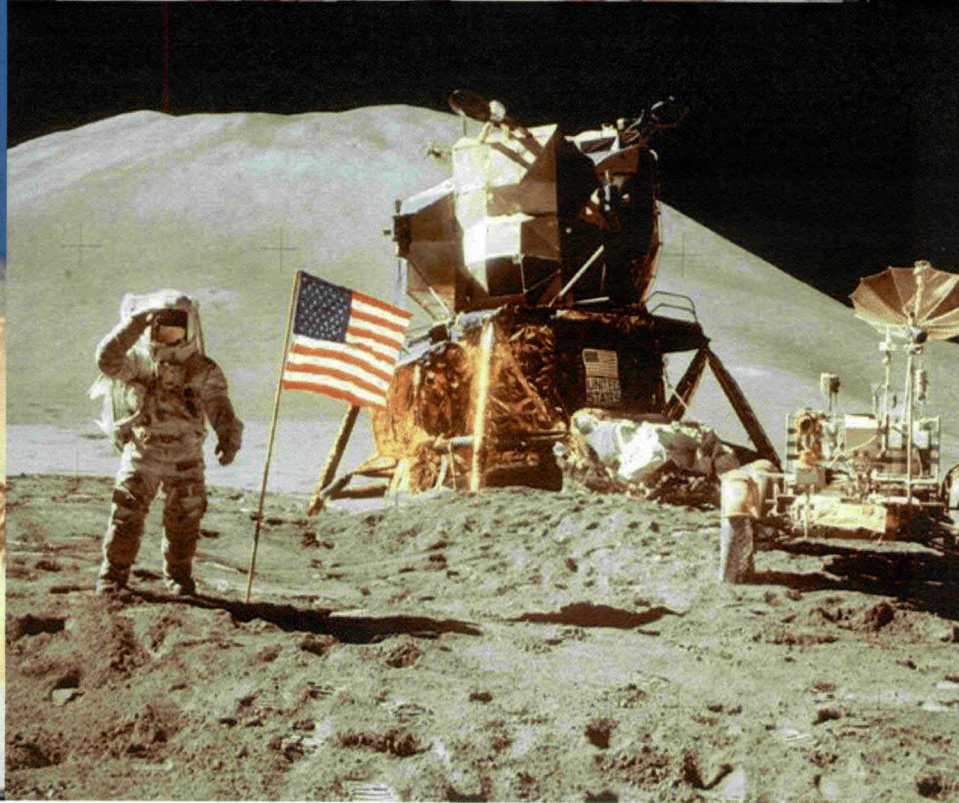
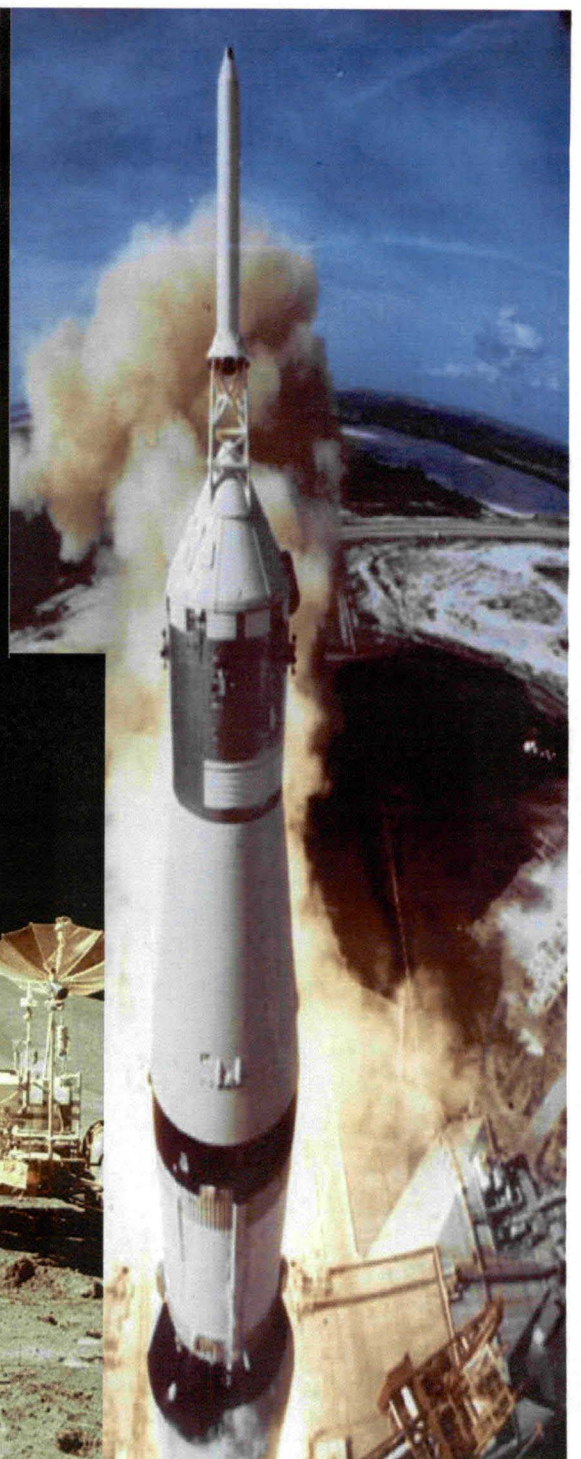
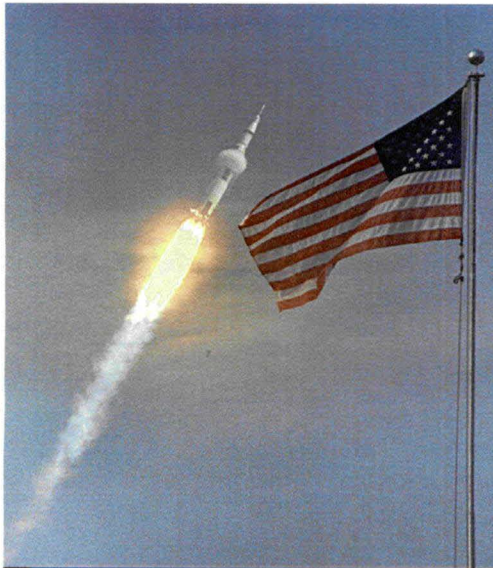
THIRD STAGE (S-IVB)

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.

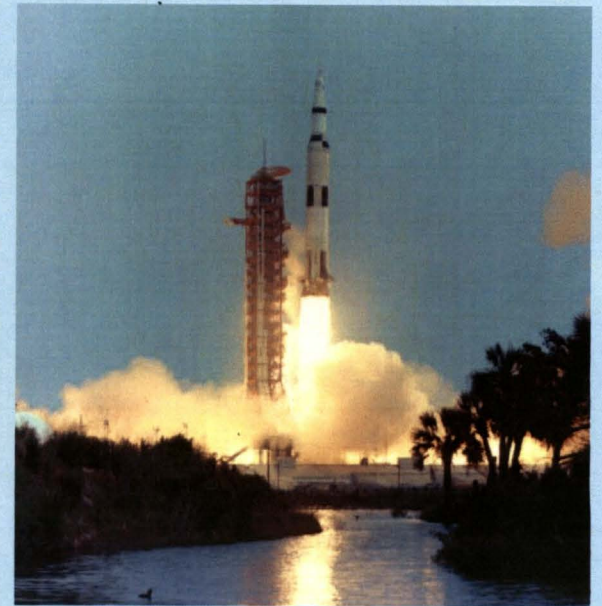
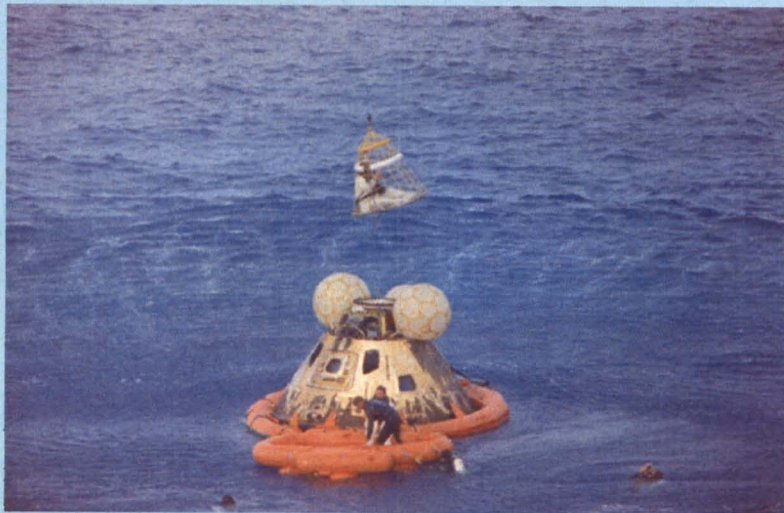
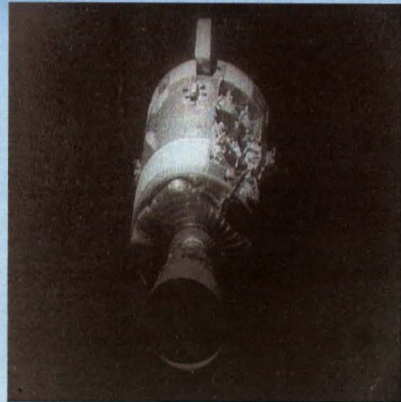
NOTE: WEIGHTS AND MEASURES GIVEN ABOVE ARE FOR THE NOMINAL VEHICLE CONFIGURATION FOR APOLLO 10. THE FIGURES MAY VARY SLIGHTLY DUE TO CHANGES BEFORE LAUNCH TO MEET CHANGING CONDITIONS.



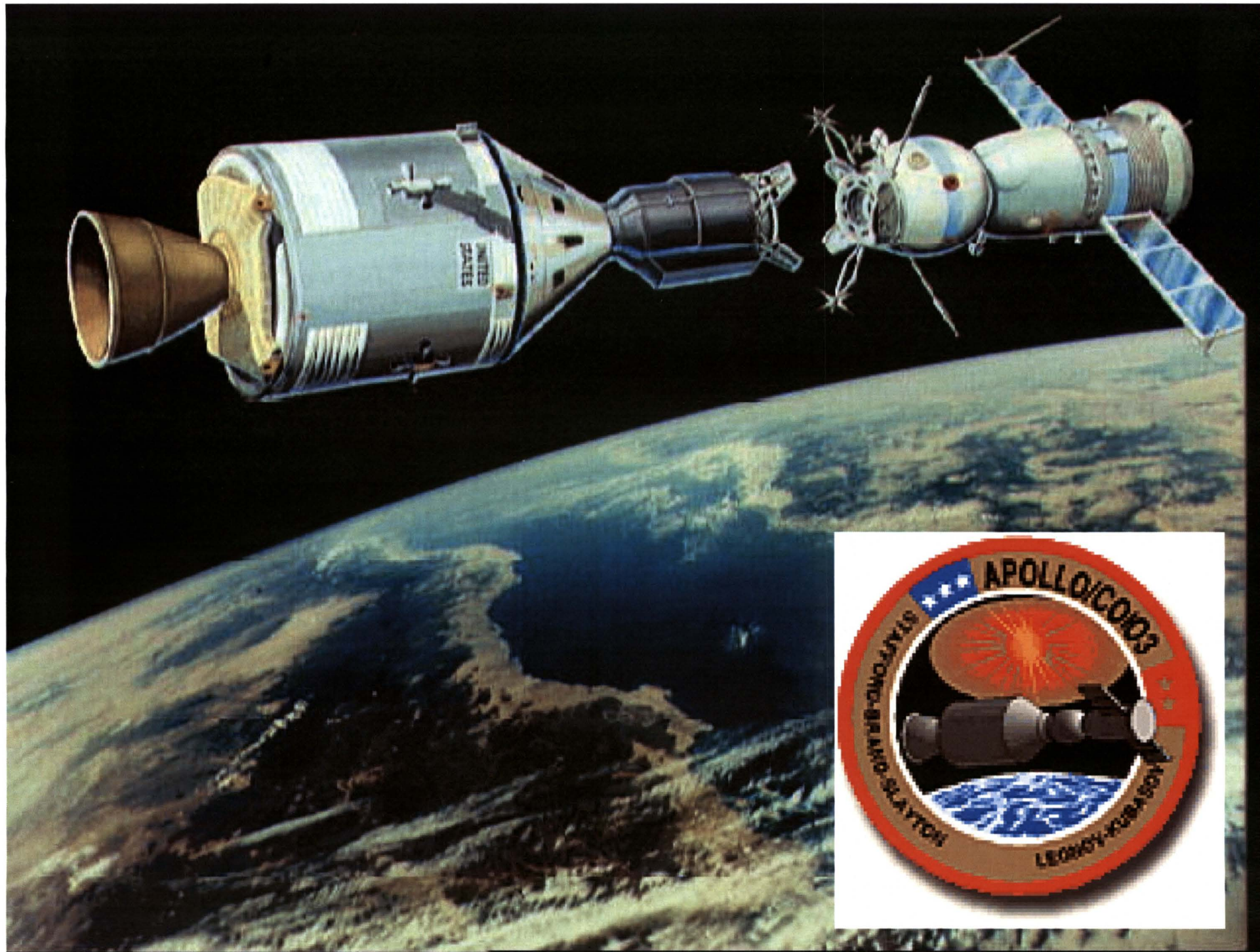
Apollo 1 Fire

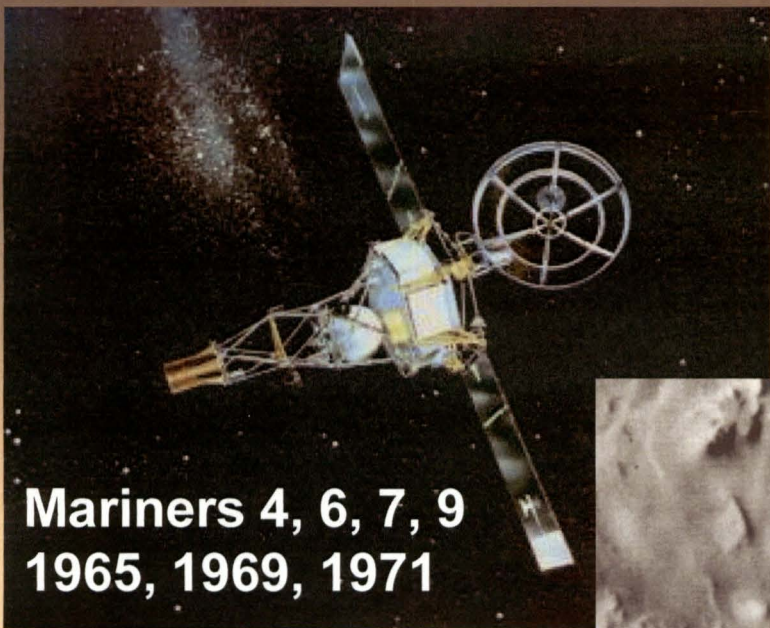


Apollo 13

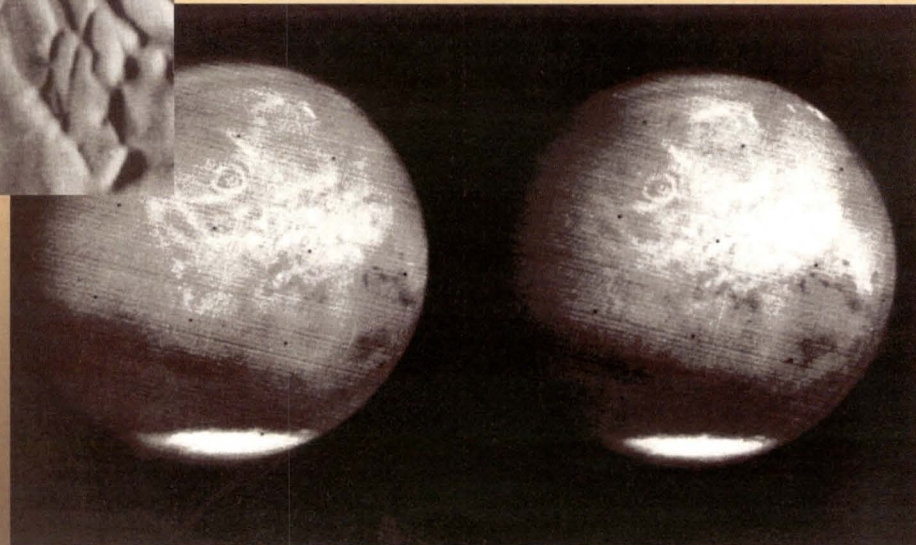
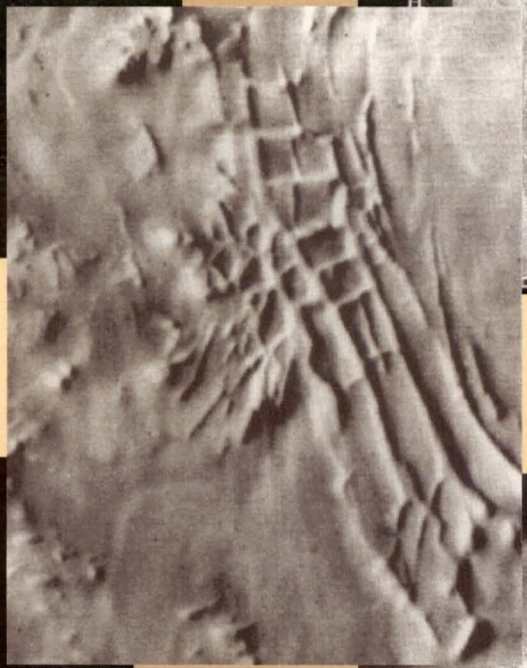


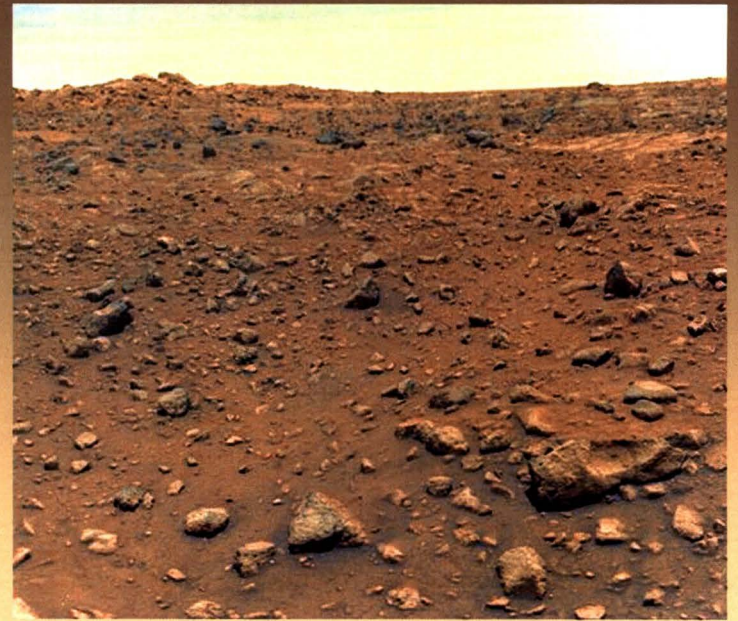
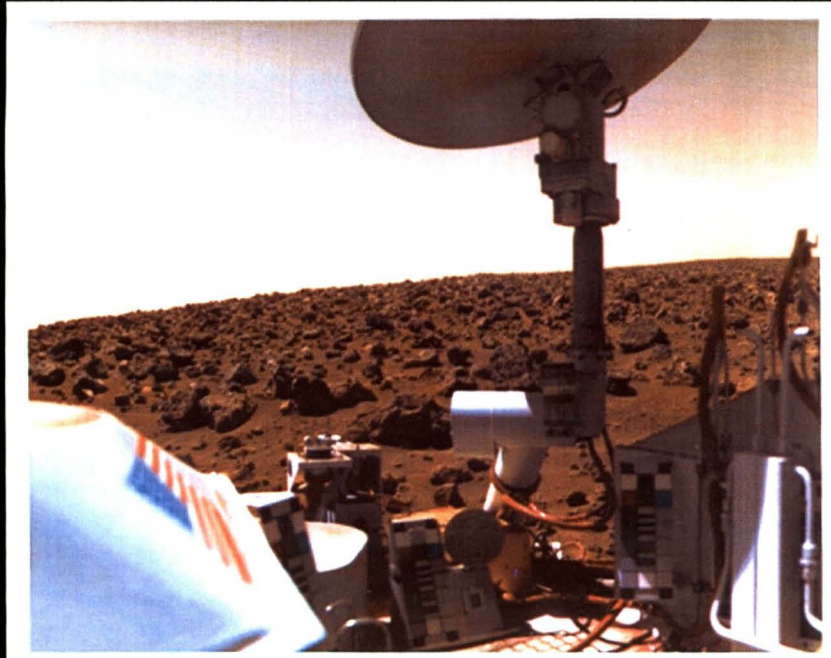






