Movidos por la Curiosidad

La exploración de Marte a nuestro alcance

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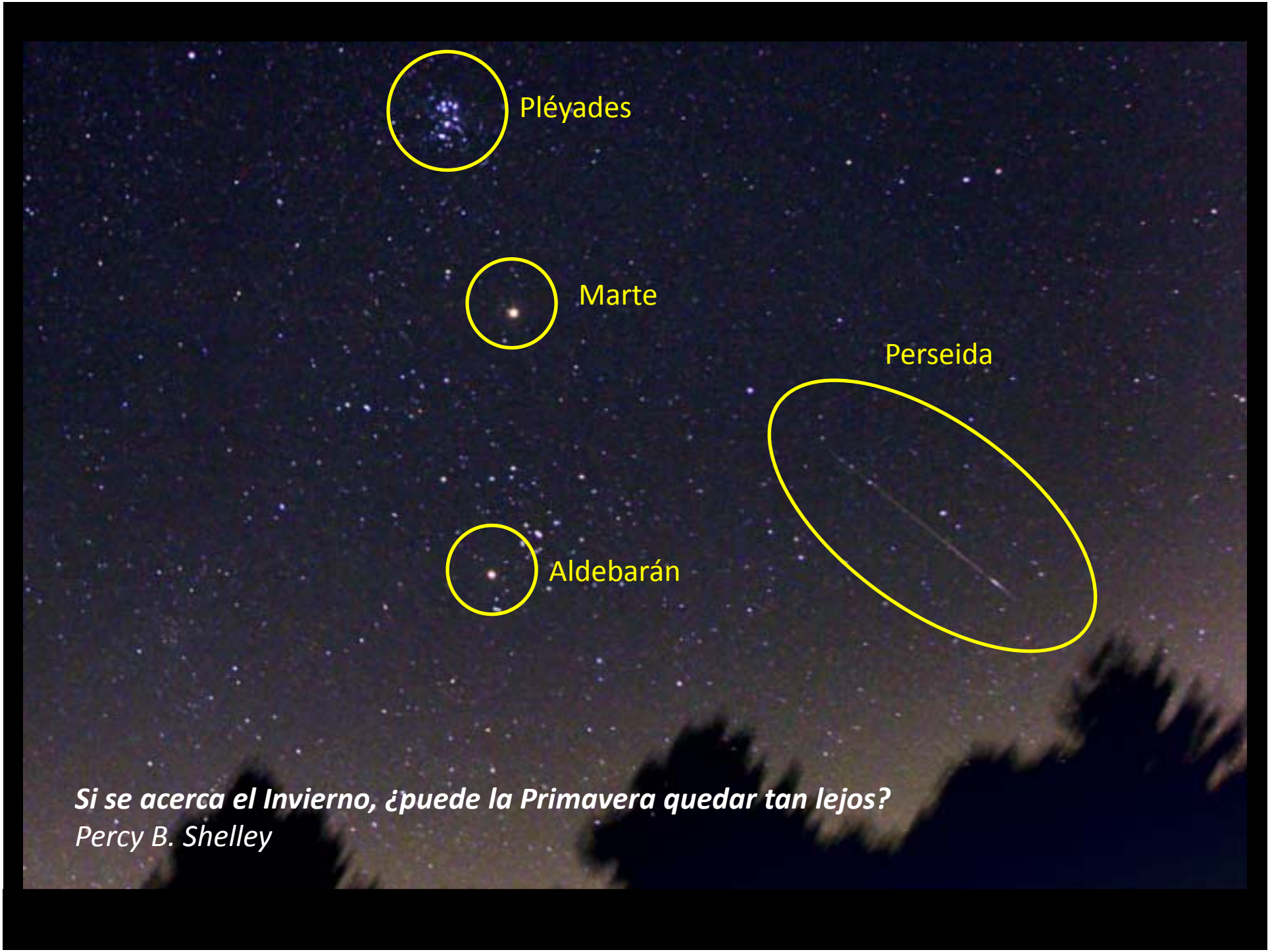
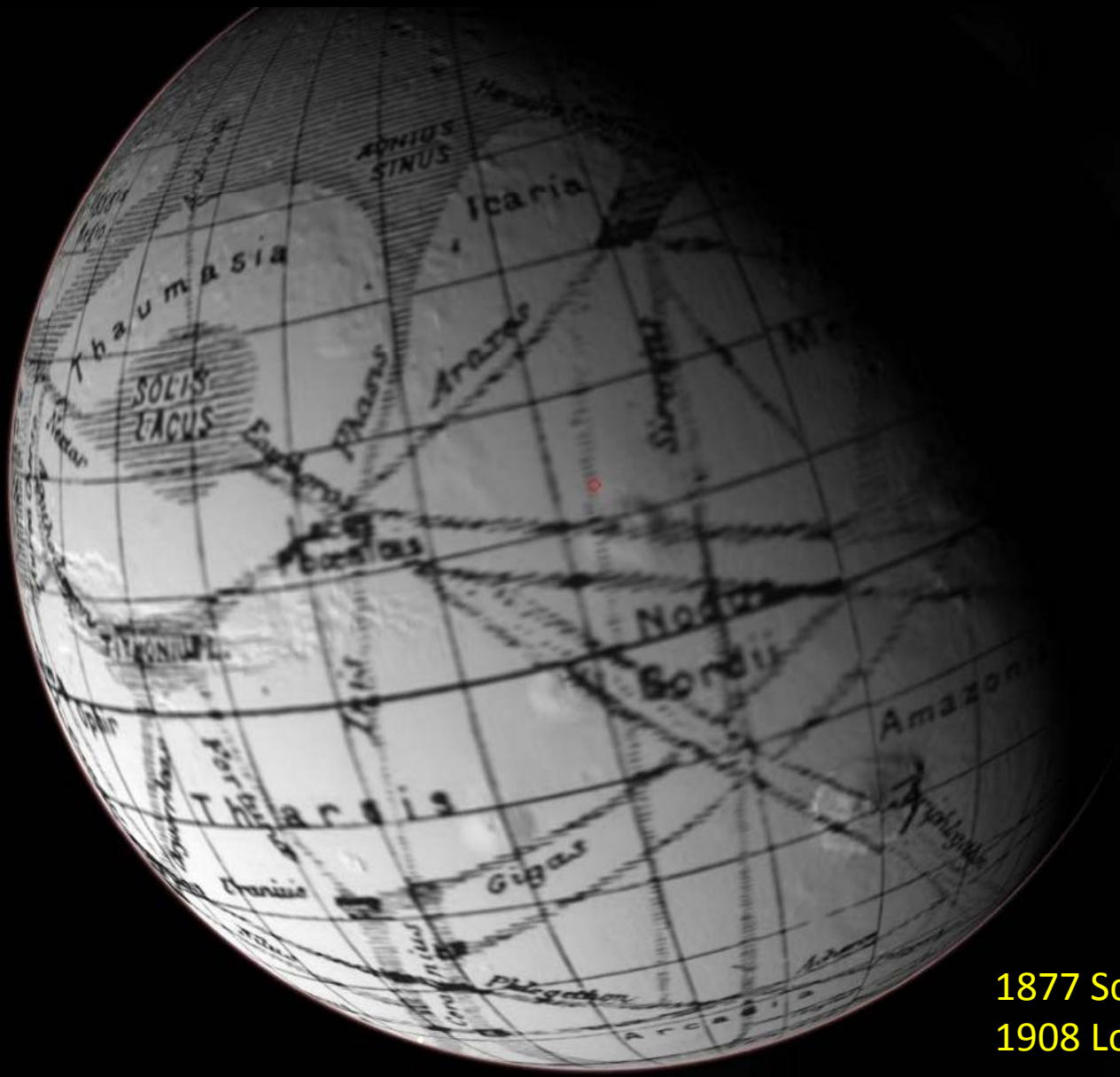
Grupo de Ciencias Planetarias
Zientzia Planetarioen Taldea

