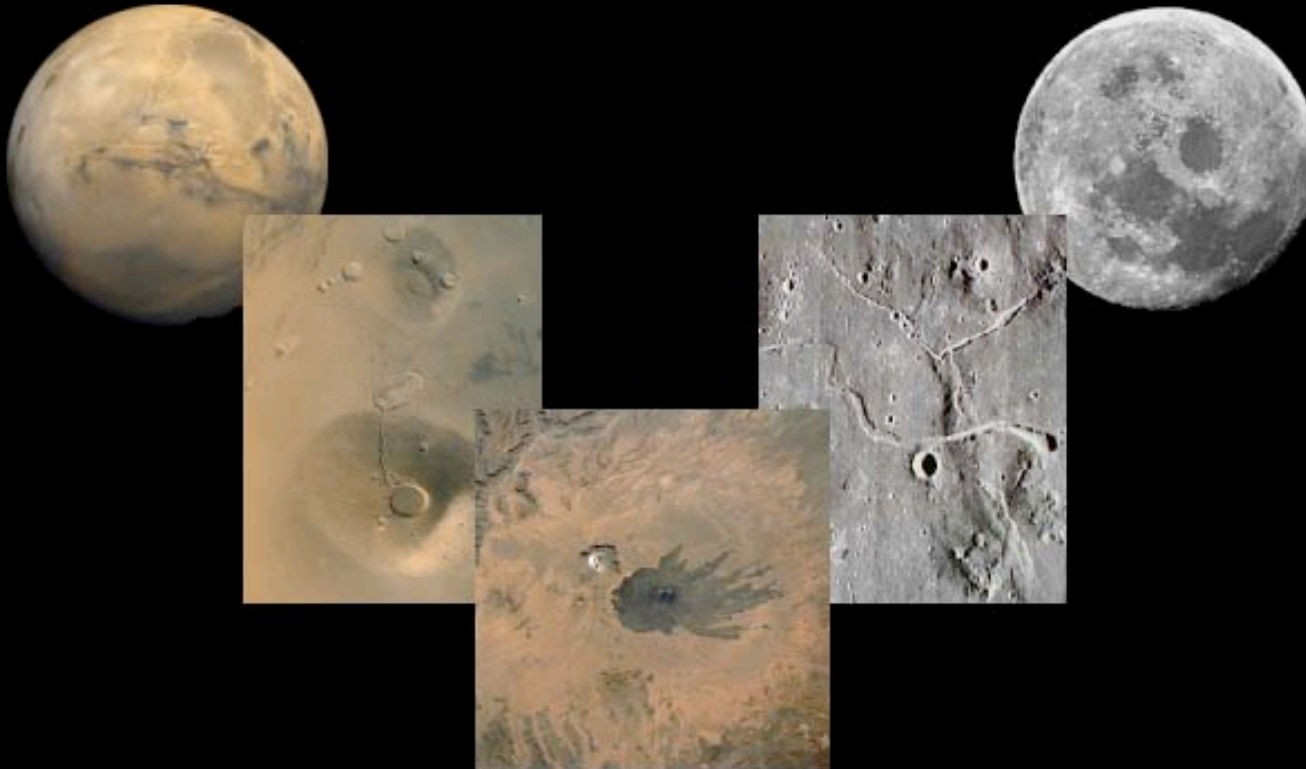
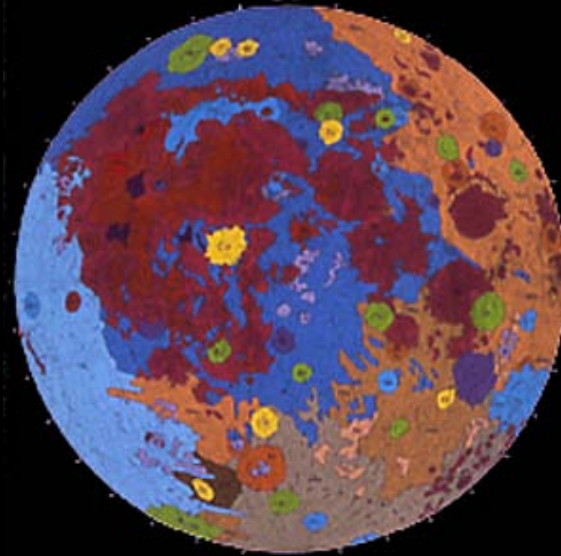