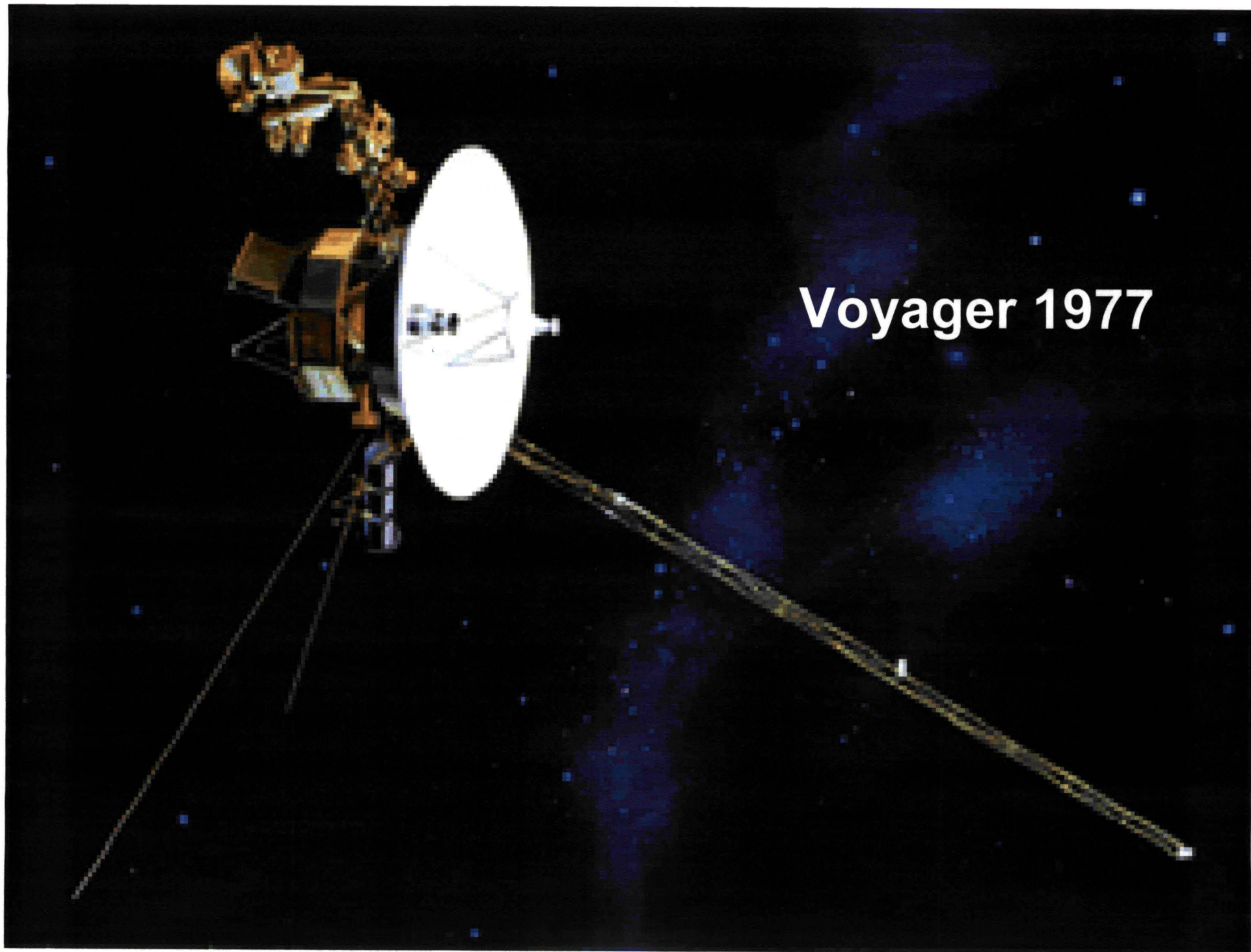
**Mariners 4, 6, 7, 9
1965, 1969, 1971**



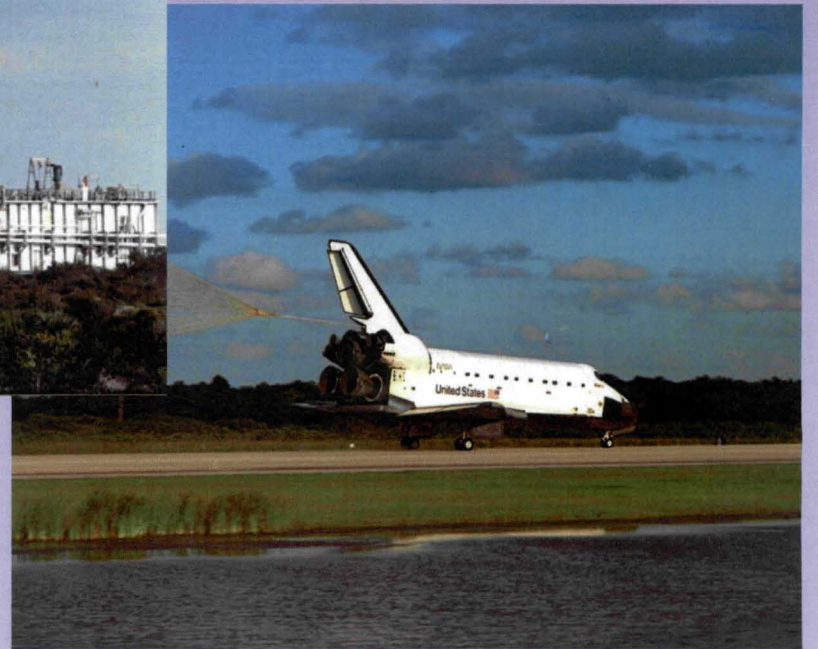
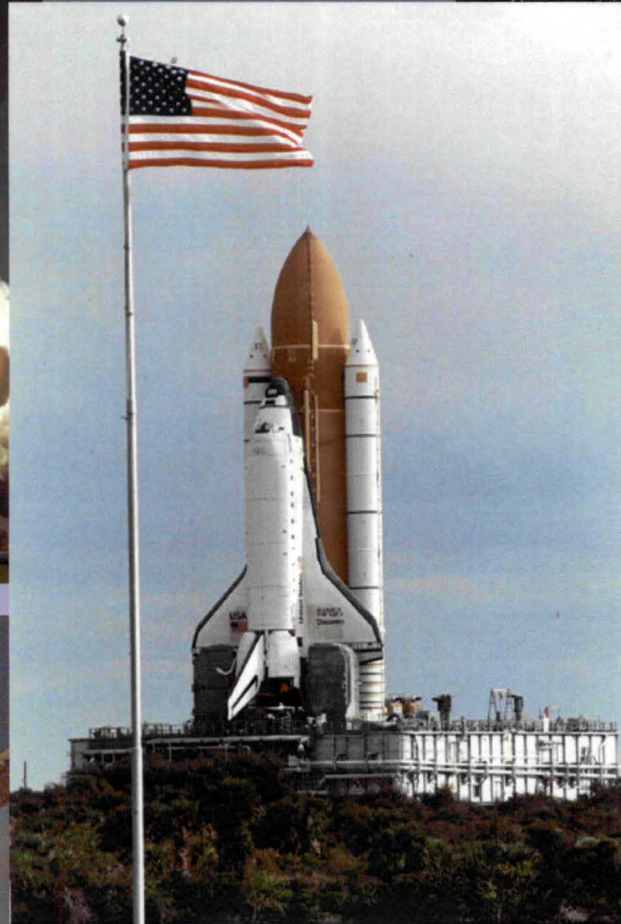
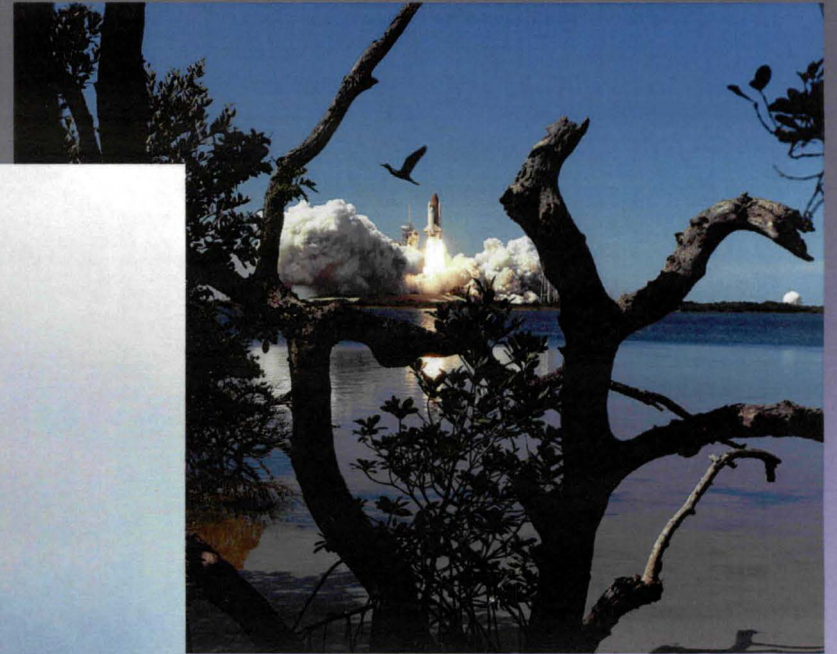


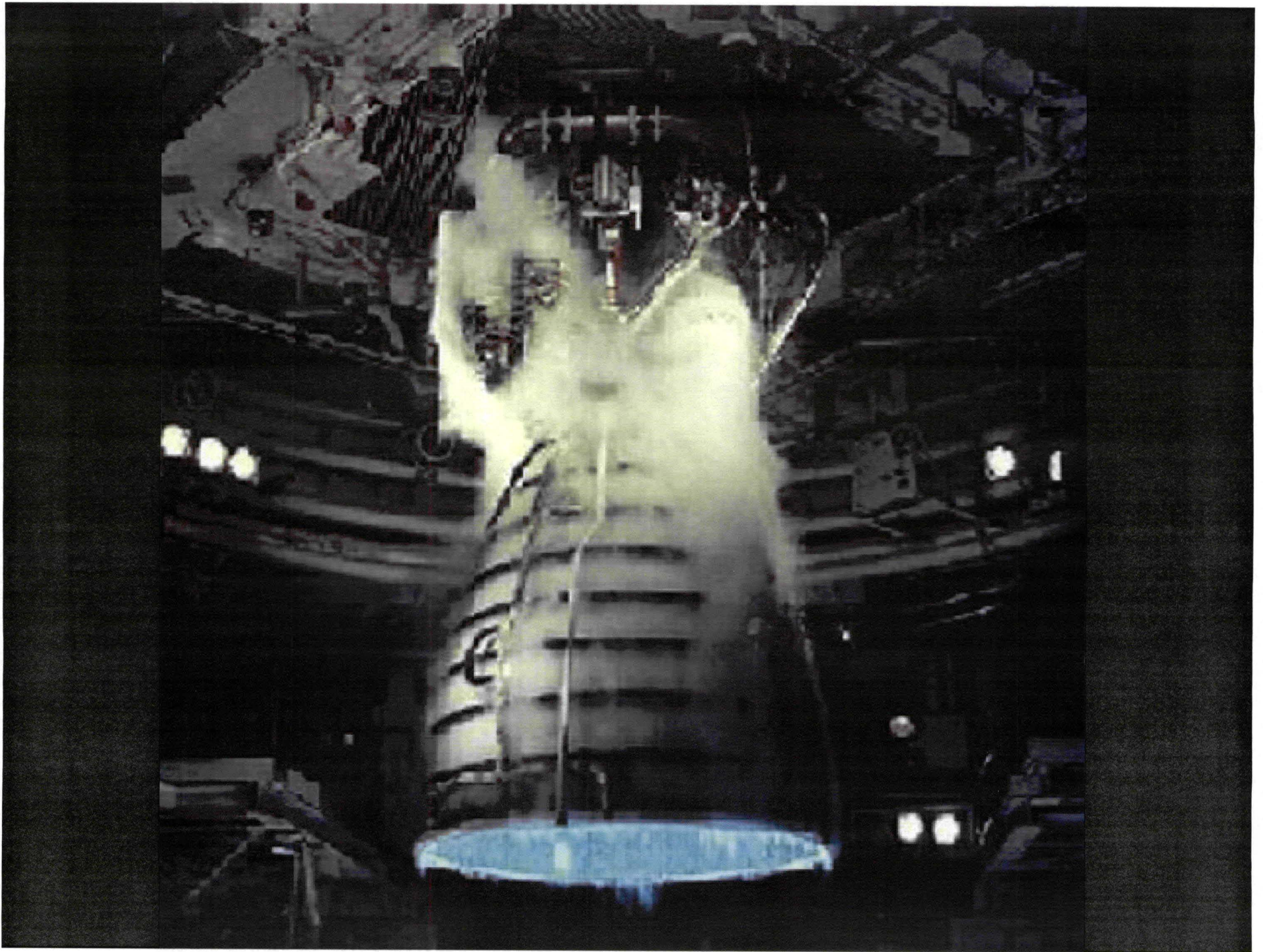
Viking 1975-79

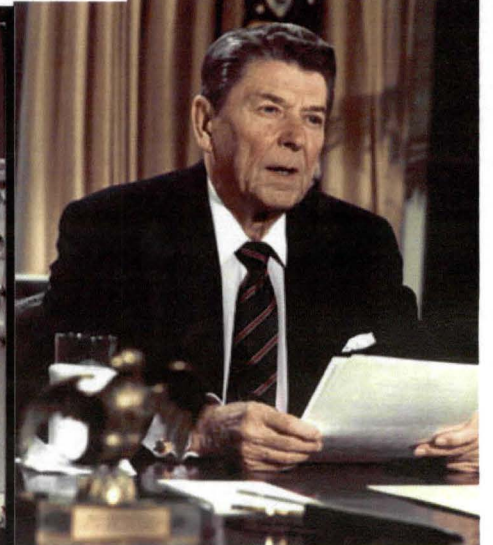
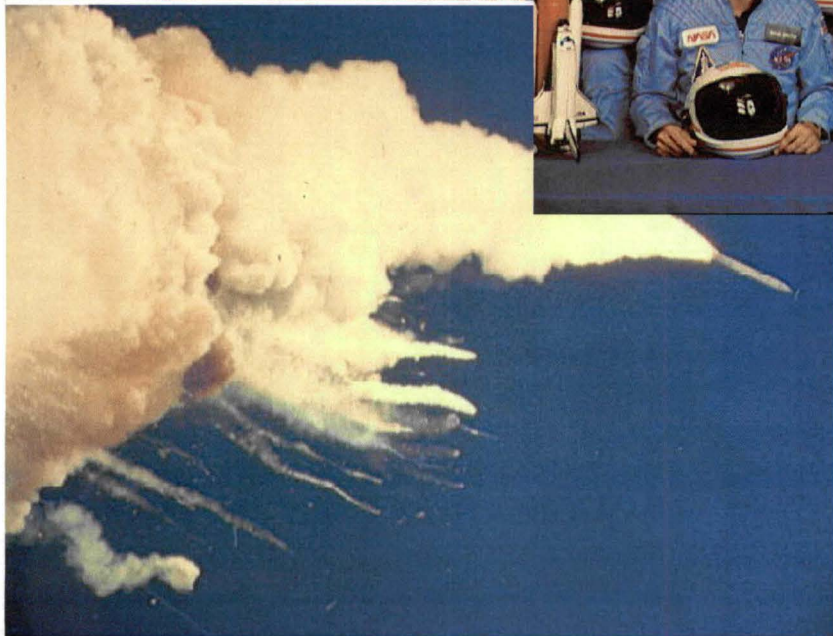
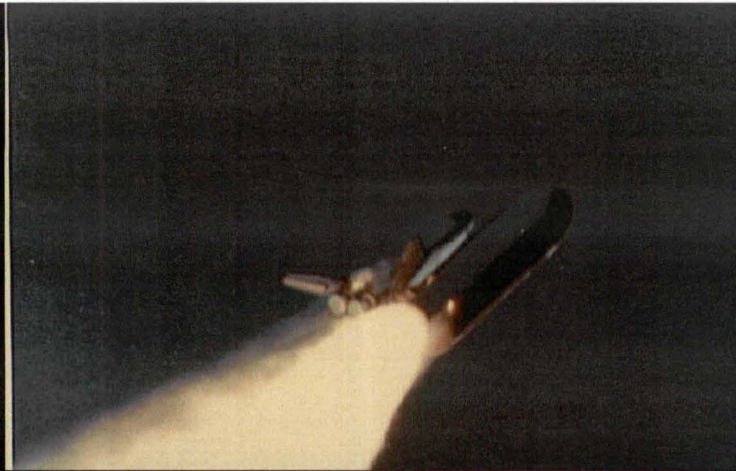
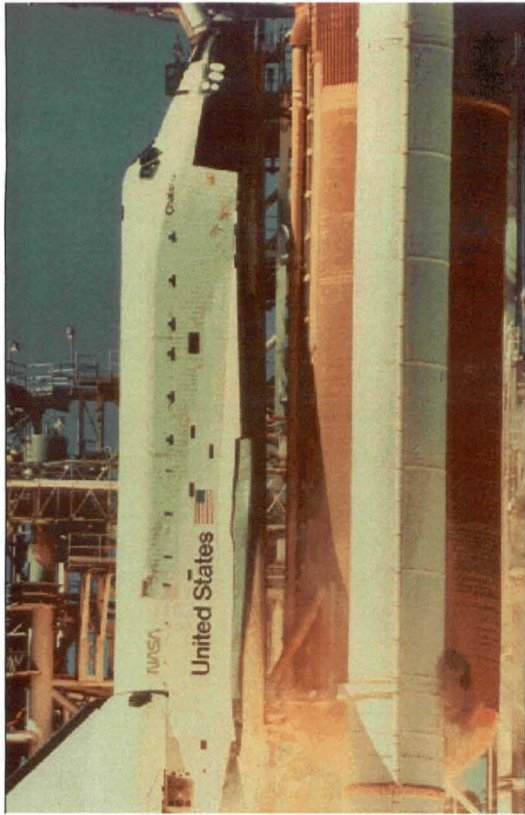