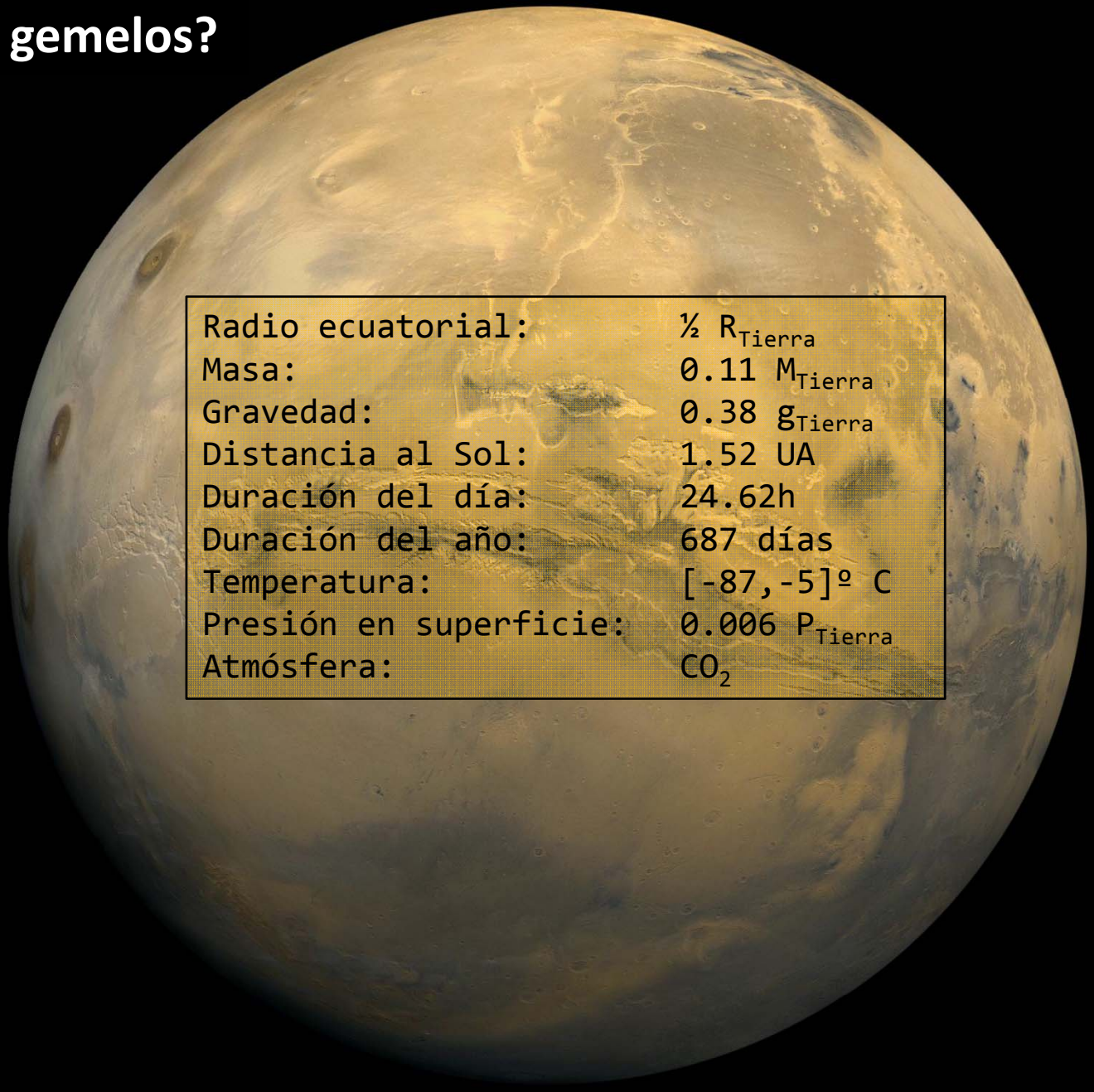

Pléyades
Marte
Perseida
Aldebarán
Si se acerca el Invierno, ¿puede la Primavera quedar tan lejos?
Percy B. Shelley