# Planets from the Ground Up



*Patricia Wood Dickerson*  
American Geological Institute & Jackson School of Geosciences

# Pre-Apollo Geologic Map of Moon



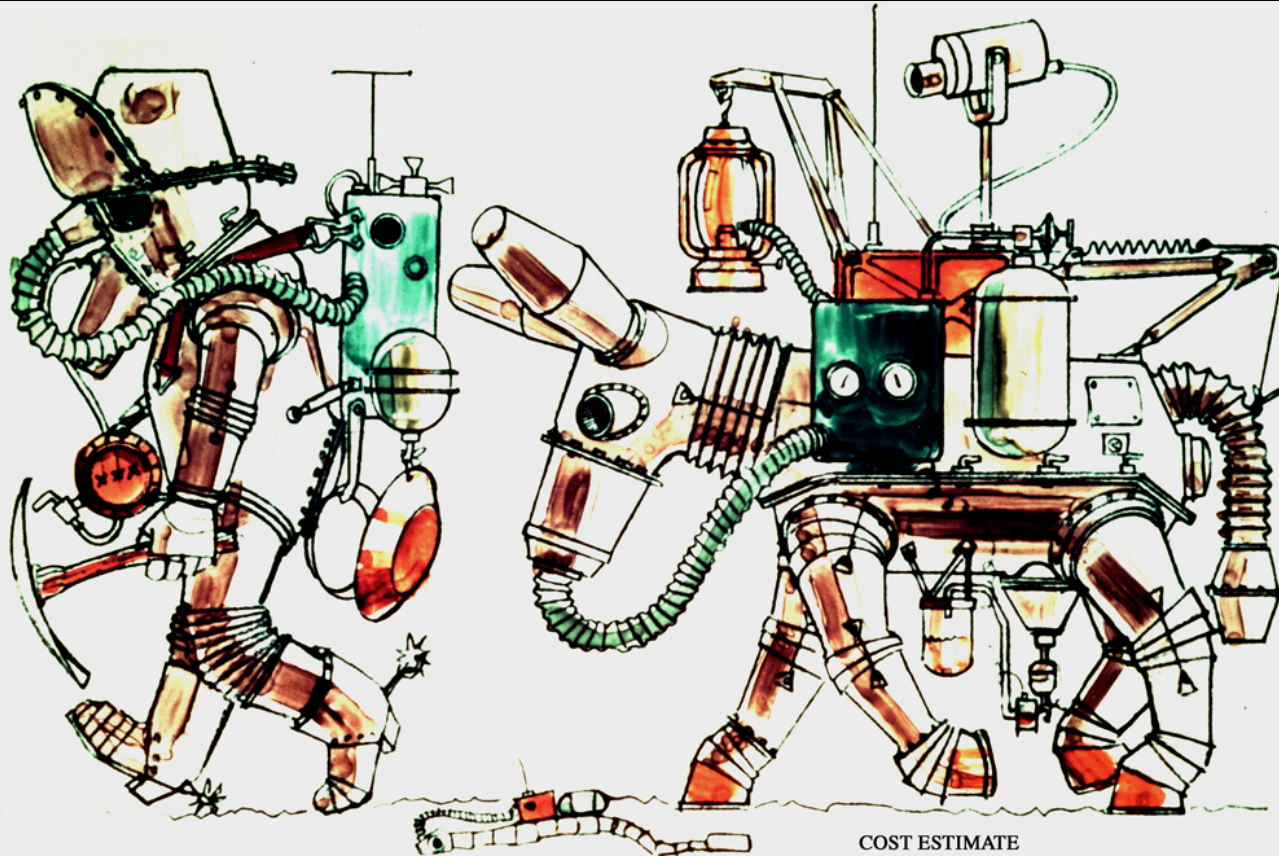
All Apollo landing sites, except A17, were selected on the basis of telescopic geological interpretations.