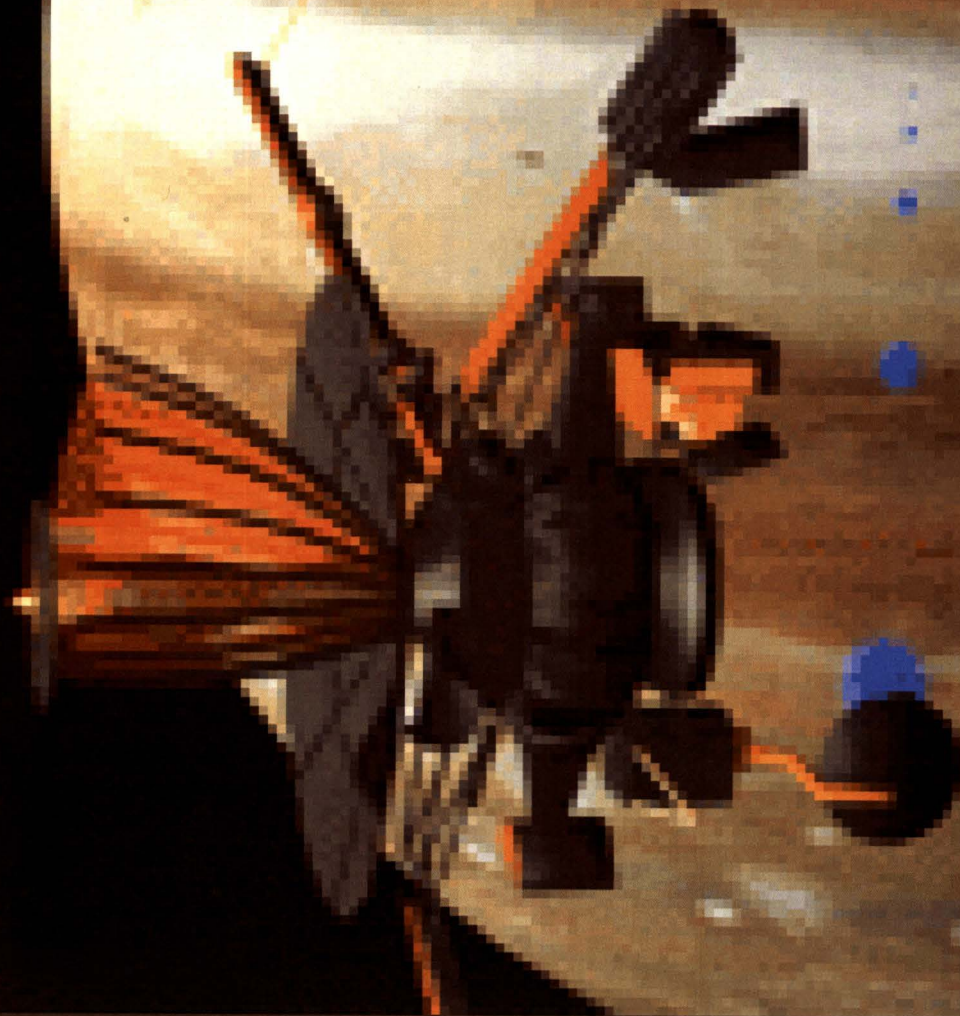
Voyager 1977

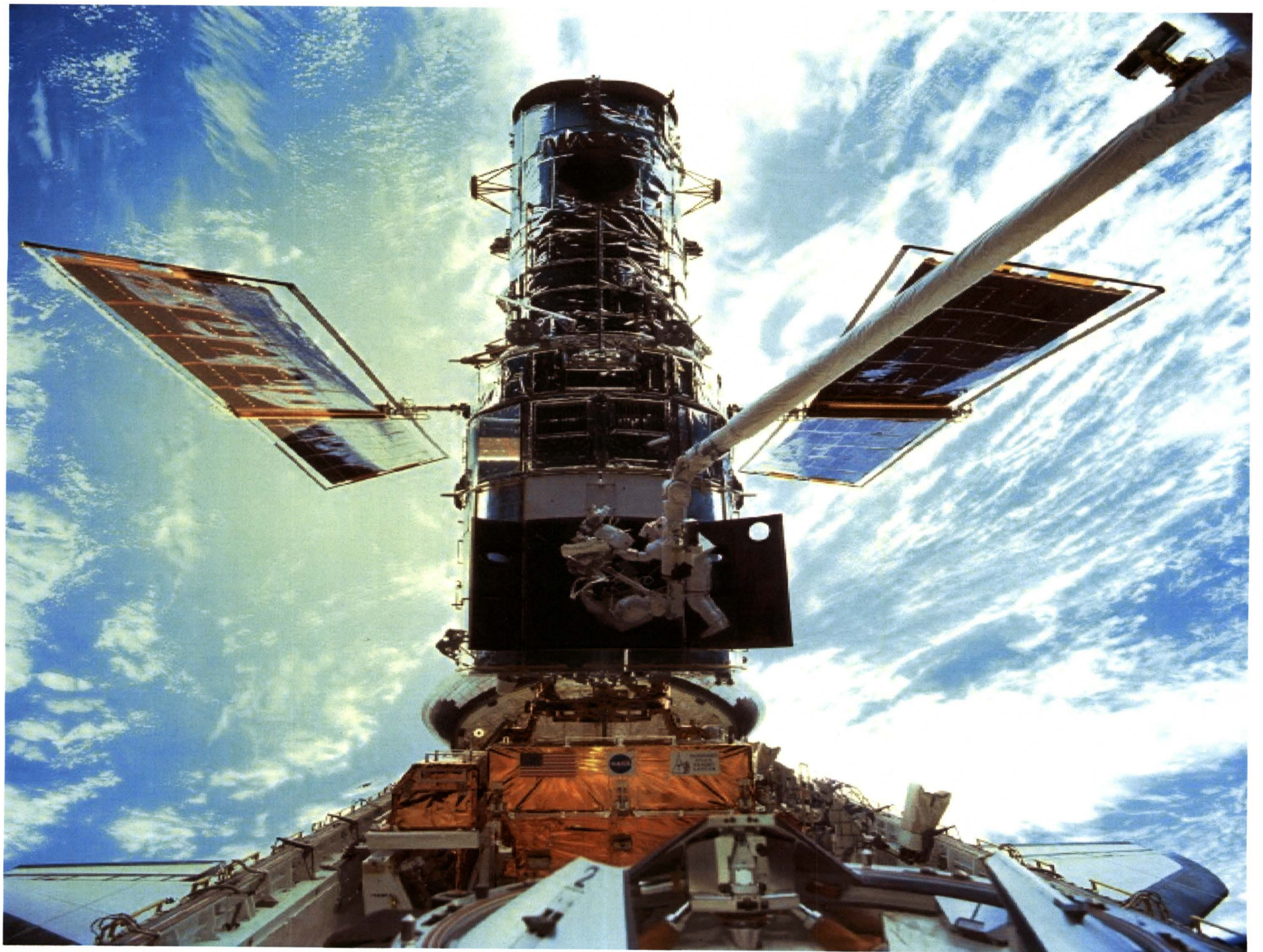




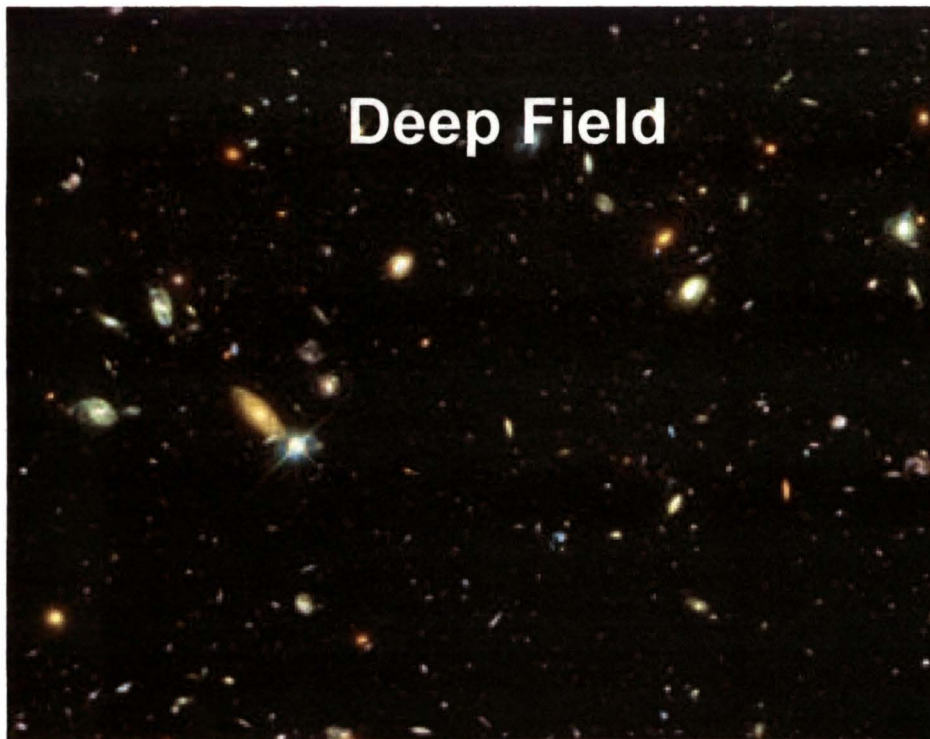


Galileo 1989

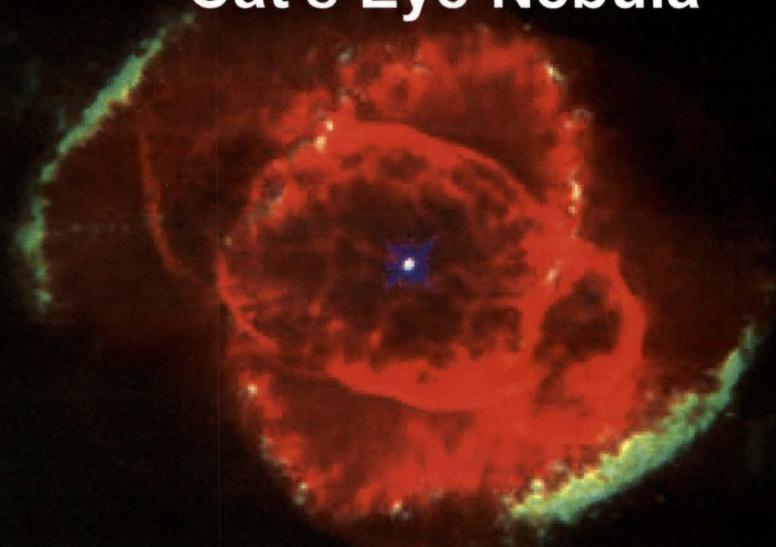




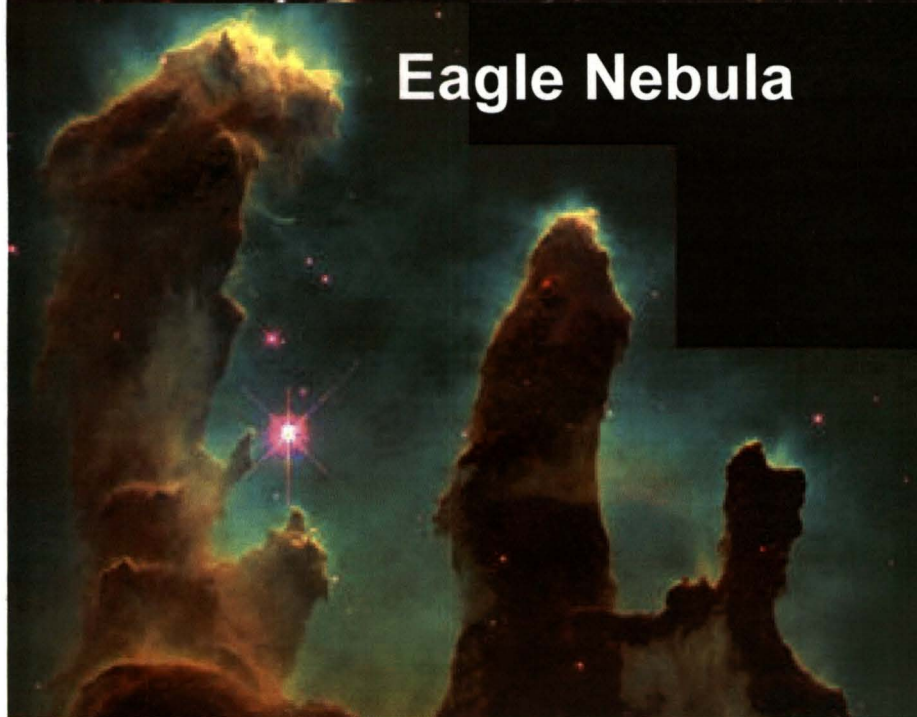
Deep Field



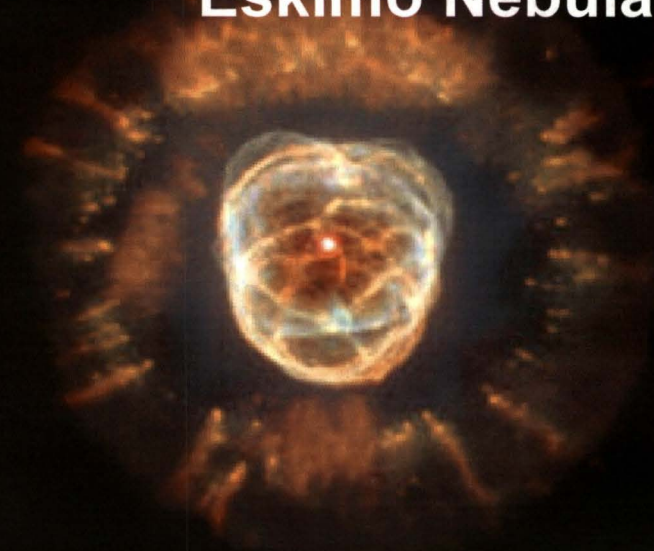
Cat's Eye Nebula



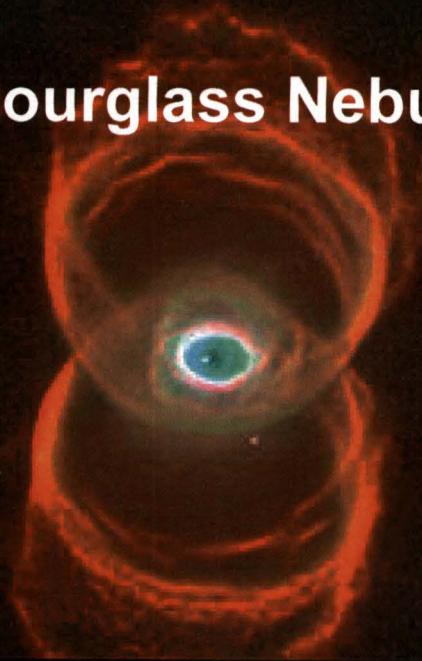
Eagle Nebula



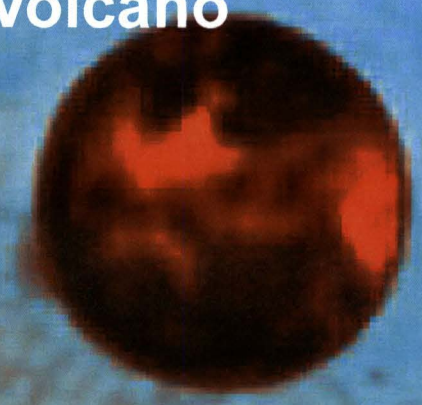
Eskimo Nebula



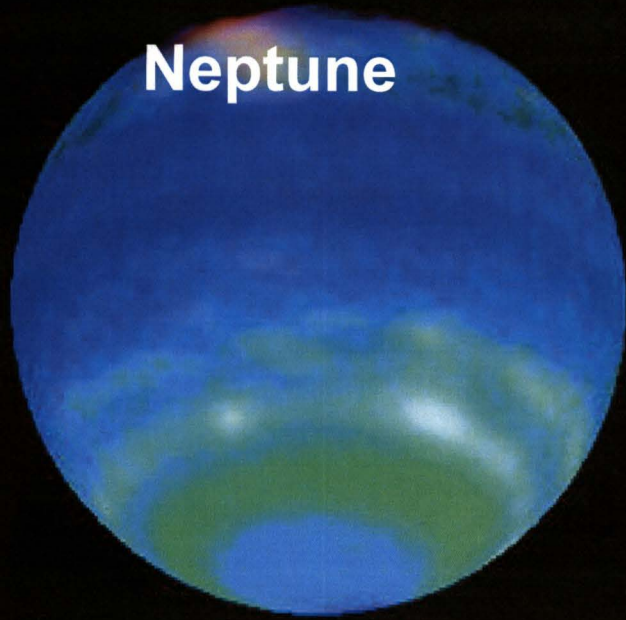
Hourglass Nebula



Io Volcano