Una fascinación a prueba de hechos



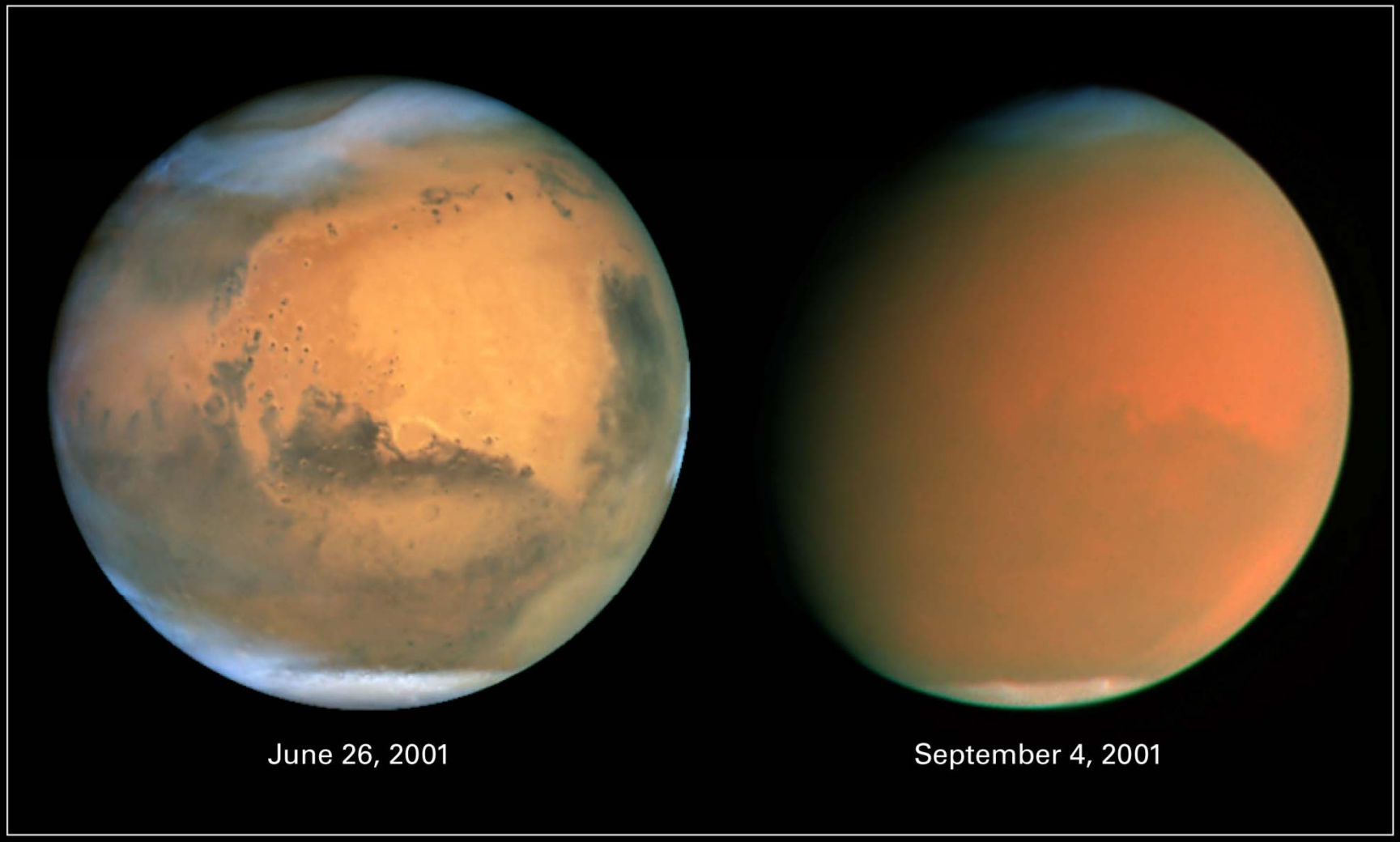
1877 Schiaparelli
1908 Lowell

¿Mundos gemelos?