Astronomical observations have informed all satellite and human investigations of terrestrial planets.

This forum for astronomers, planetary geophysicists and geologists is far-seeing in every sense of the term.

**THANK YOU TO THE CONVENORS!**

# Surface Exploration Readiness



LGRV MK II

COST ESTIMATE

1 Texas burro	\$ 130
1 Texas astronaut	donated
1 Burro suit (hard)	6,000,000
1 Astronaut suit	20,000
Expendables - burro (oats)	15,000
Expendables - man (corn)	15
<b>TOTAL</b>	<b>\$ 6,035,145</b>

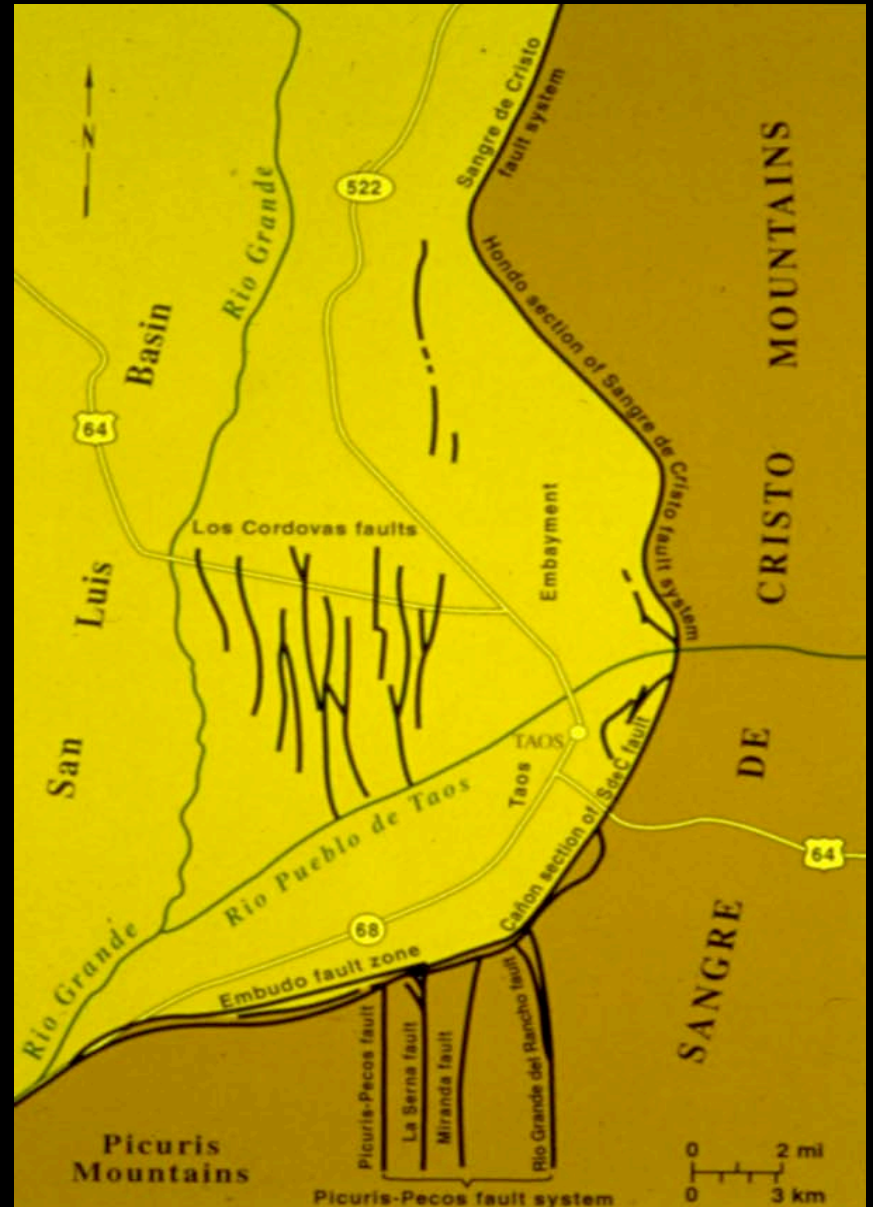
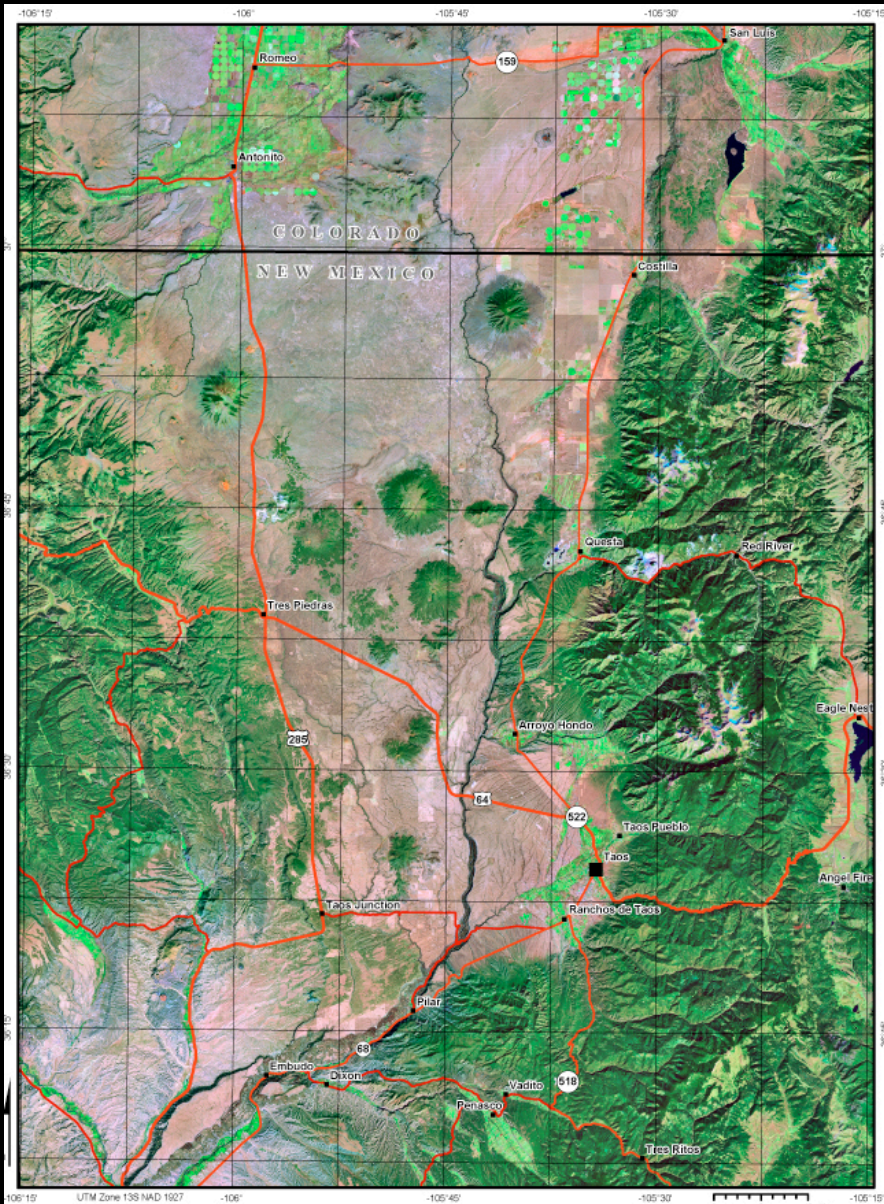
NASA-S-68-13536

1 GFE - not included

# On the Ground



# Topography & Structural Geology, Taos Rift Valley



# Geophysical Methods - Gravimetric Surveys



L - Gordon Cooper & Marty Kane read gravimeter, Apollo field training (Schaber, 2002).