Neptune



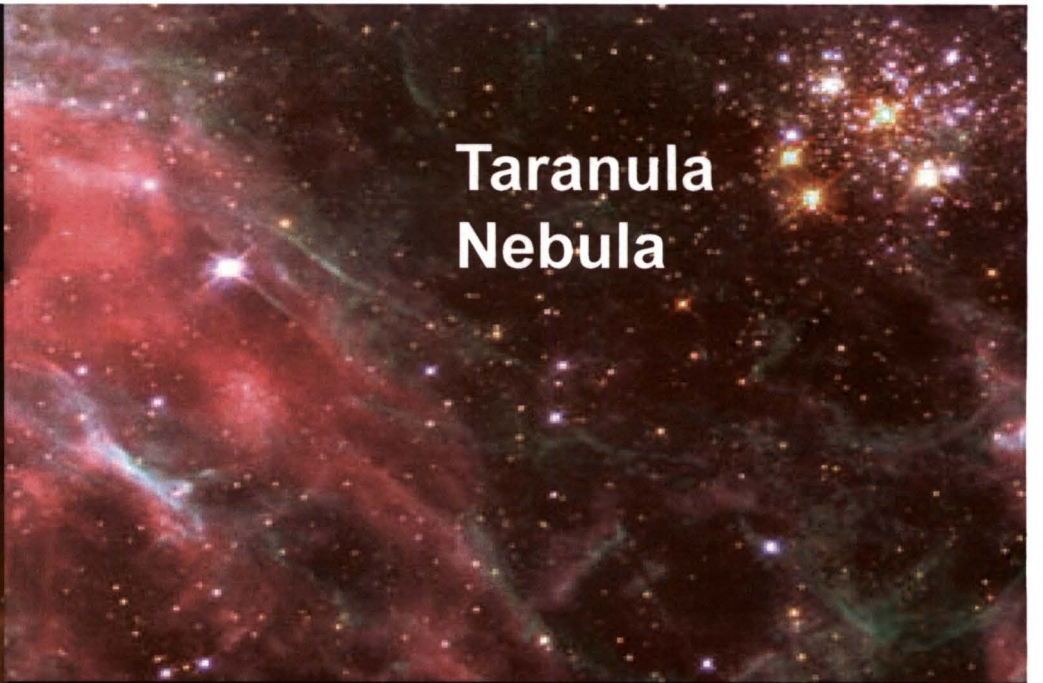
Lagoon Nebula



Young Star Cluster



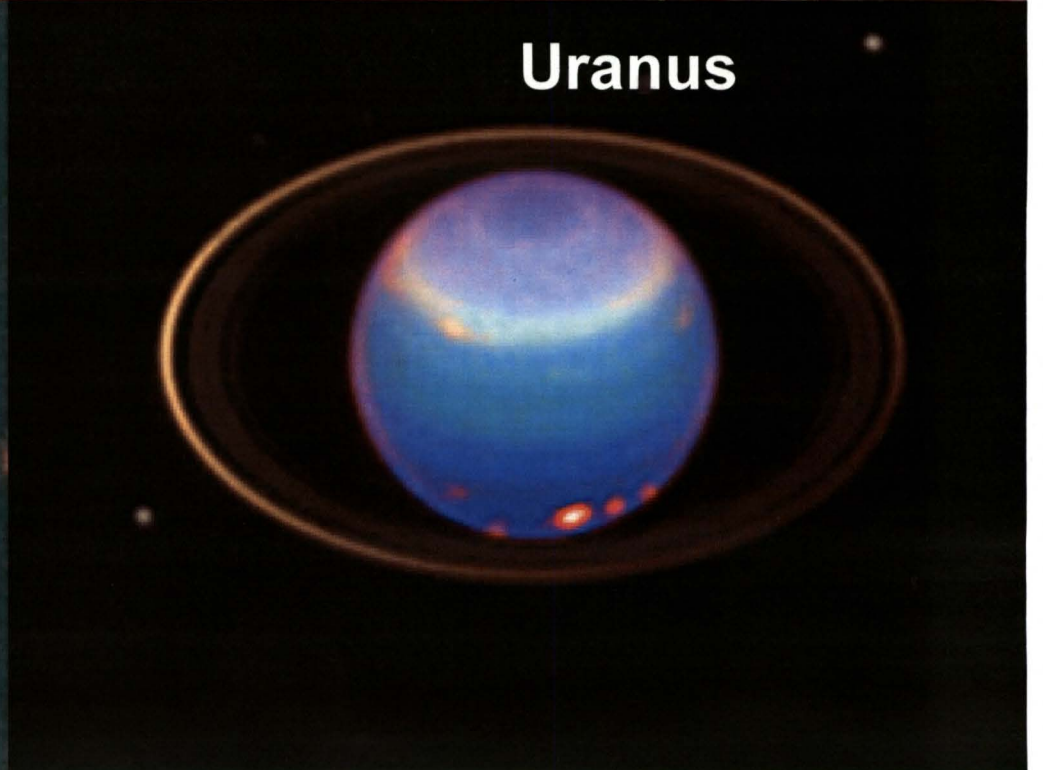
Taranula Nebula



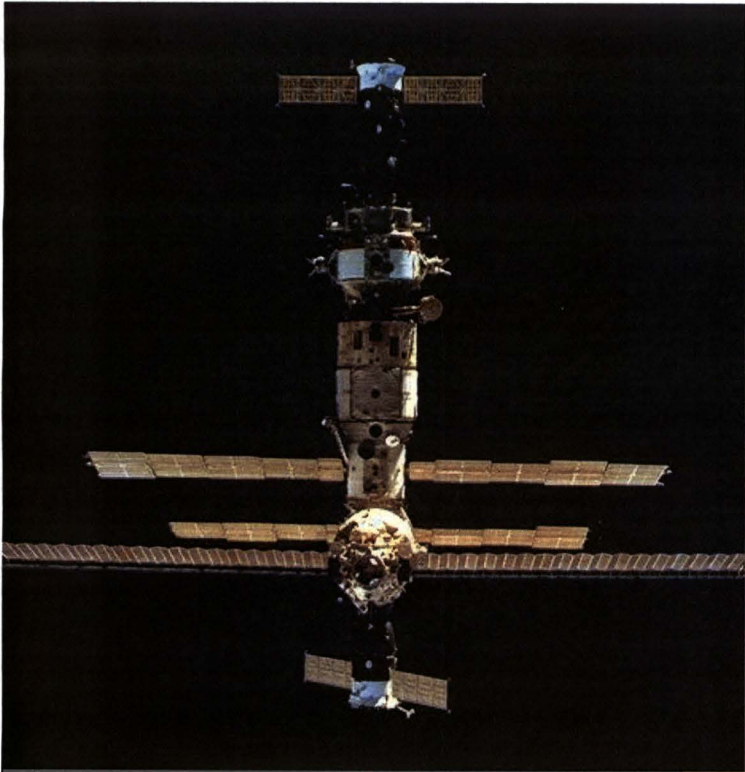
Stellar Jet

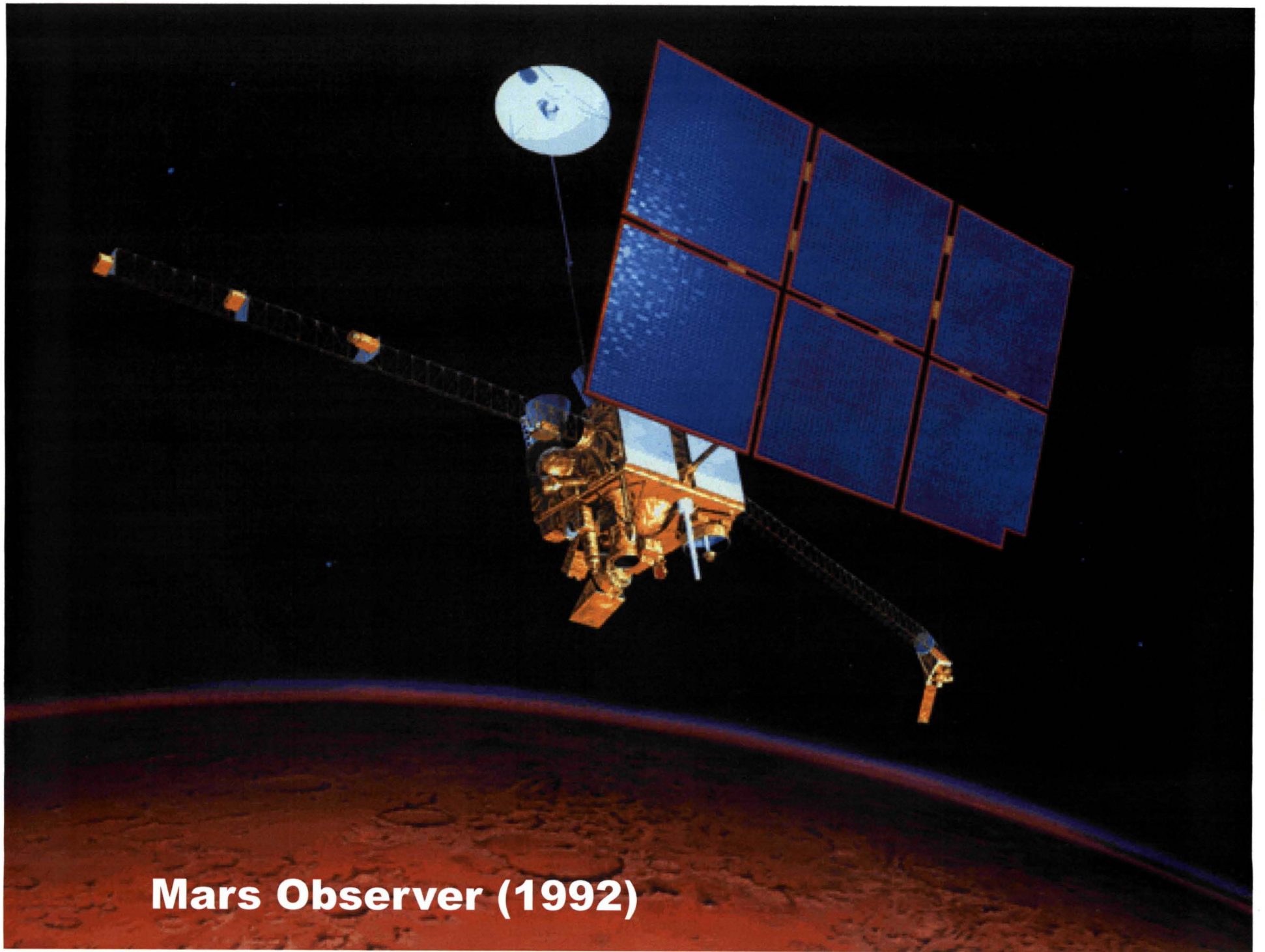


Uranus

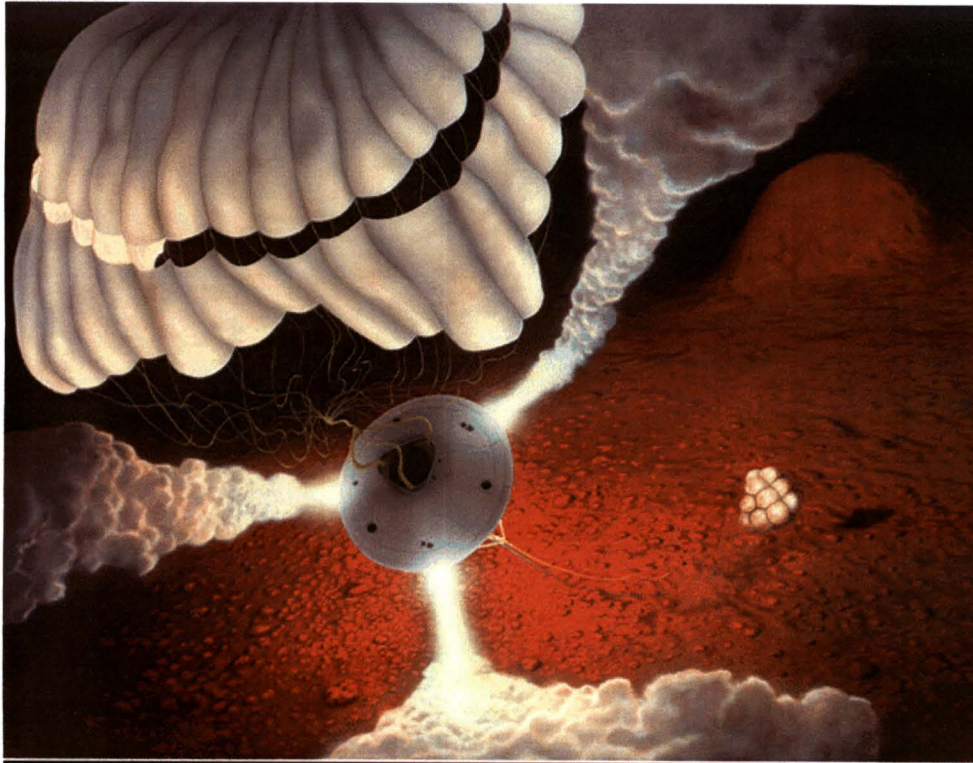


Mir Space Station



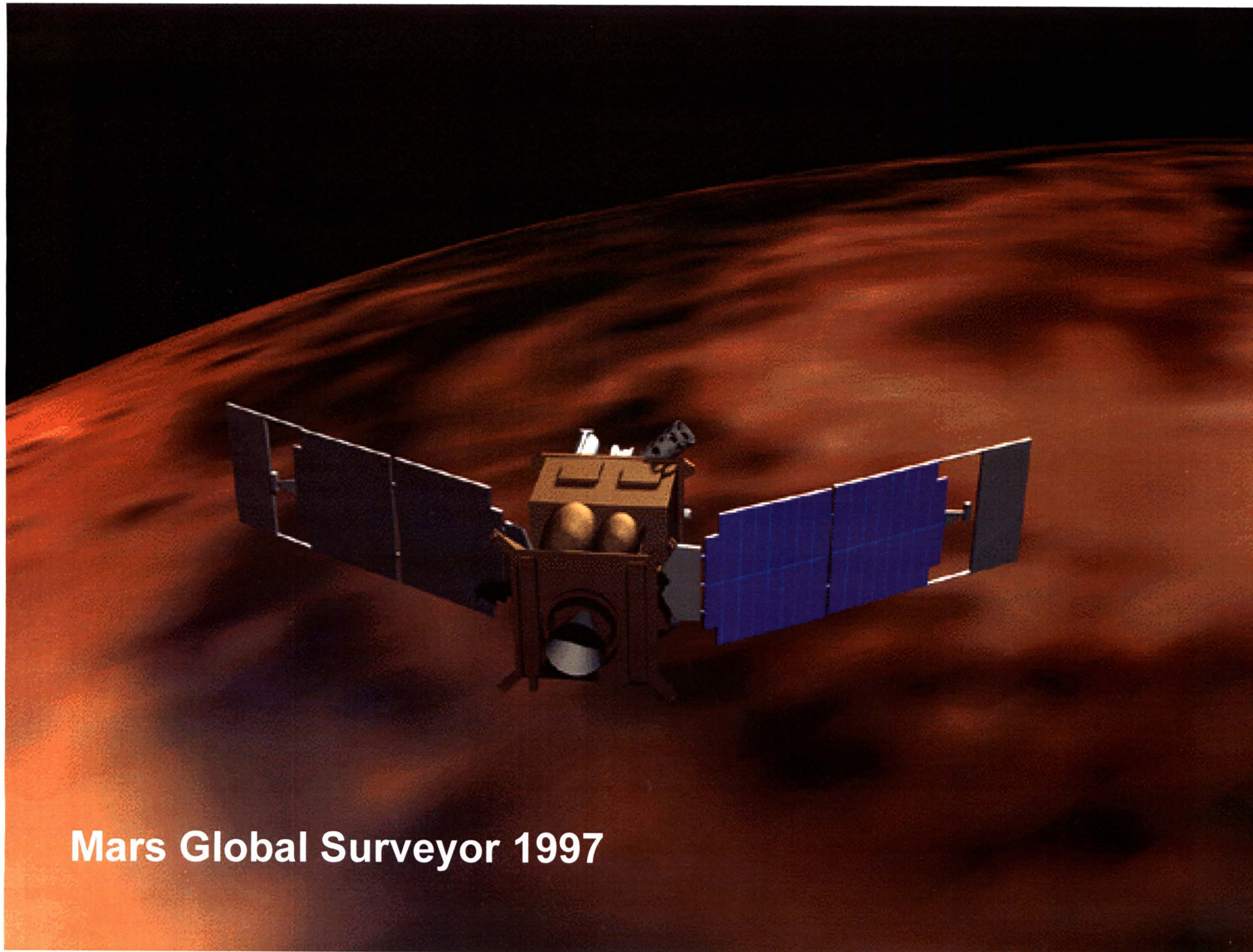


Mars Observer (1992)

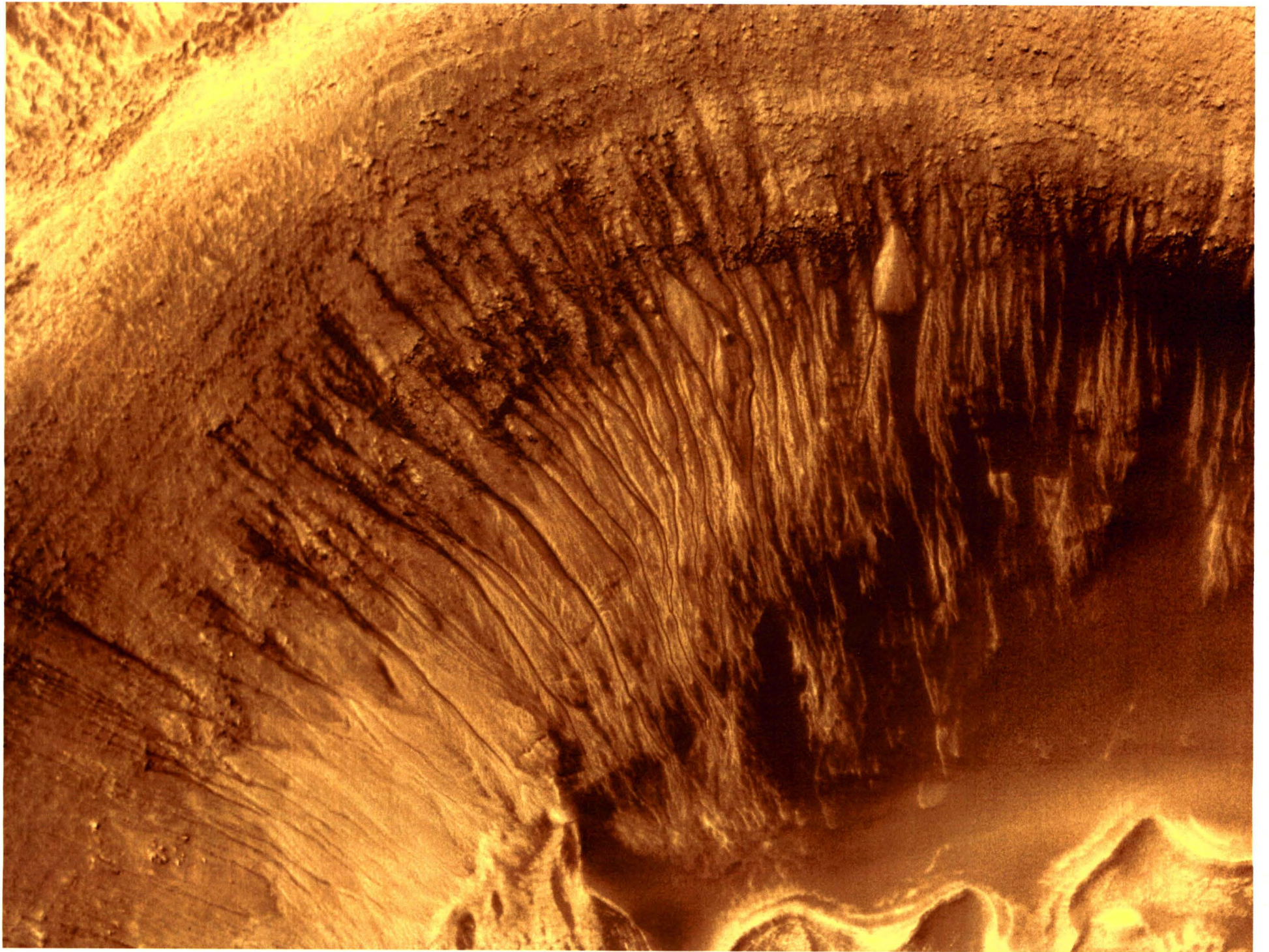


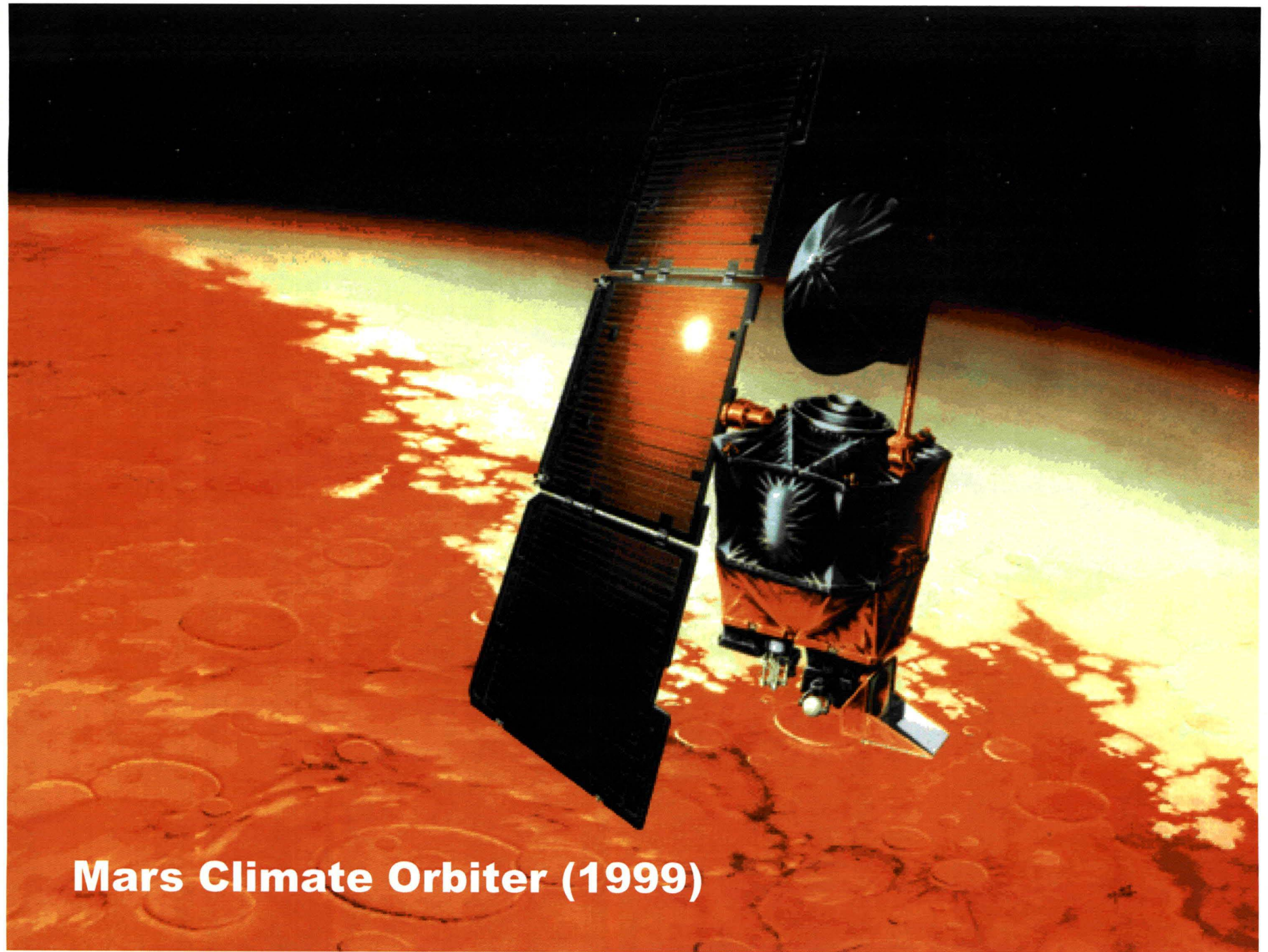
Mars Pathfinder (1997)