Radio ecuatorial:	½ R_{Tierra}
Masa:	0.11 M_{Tierra}
Gravedad:	0.38 g_{Tierra}
Distancia al Sol:	1.52 UA
Duración del día:	24.62h
Duración del año:	687 días
Temperatura:	[-87,-5]º C
Presión en superficie:	0.006 P_{Tierra}
Atmósfera:	CO_2

Tormentas de polvo

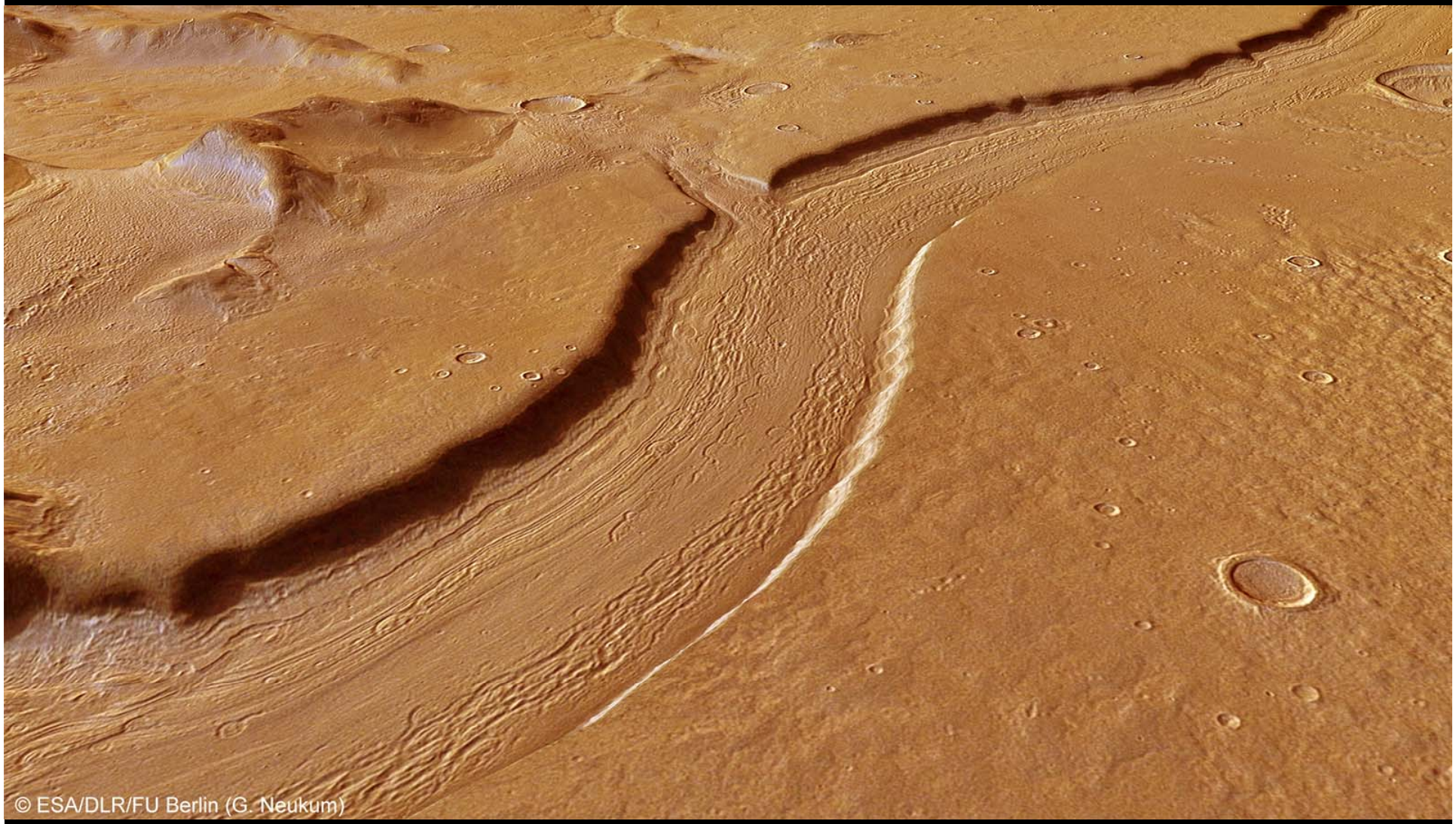


Mars • Global Dust Storm
Hubble Space Telescope • WFPC2

NASA, J. Bell (Cornell University), M. Wolff (SSI), and the Hubble Heritage Team (STScI/AURA) • STScI-PRC01-31