R - Chris Ferguson, John Young and Barbara Morgan collect gravity and GPS data (1999 field training).

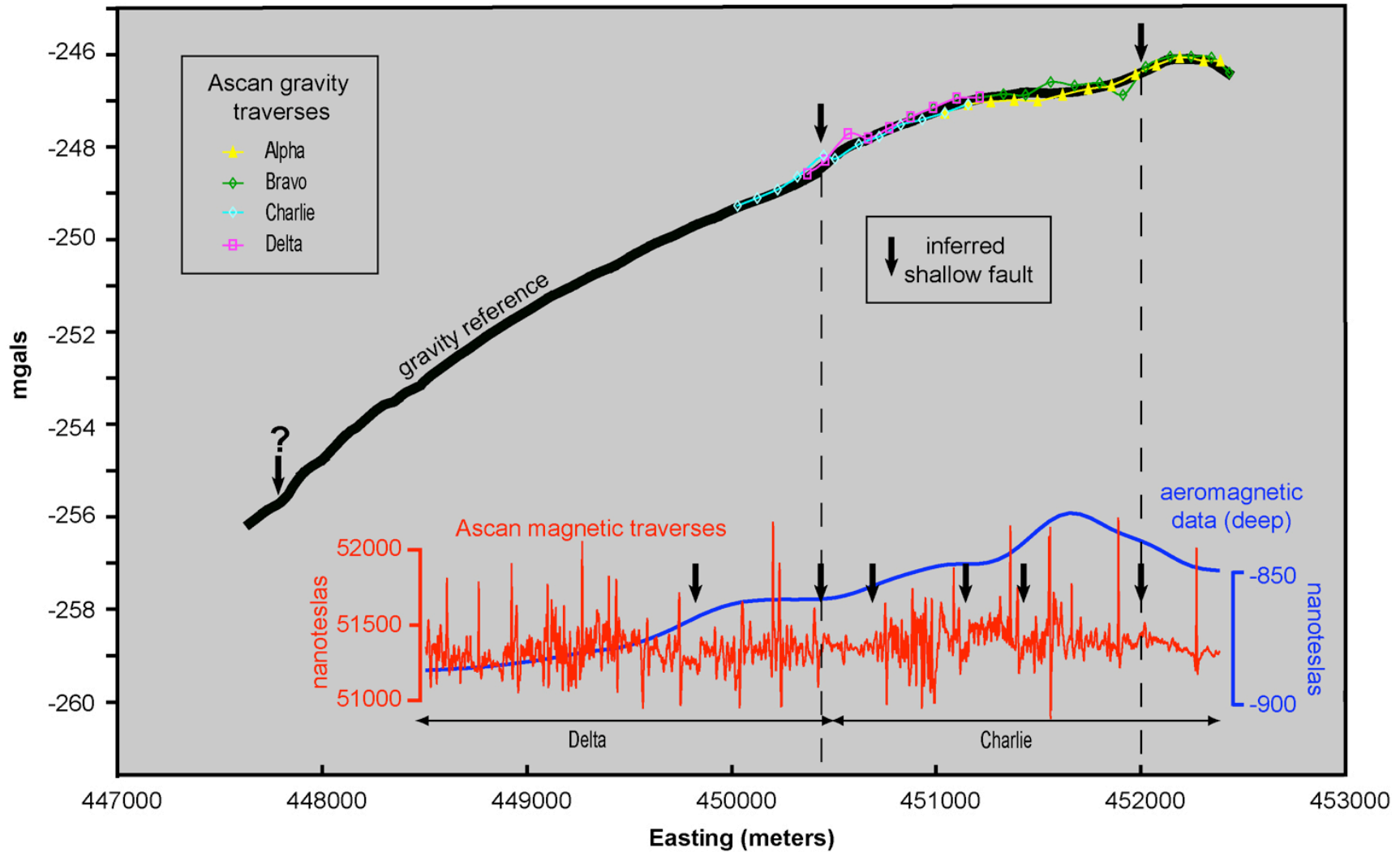
# Geophysical Investigations 2005 - Taos Pueblo