Mars Global Surveyor 1997

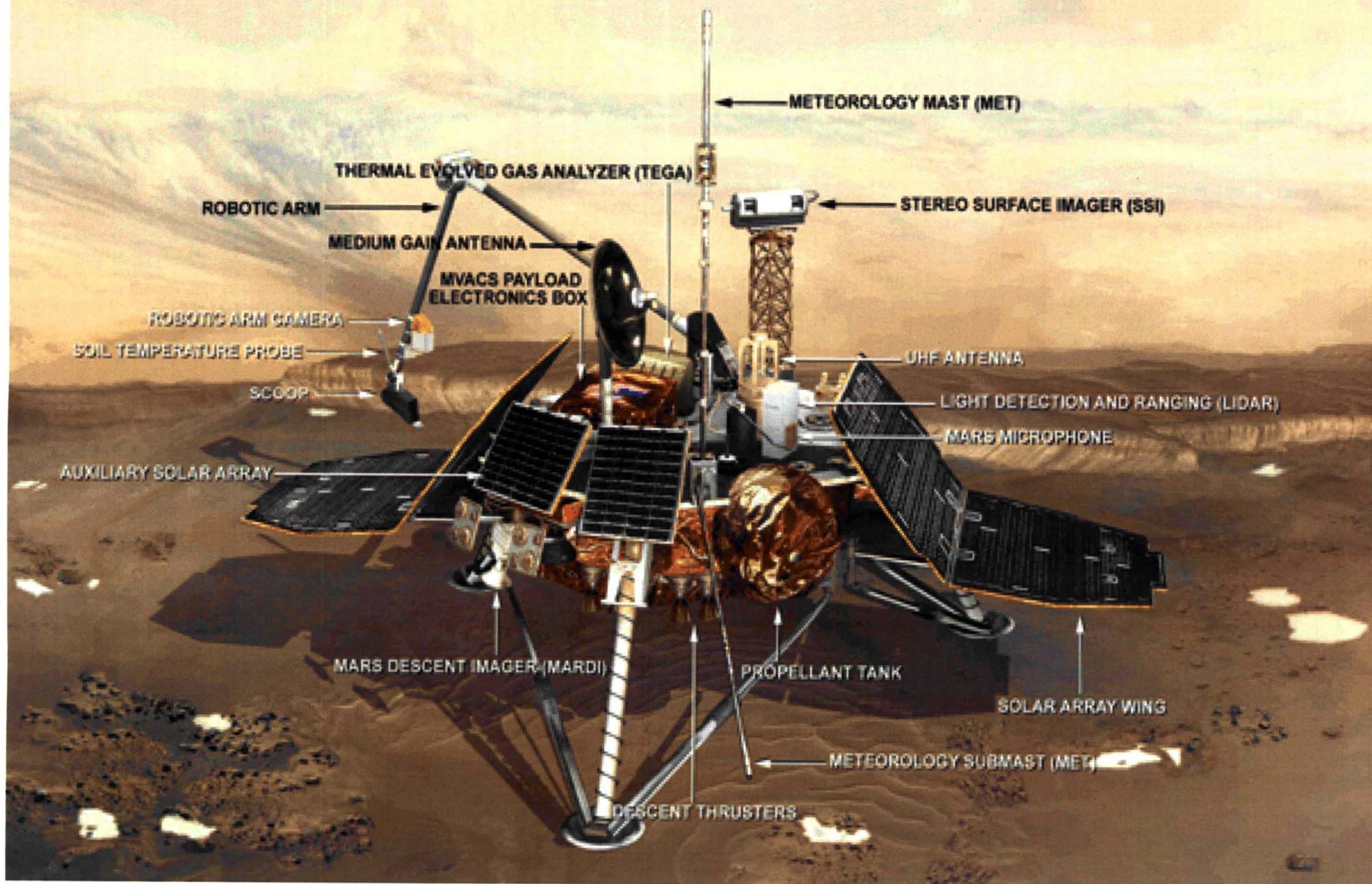


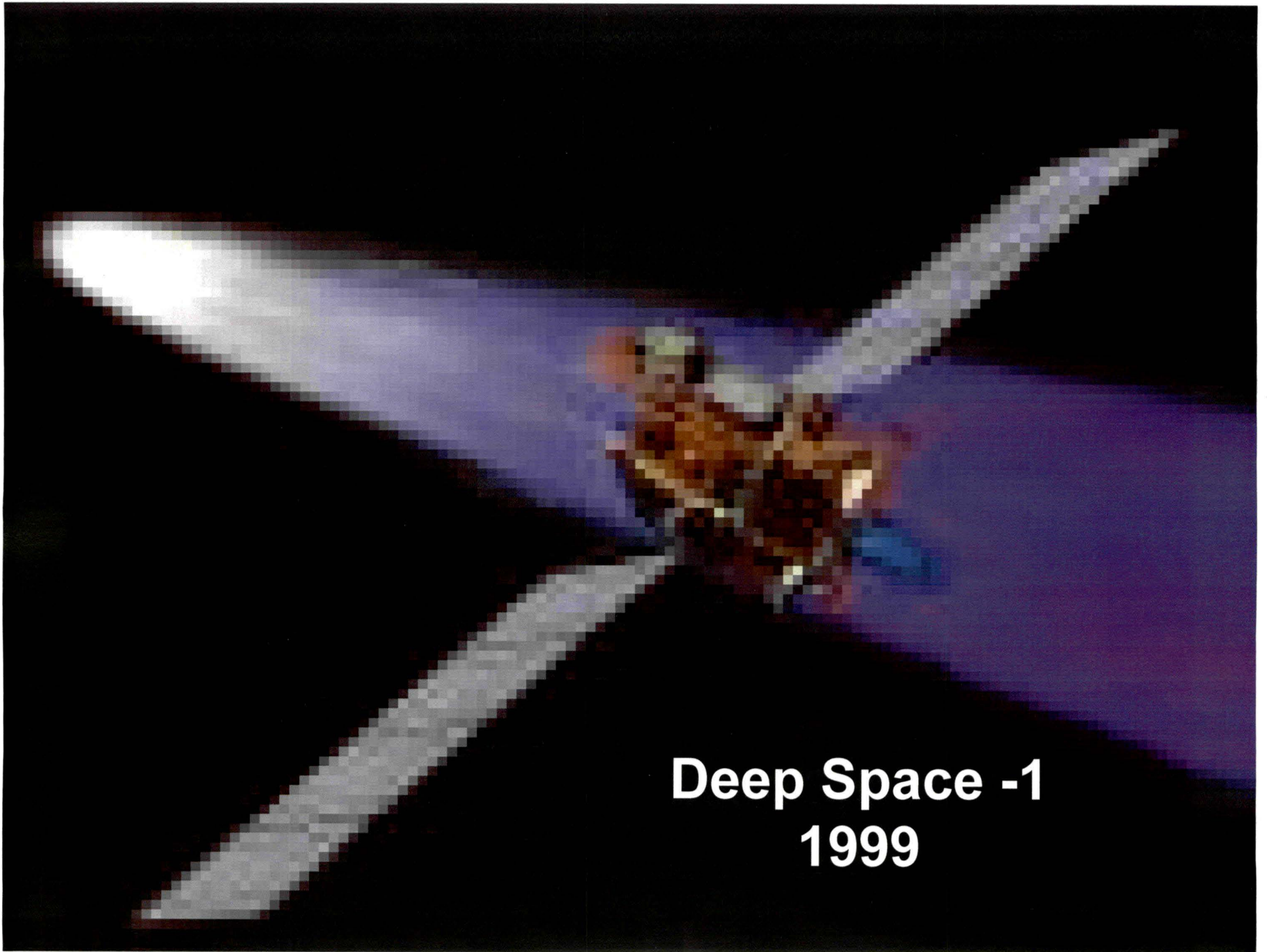


Mars Climate Orbiter (1999)

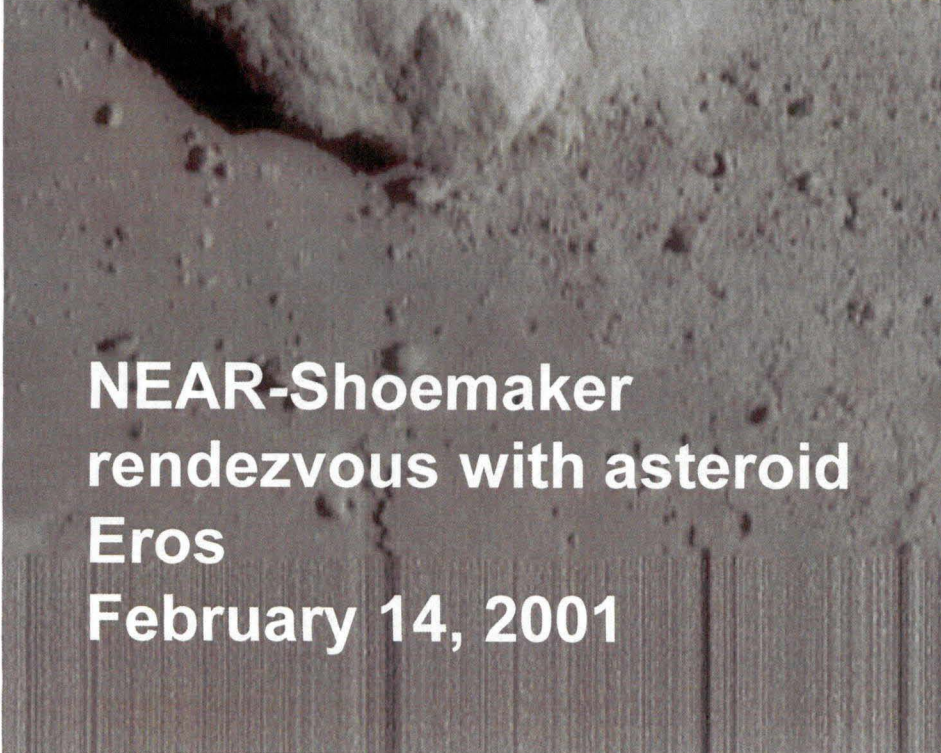
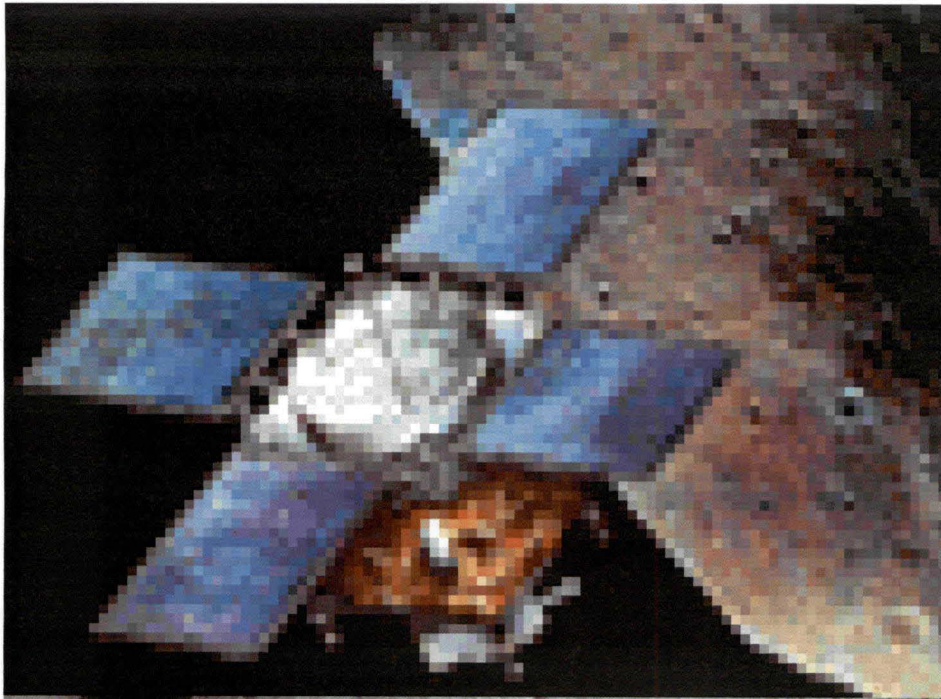
MARS POLAR LANDER: AN EXPEDITION TO THE SOUTH POLAR REGION

1999



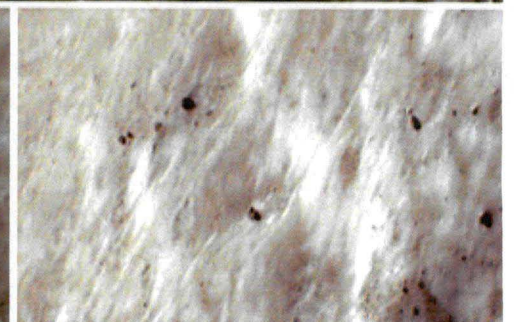
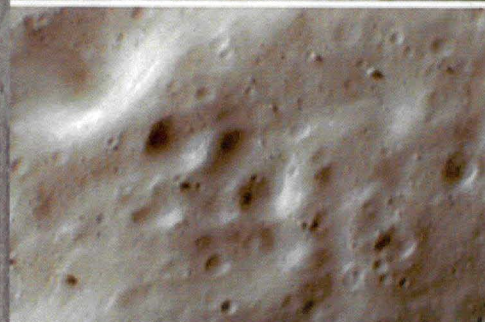
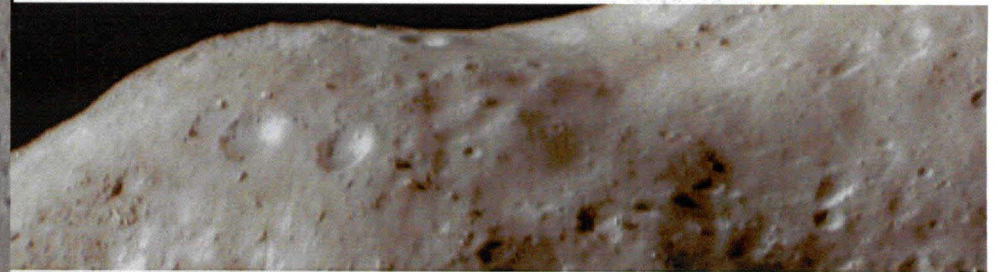
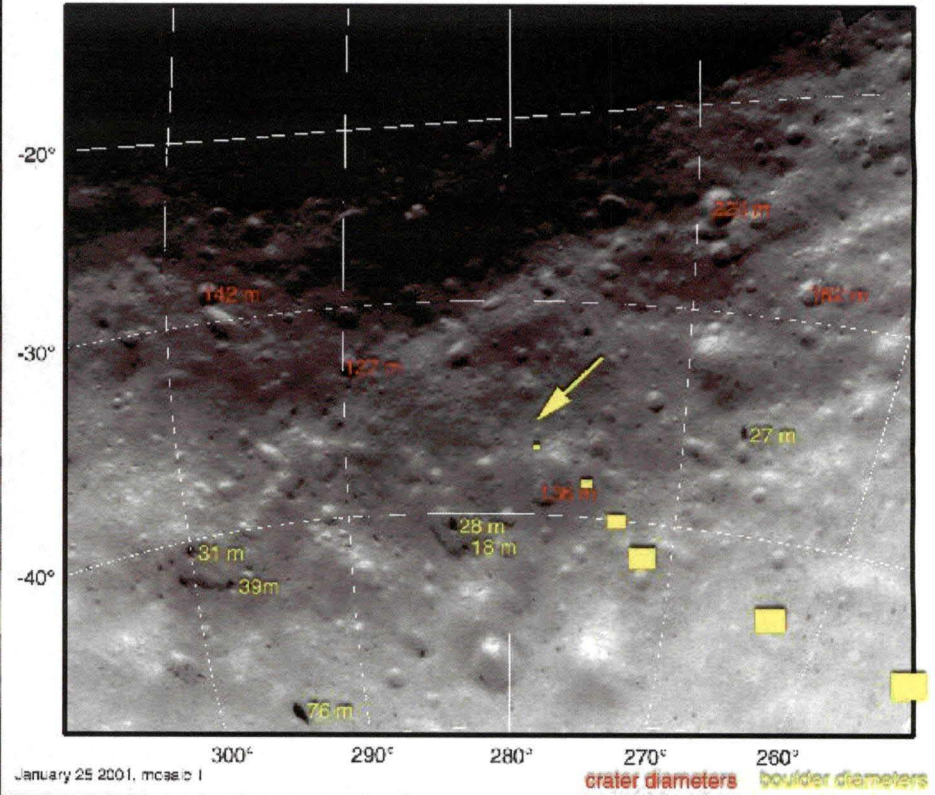


Deep Space -1
1999

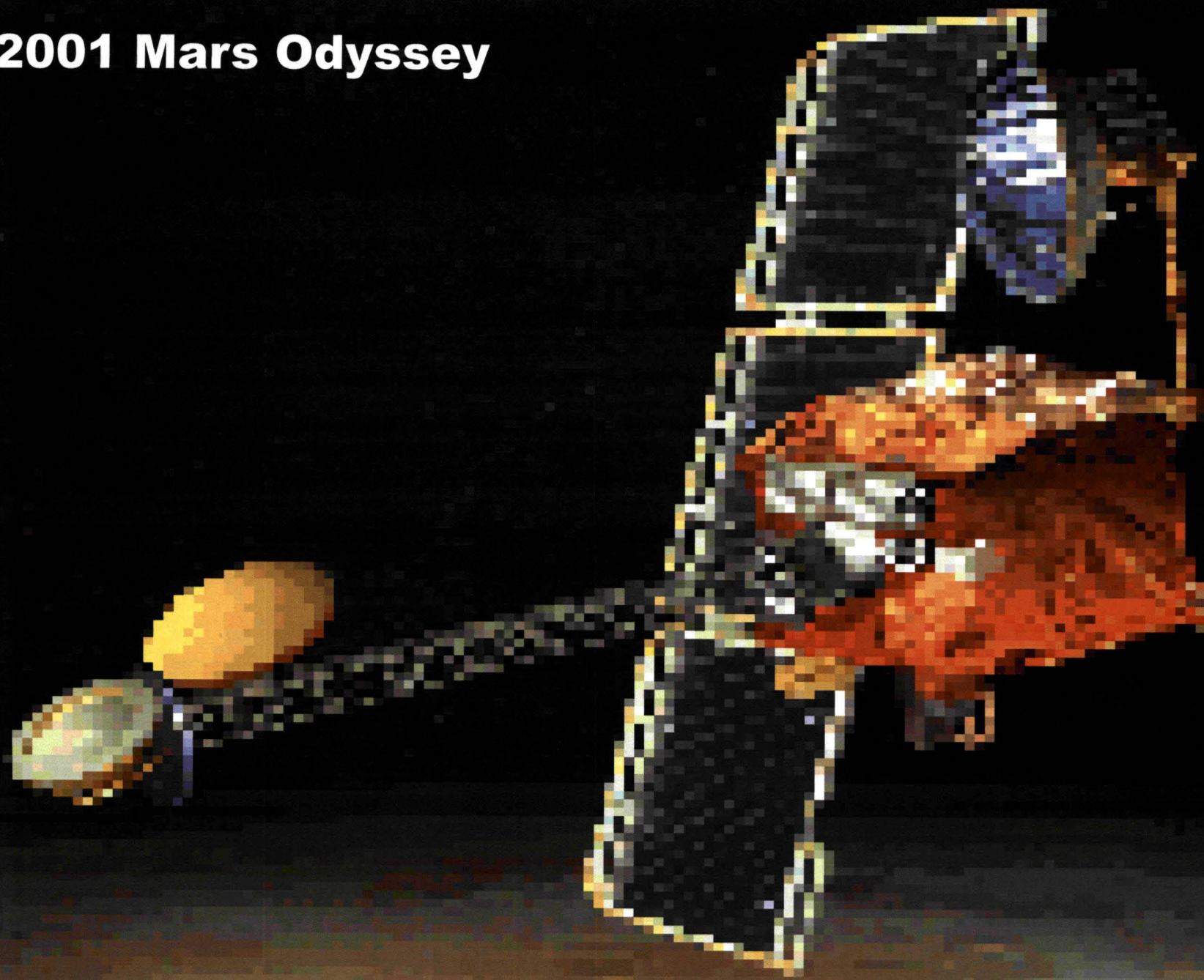


**NEAR-Shoemaker
rendezvous with asteroid
Eros
February 14, 2001**

NEAR Estimated Impact Site



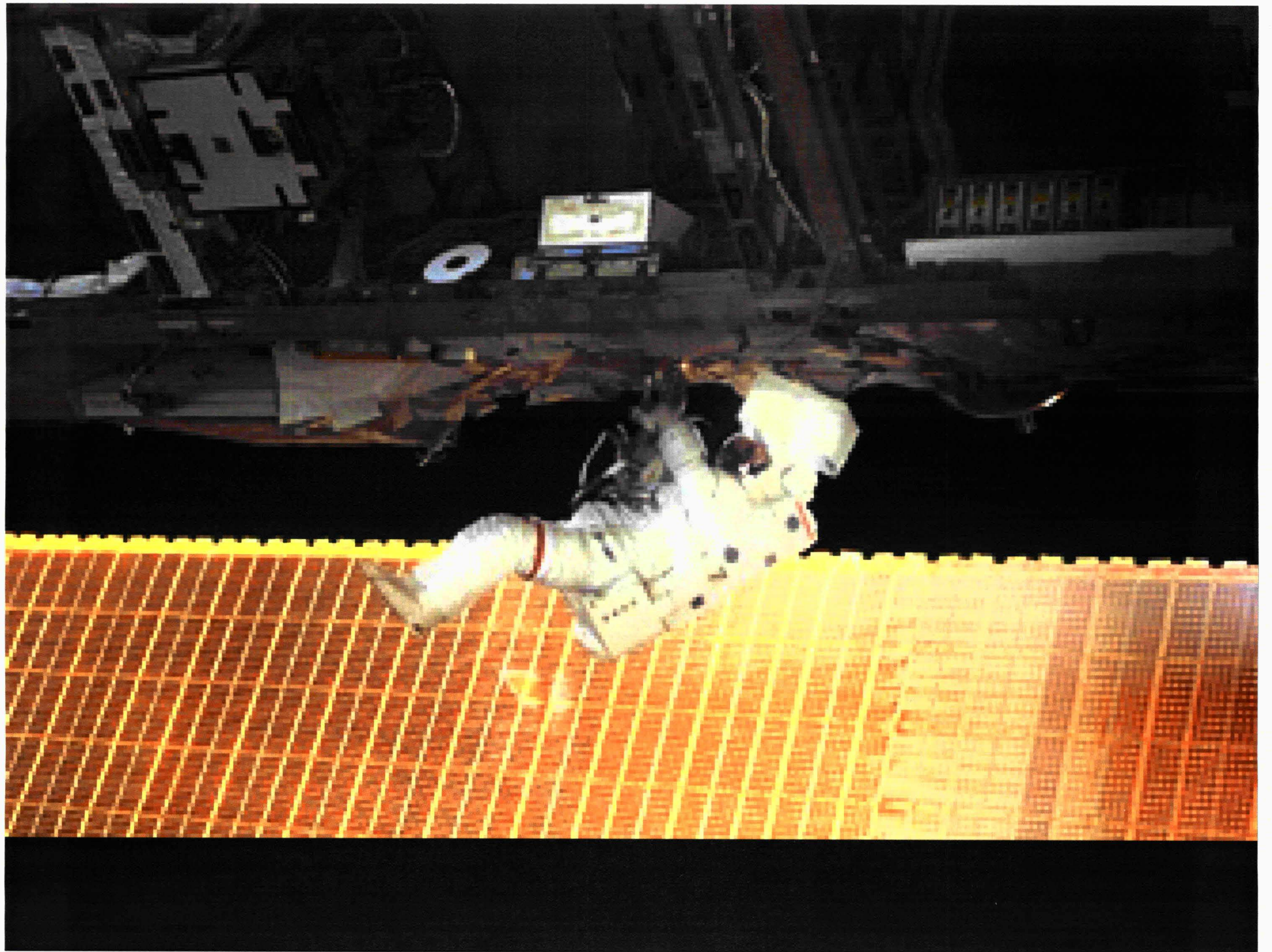
2001 Mars Odyssey





**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

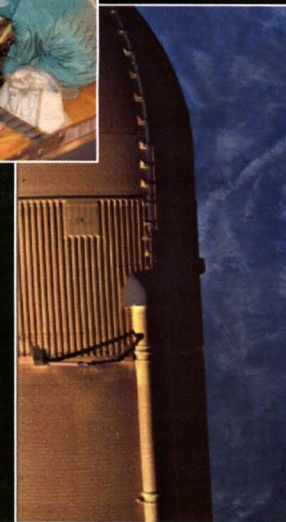
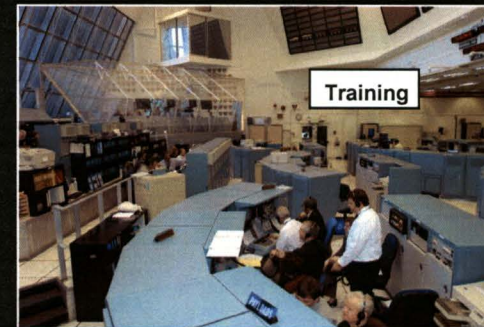
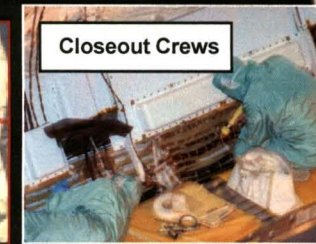
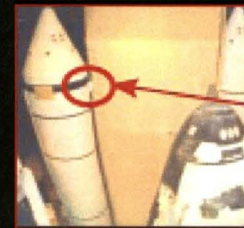
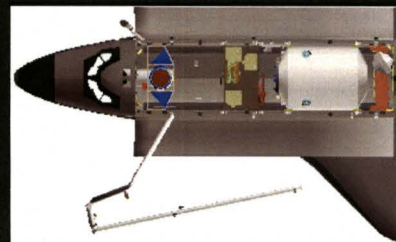
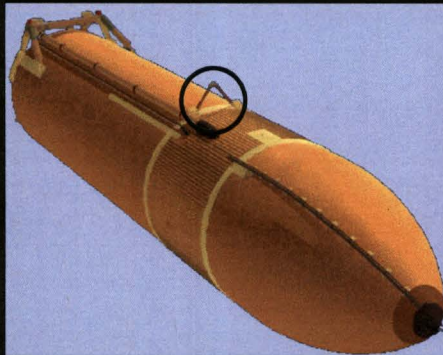
15 CAIB RTF Recommendations

June 8, 2005



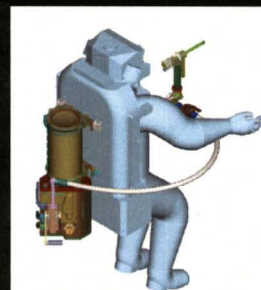
Approved

- 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**

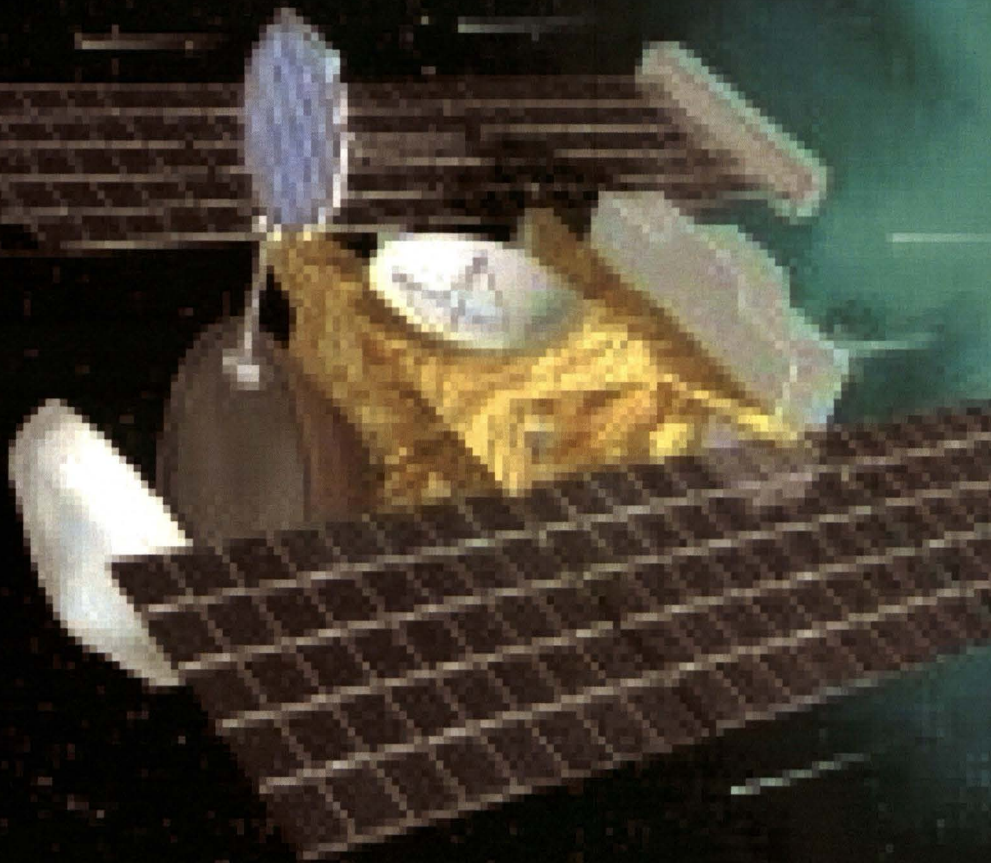
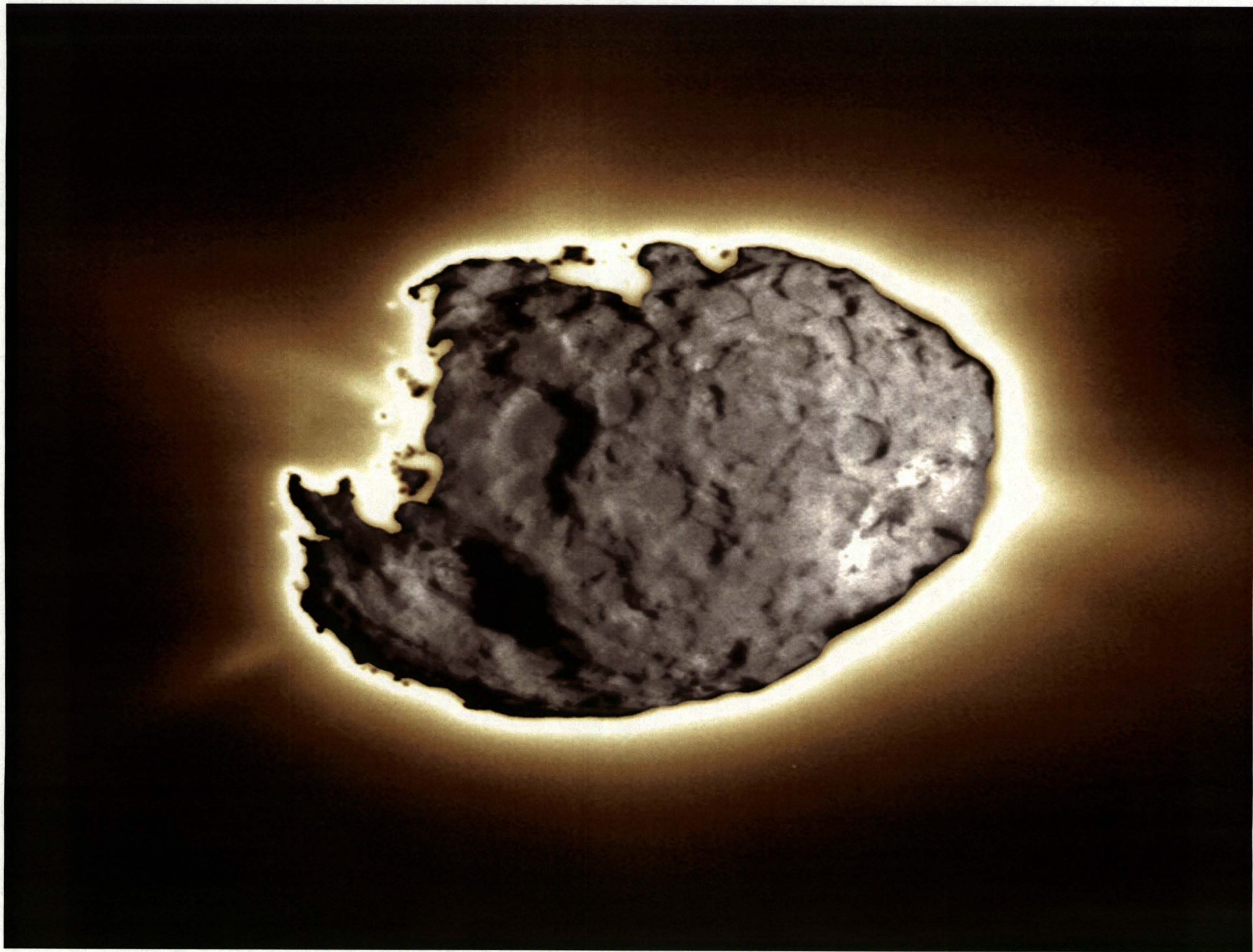


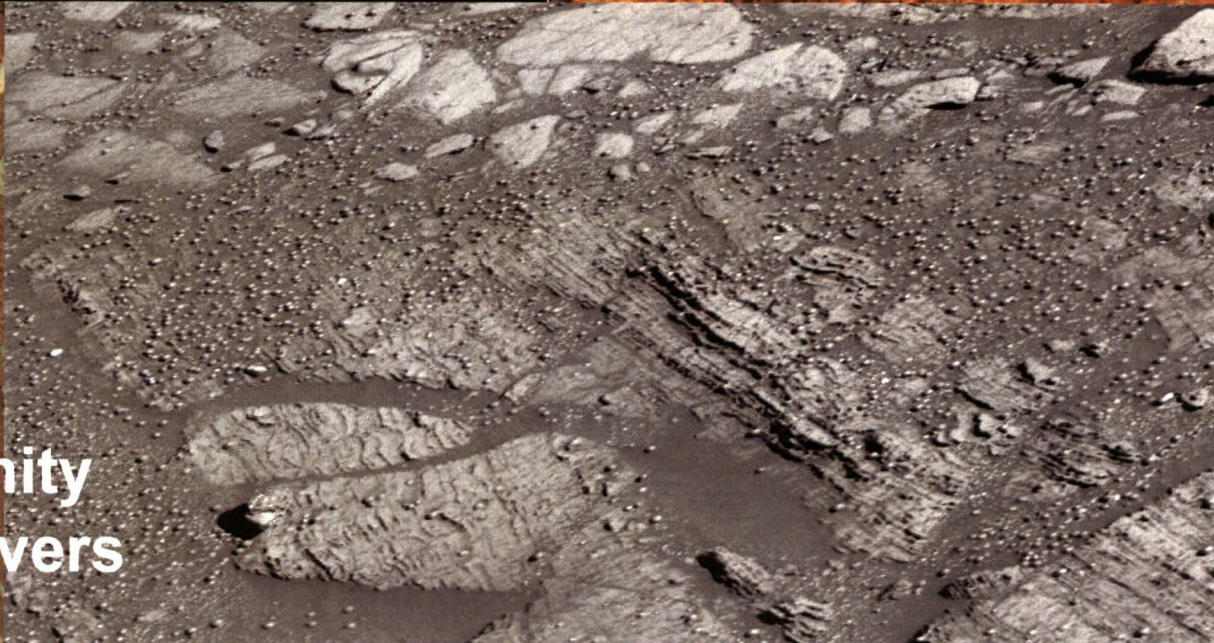
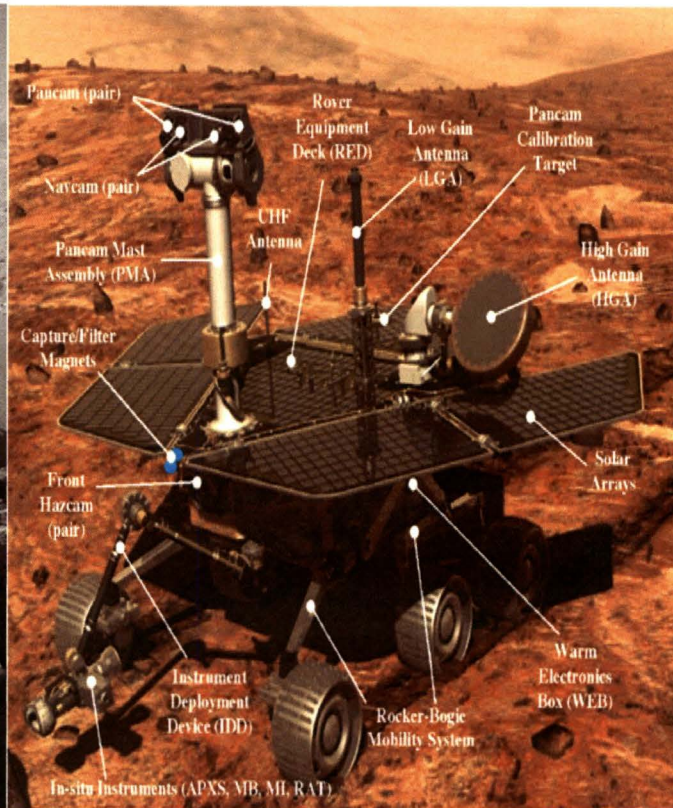
Photo of comet's nucleus