Portable magnetometer  
Worden & Scintrex gravity meters  
Rock physical-property measurements



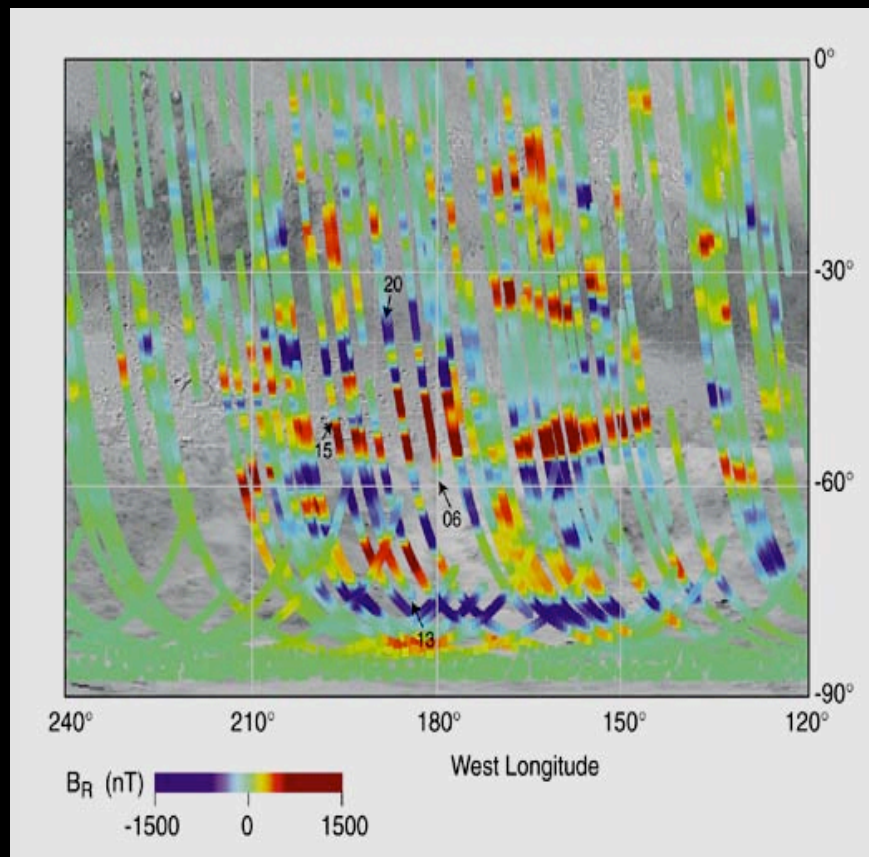
# Taos Pueblo - Composite Profile

## Peacocks Line - 2005 Ascan Geophysical Training





# Magnetic Stripes on Mars



- Mars Global Surveyor magnetic data reflect periods of both normal and reversed polarity.
- At some stage of its evolution, the core of Mars was apparently molten, like that of Earth.
- Stripes are not aligned with the present pole of rotation, as on Earth.
- Analogous to magnetic stripes on Earth? Crustal extension and rupture?