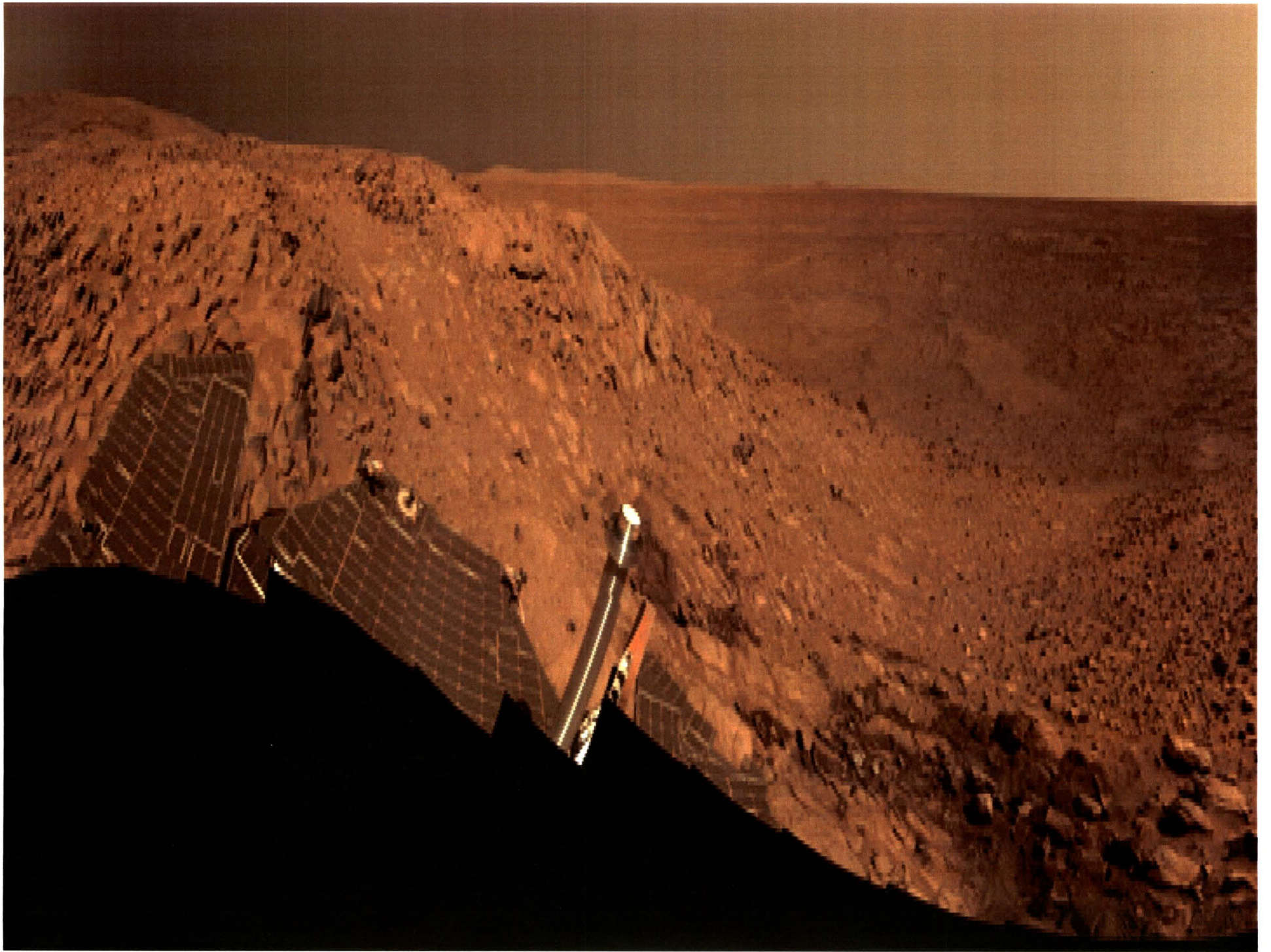


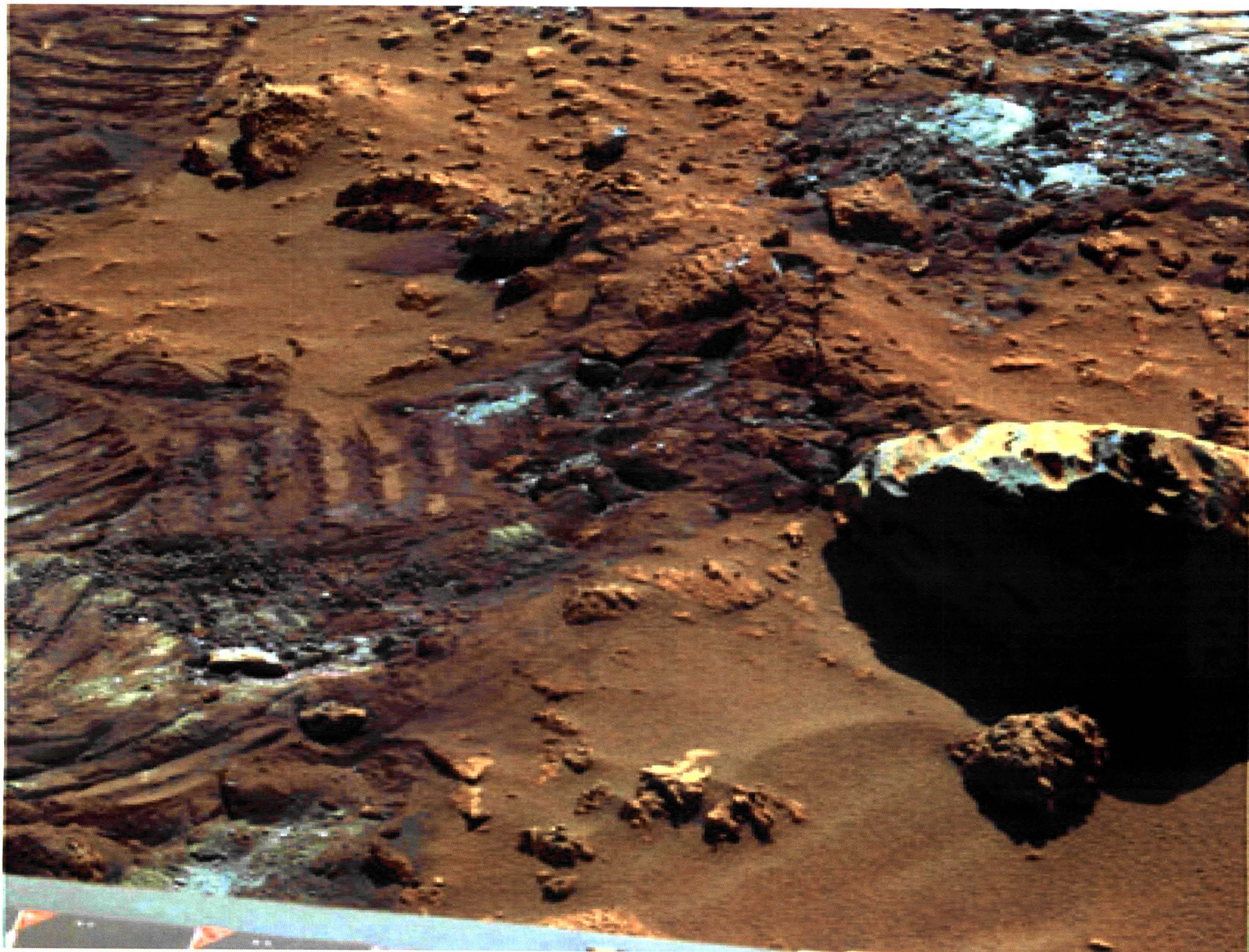


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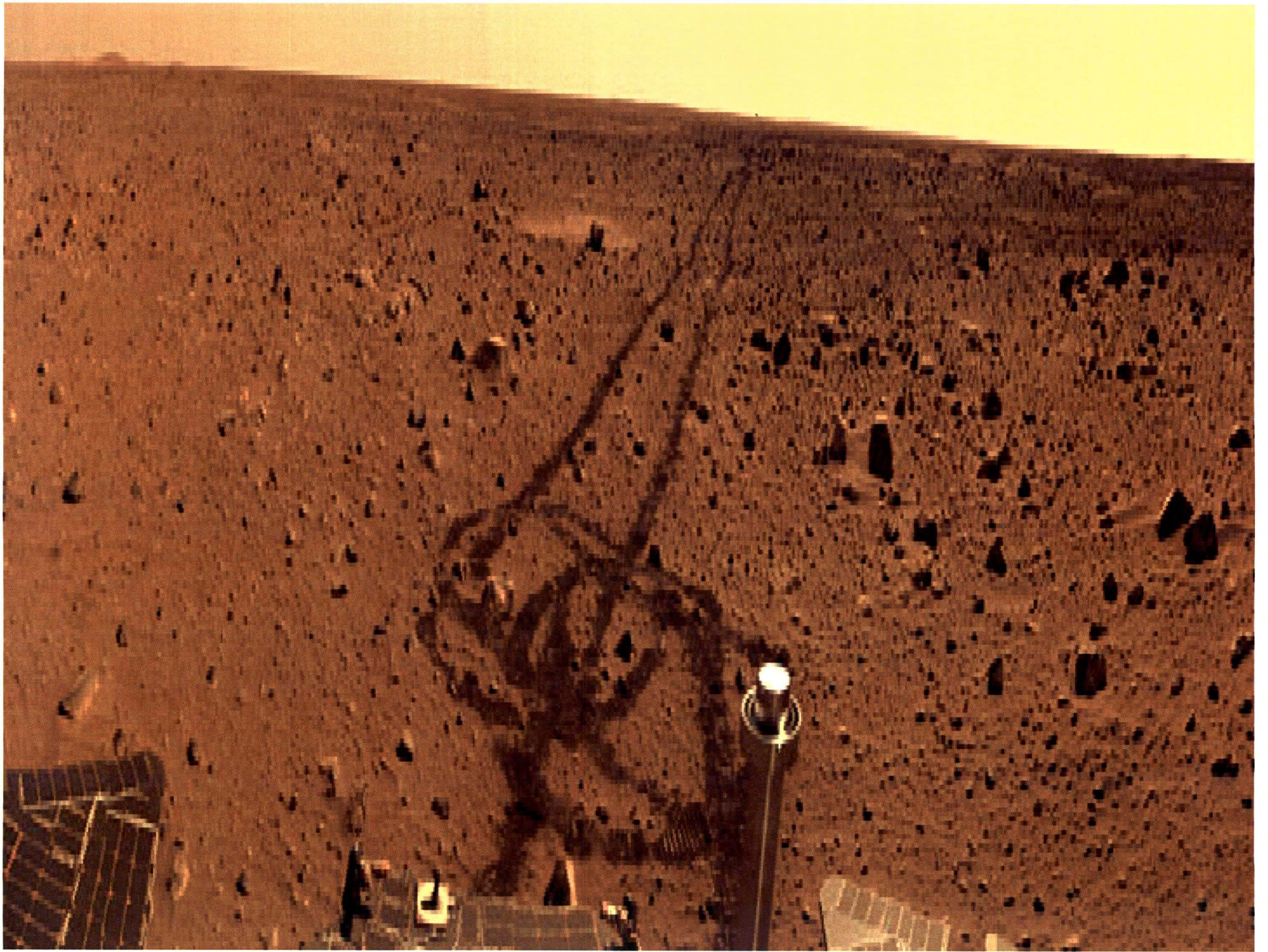


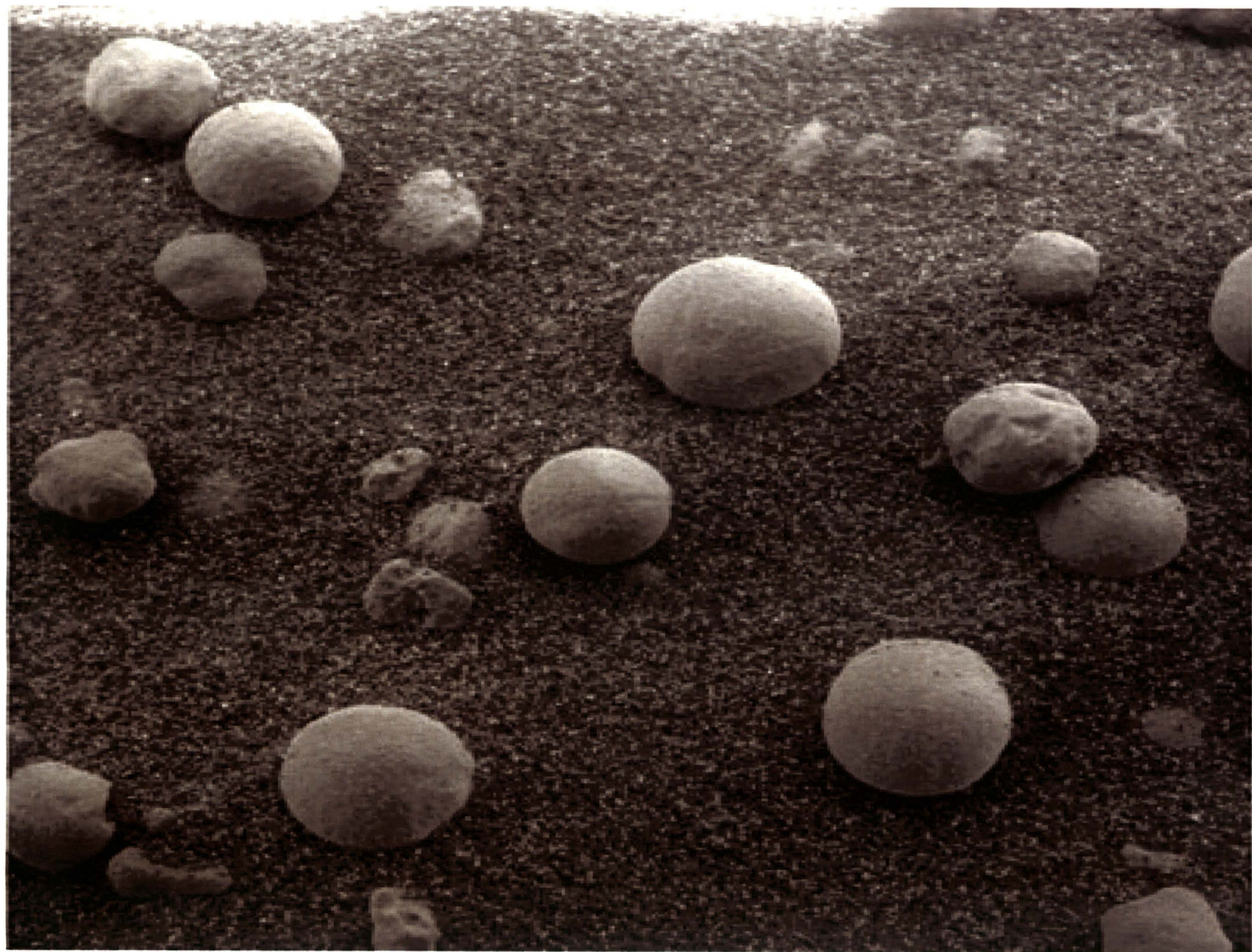
Spirit and Opportunity Mars Excursion Rovers







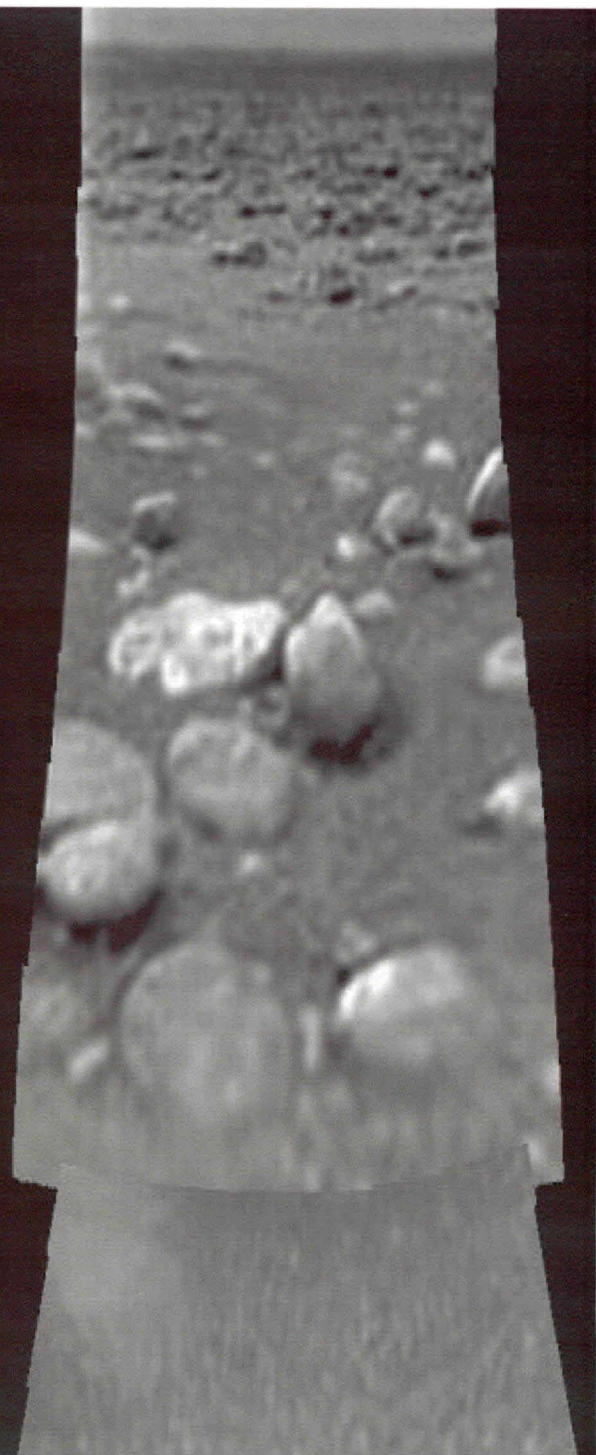
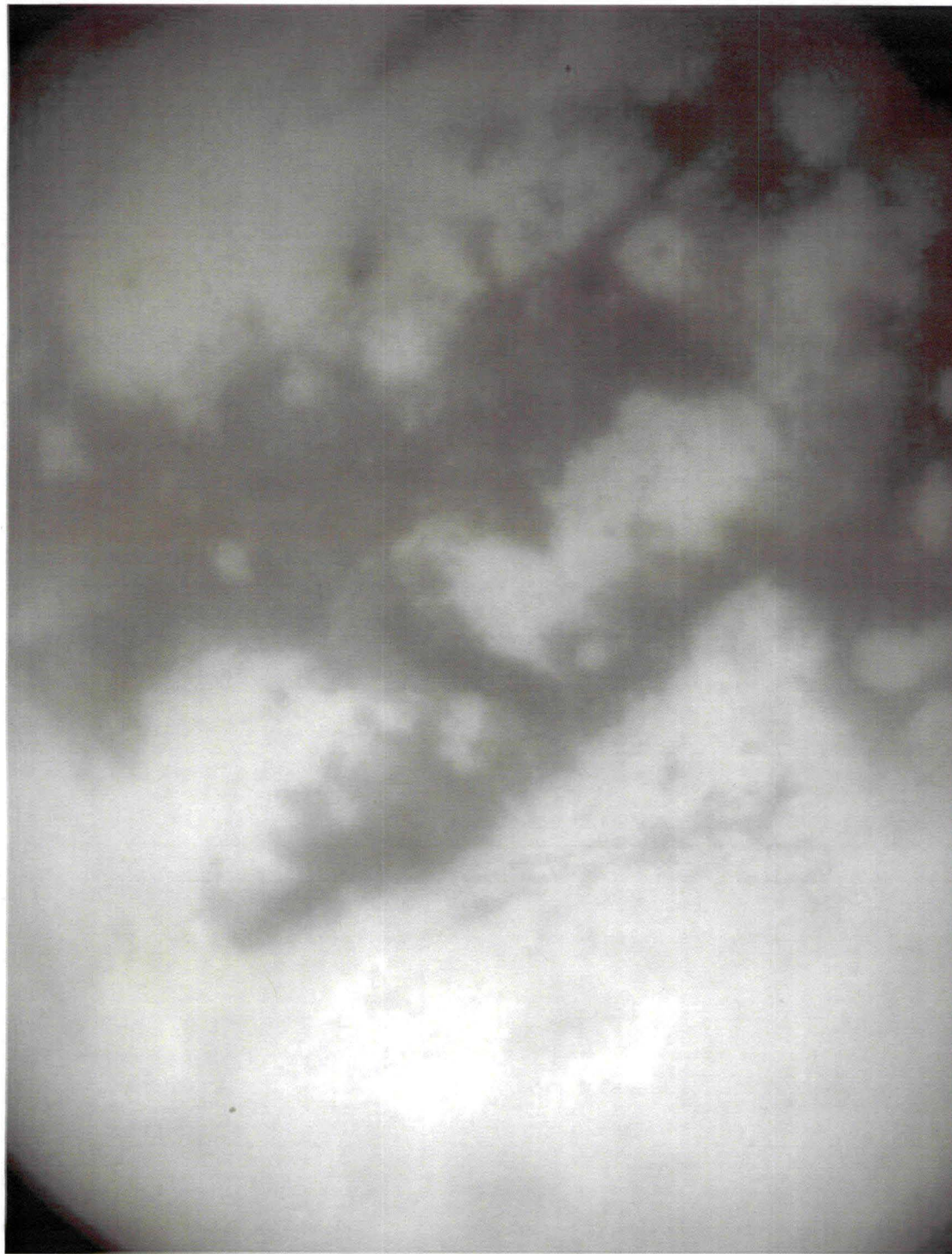


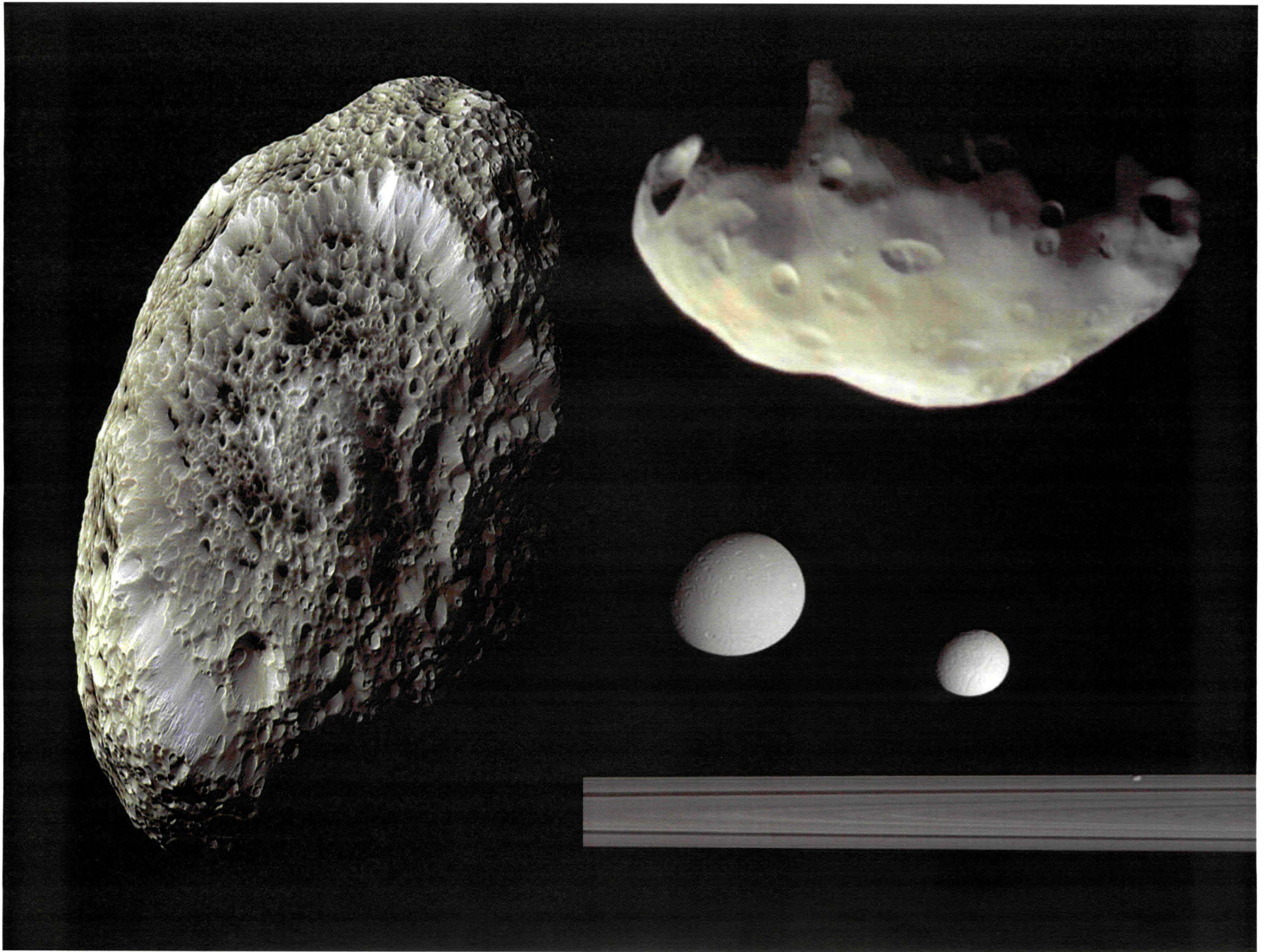


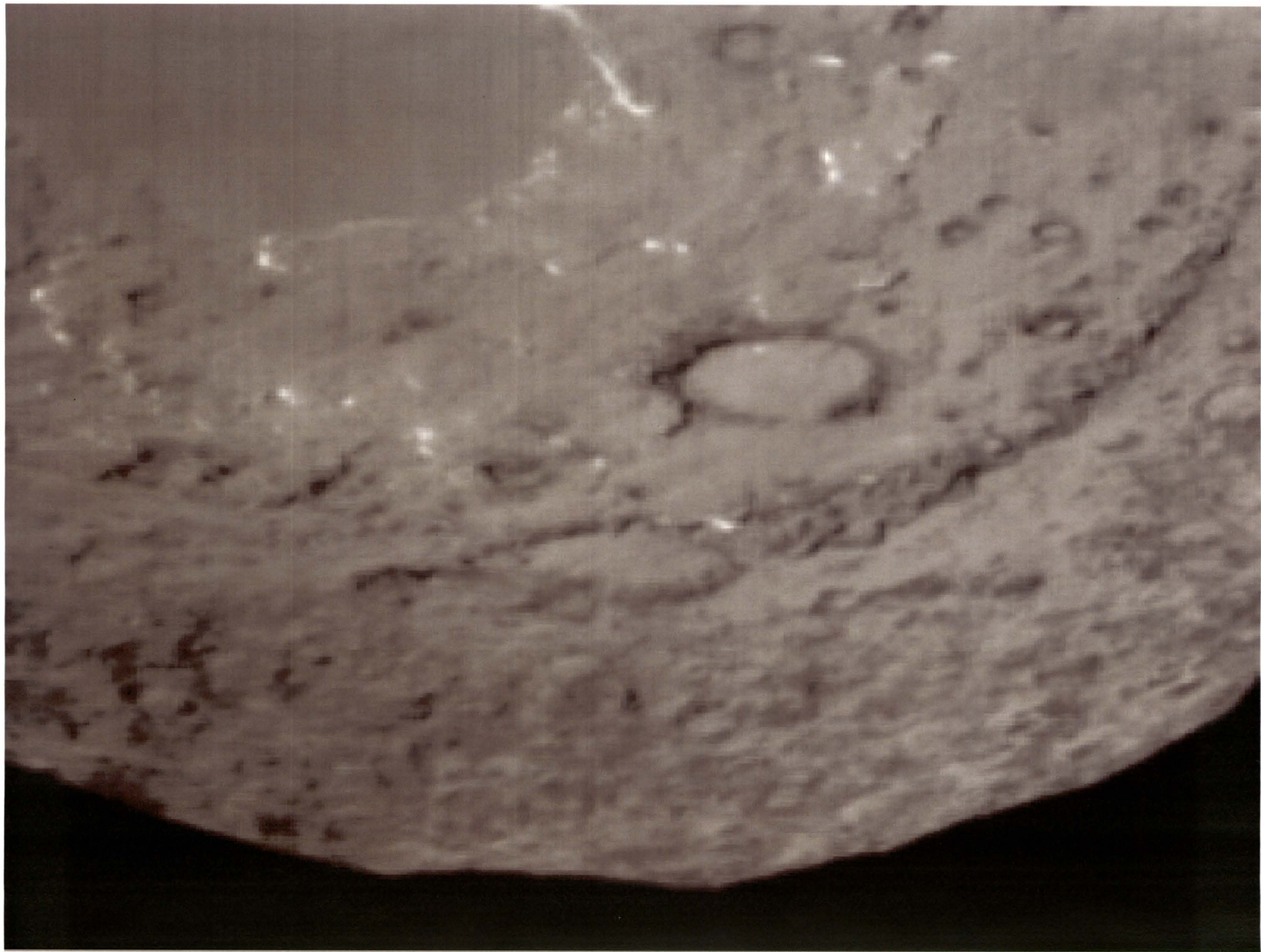


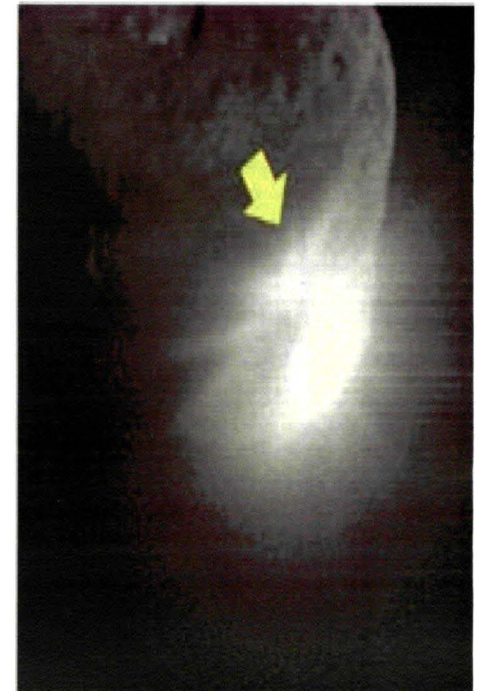
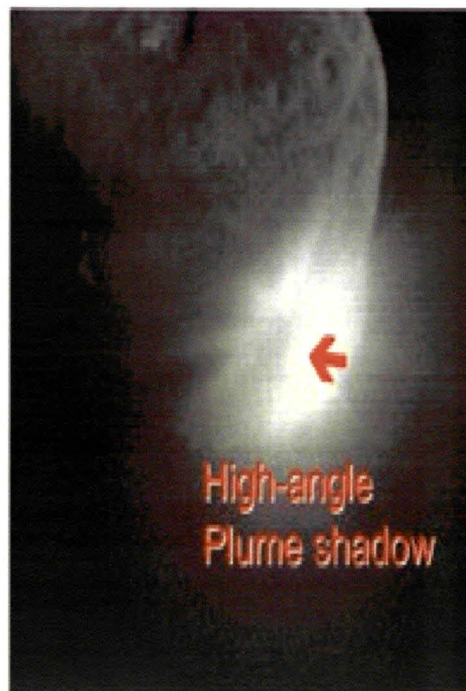
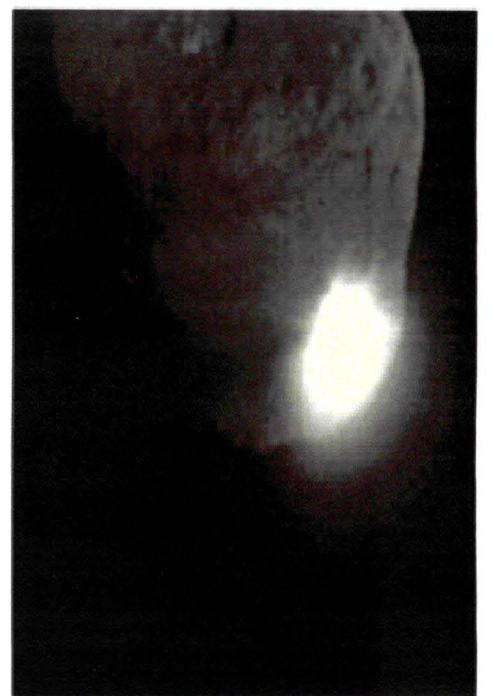
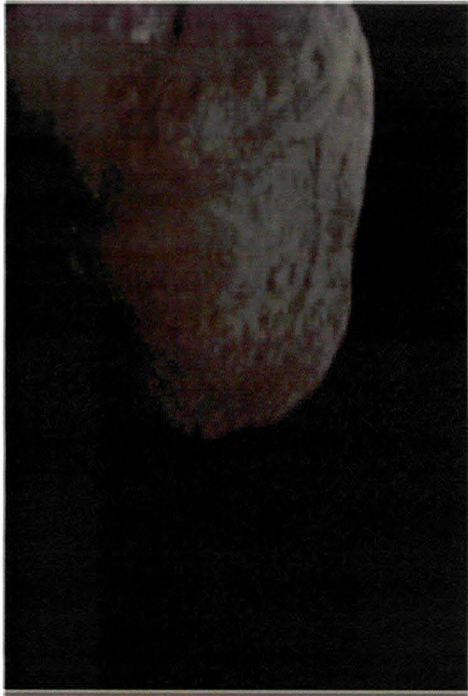
**Cassini Mission
To Saturn's moon
Titan**







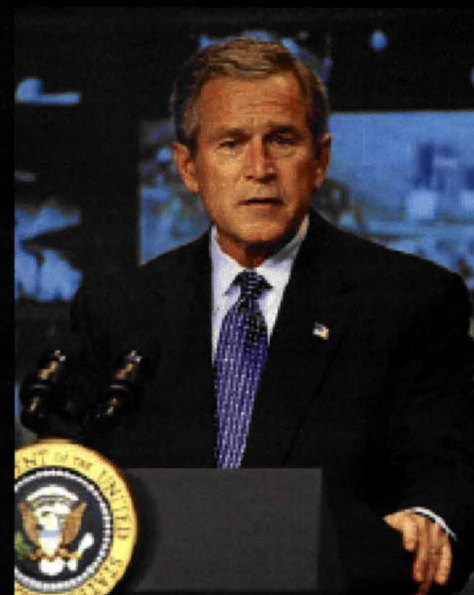






A Bold Vision for Space Exploration

- ◆ 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

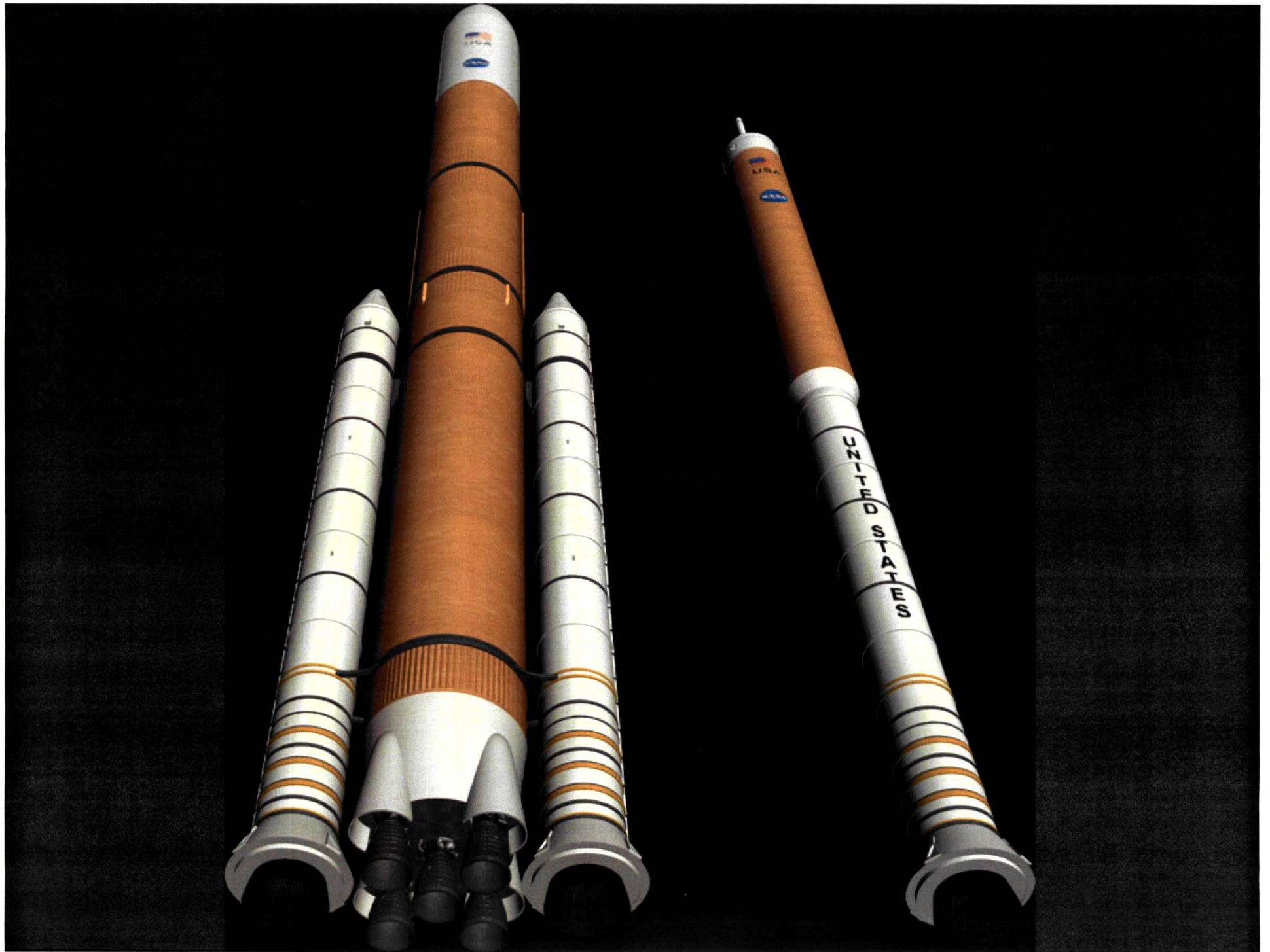


"It is time for America to take the next steps.

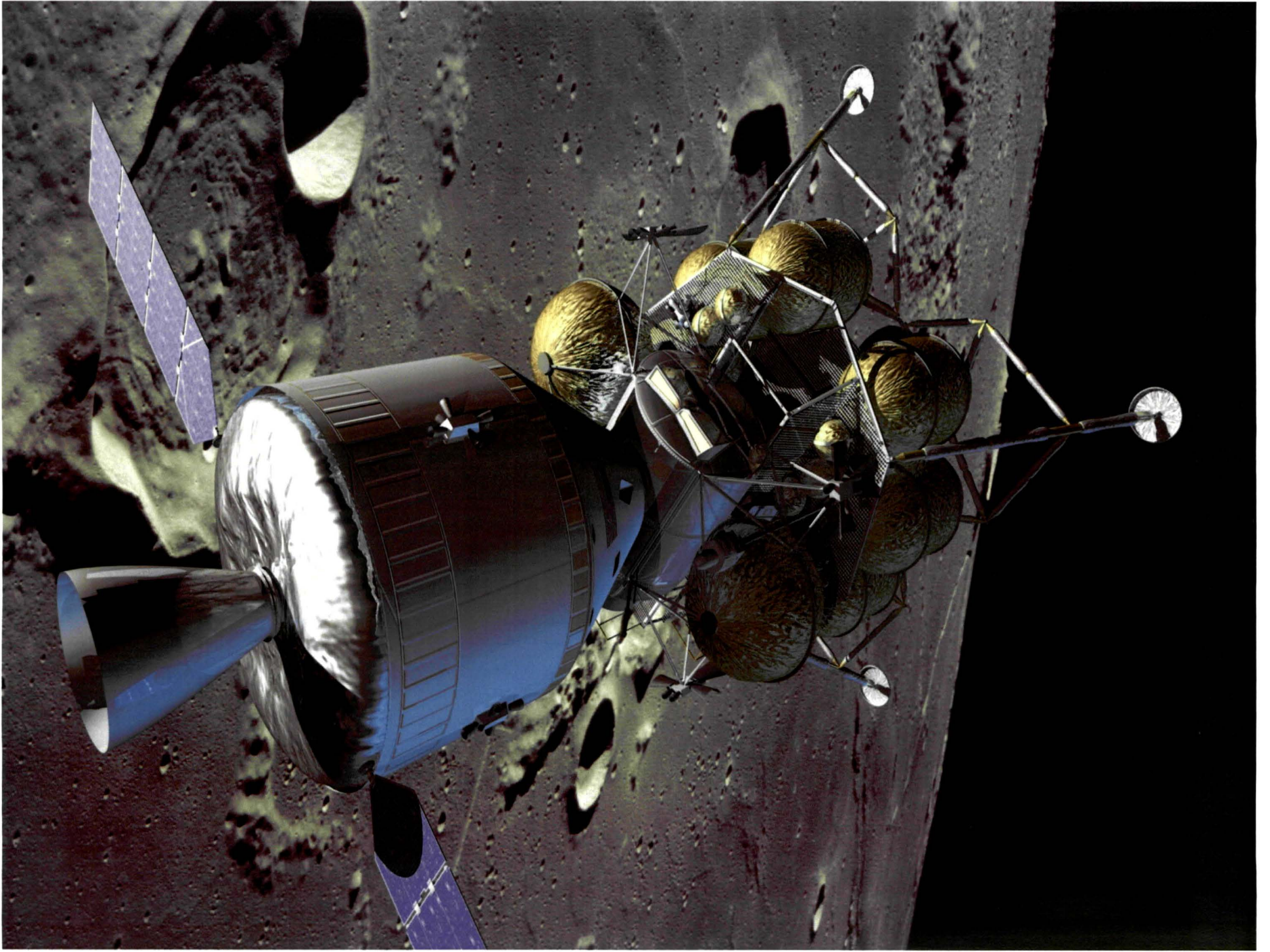
Today I announce a new plan to explore space and extend a human presence across our solar system. We will begin the effort quickly, using existing programs and personnel. We'll make steady progress – one mission, one voyage, one landing at a time"

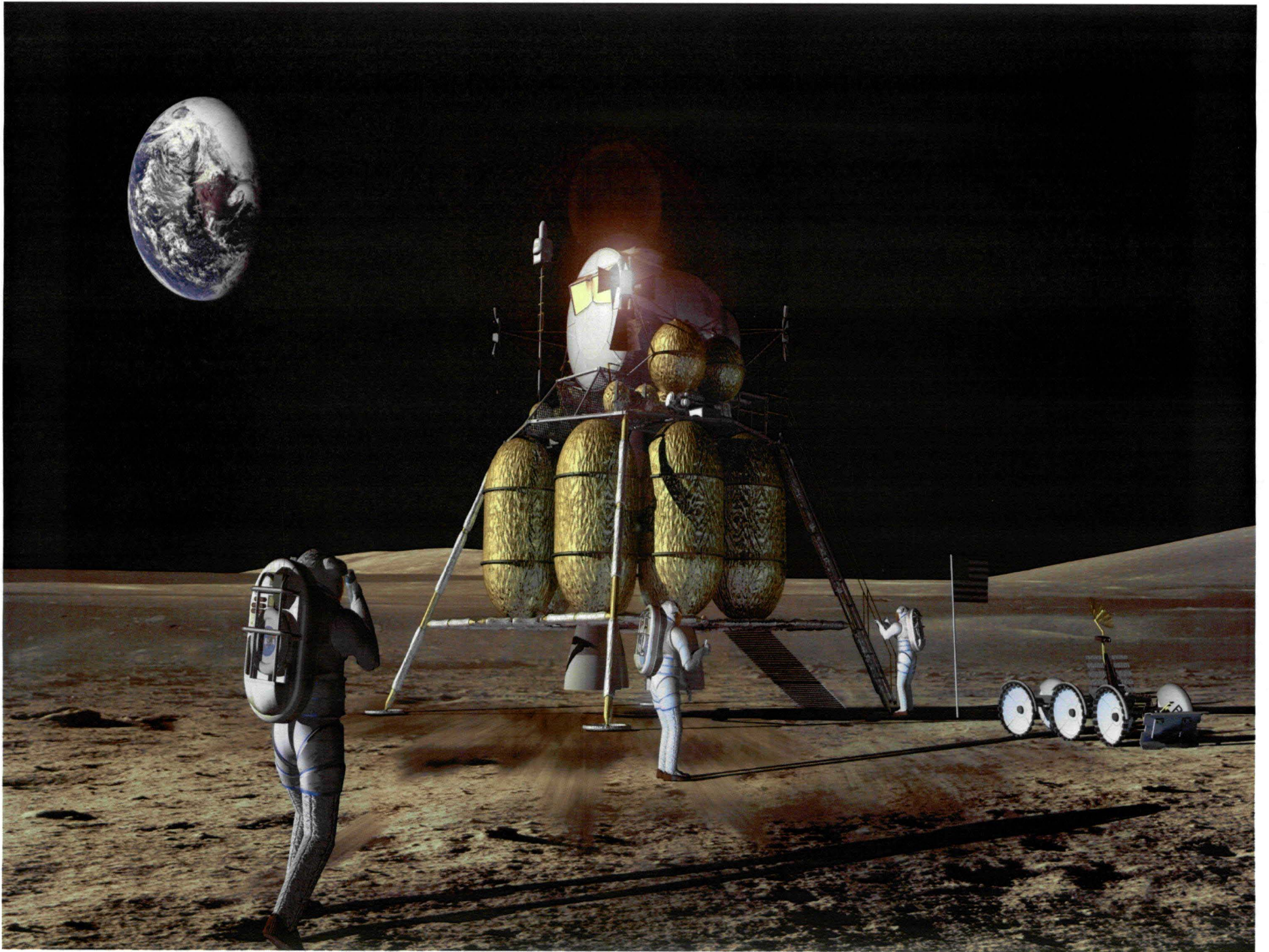
*President George W. Bush –
January 14, 2004*



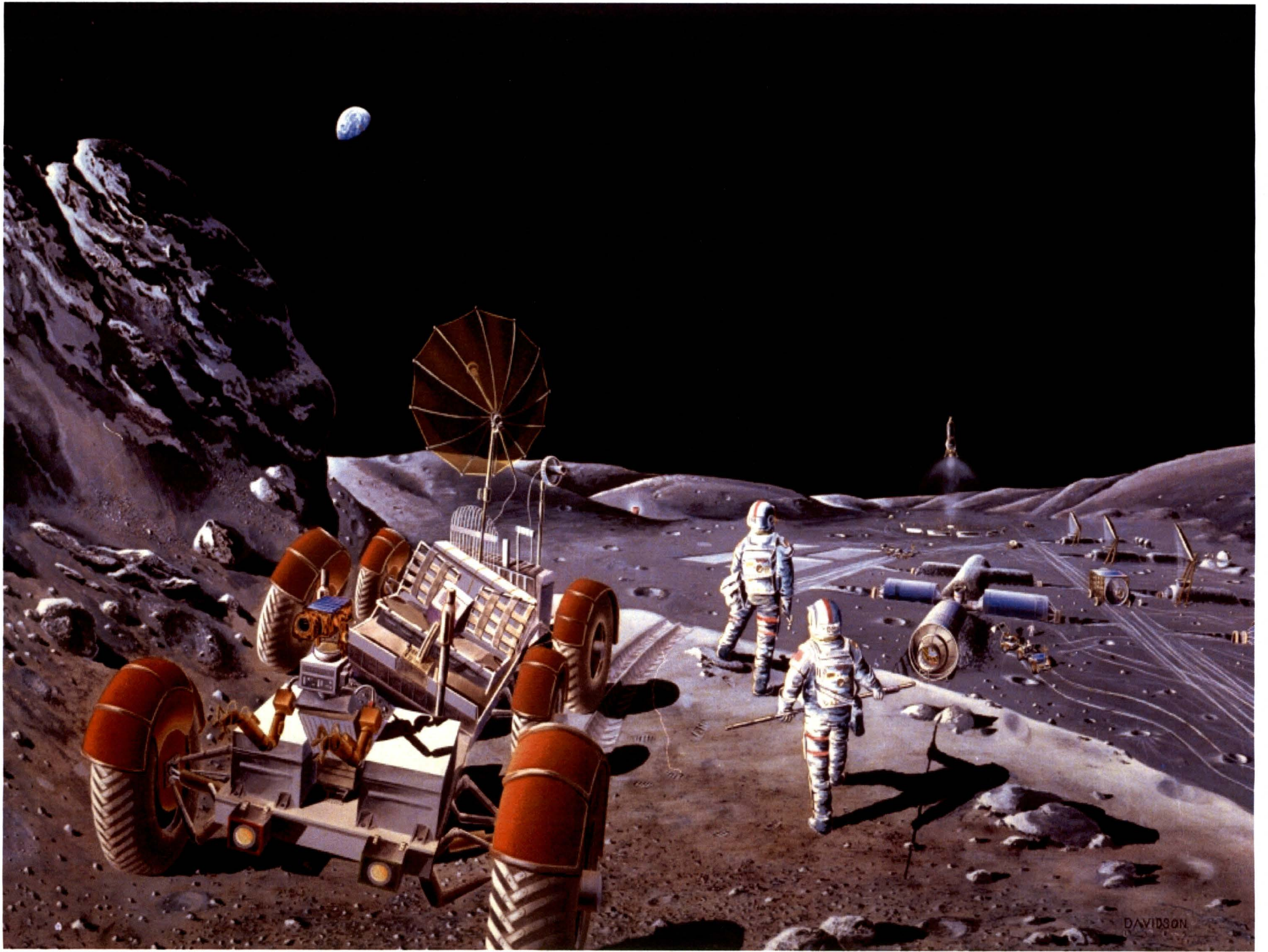












DAVIDSON