# Volcanoes - Analogous and Disparate Spheres

Atmospheres - Volatiles, climate evolution

Lithospheres - Mantle/crustal structure and composition

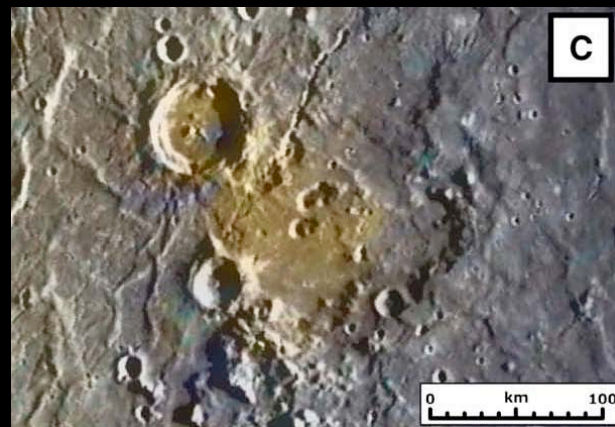
Magnetospheres - Core/mantle dynamics

Biospheres - Fluids, extremophiles, astrobiology

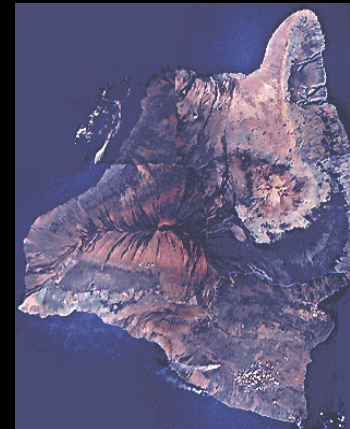
Io



Mercury



Earth



Mars



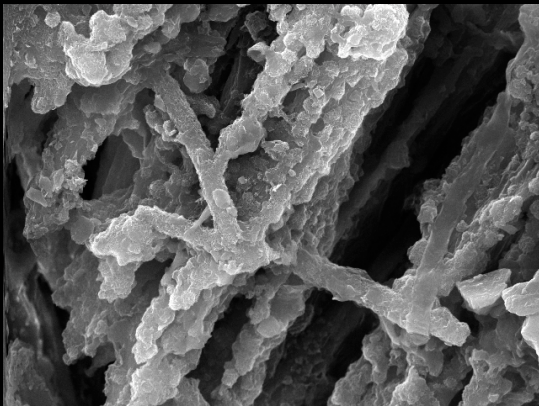
# Jemez Volcanic Complex - Hot Spring Extremophiles, Rio Grande Rift



# Chemosynthesizers - Submicroscopic Life at the Vent

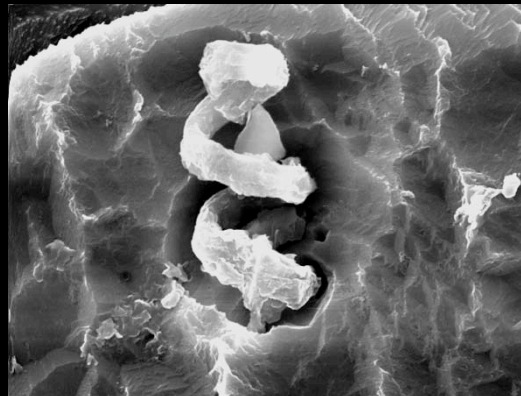
(scanning electron microscope images)

## Bacteria & other forms



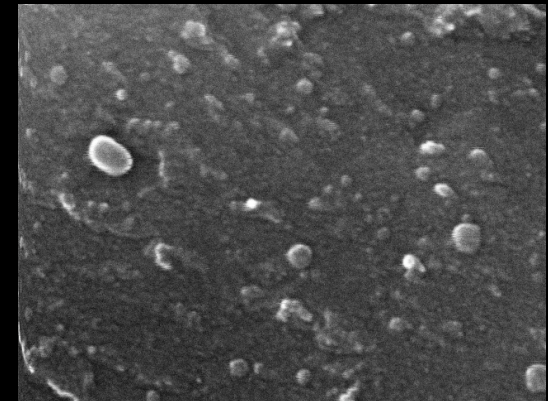
6 $\mu$ m

*Leptothrix(?)*  
iron-bearing  
bacterium



6 $\mu$ m

*Spirulina*  
bacterium



800nm

Nanospheres

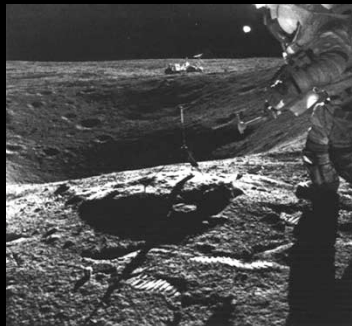
# NAC Planetary Sciences Subcommittee — Synergies & Interfaces



- **EMPHASIS ON SYNERGIES**  
Telescopic, satellite and surface observations  
Human and robotic investigations  
Science, engineering, instrument development

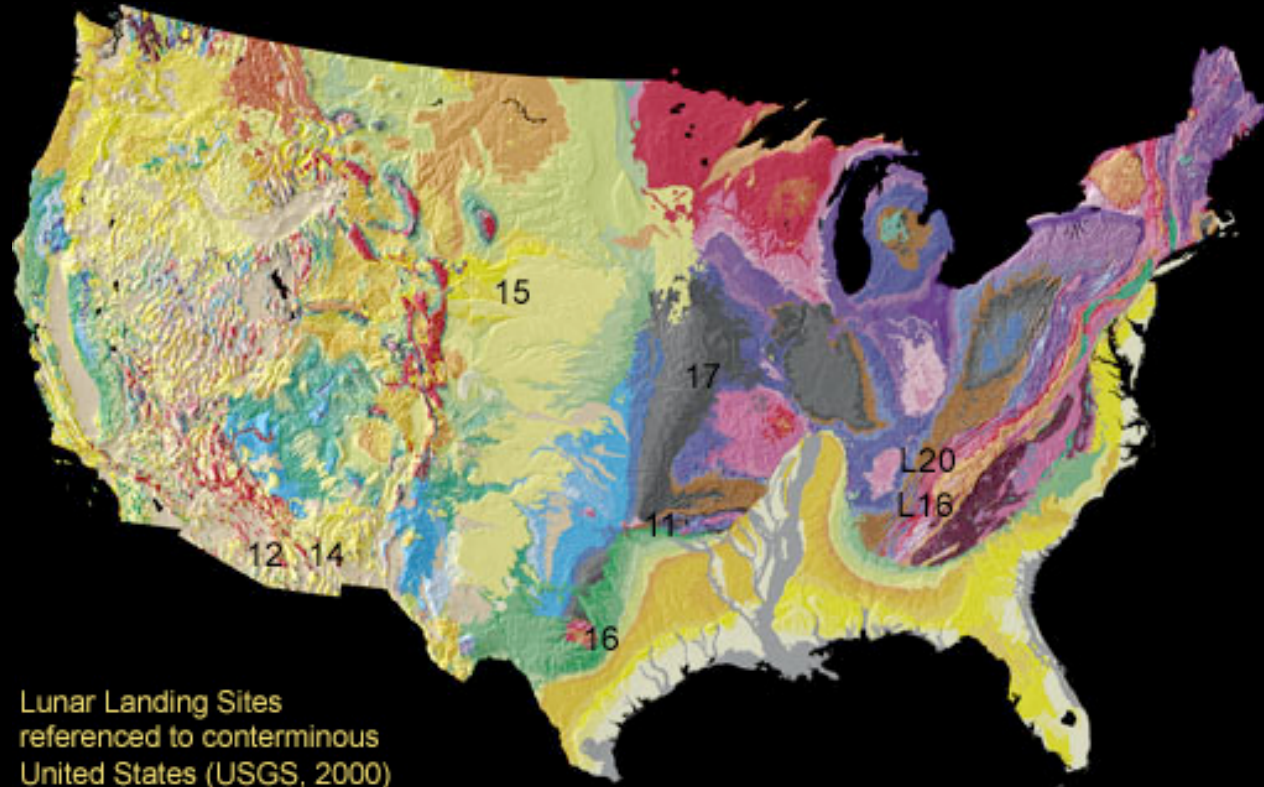


- **MAXIMIZE FEED-FORWARD AND FEEDBACK  
AMONG MISSIONS, PROGRAMS**
- **ALL MISSIONS AND RESEARCH PROGRAMS ARE/  
WILL BE SUBJECT TO EBBS, FLOWS,  
REALLOCATIONS OF FUNDS**



- **WHETHER ORBITAL OR SURFICIAL, ROBOTIC  
AND/OR HUMAN, ALL MISSIONS/PROGRAMS MAY  
RISE OR FALL ON ISSUES OF MASS, VOLUME AND  
POWER**

# Your Mission:



Characterize the geology of Earth  
and discuss the origin and evolution of the planet