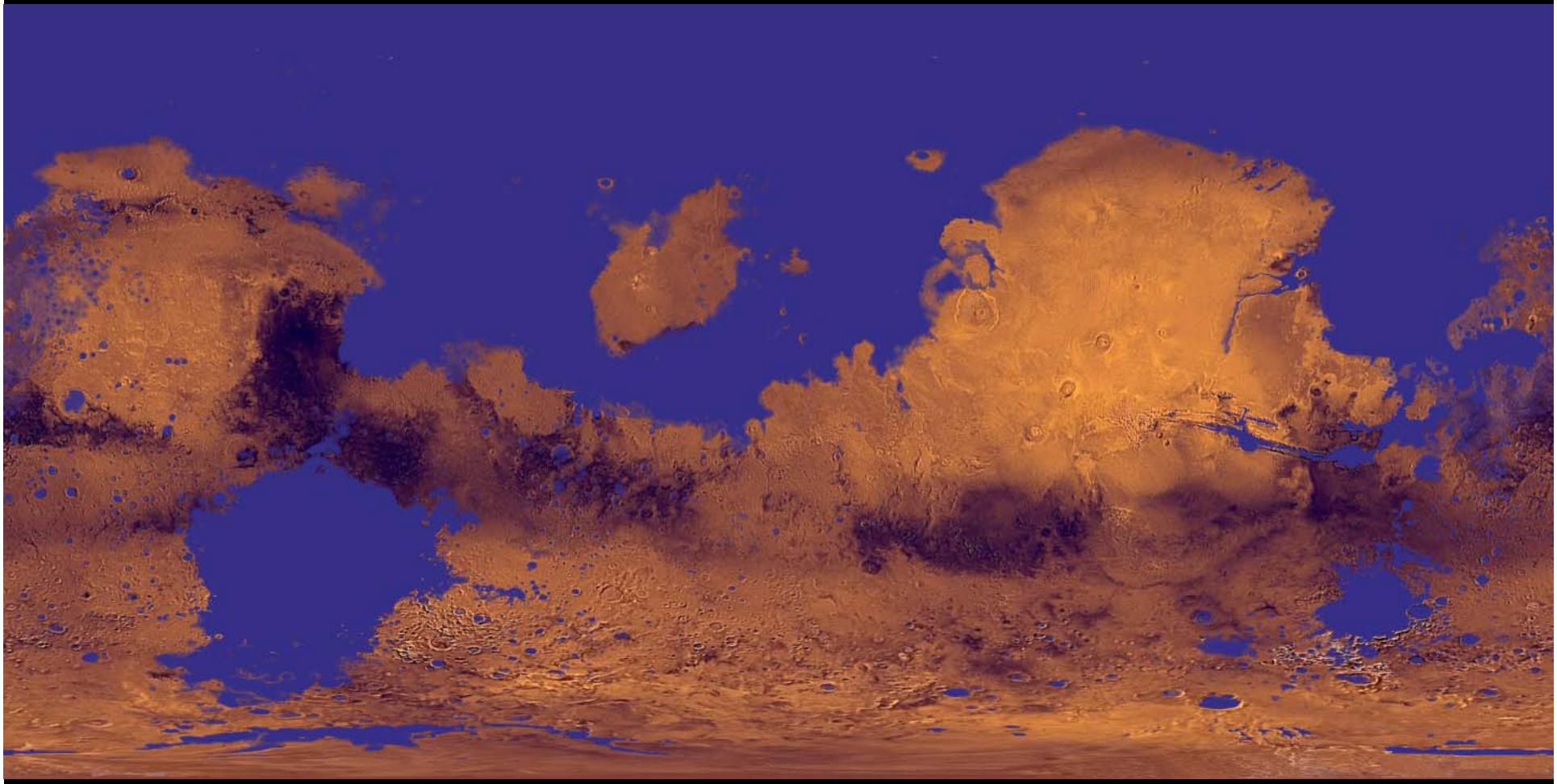
Tormentas de polvo

¿Ríos en Marte?



2013 Mars Express (ESA)
Reull Vallis – 1500 km x 7km x 300m

El otro planeta azul

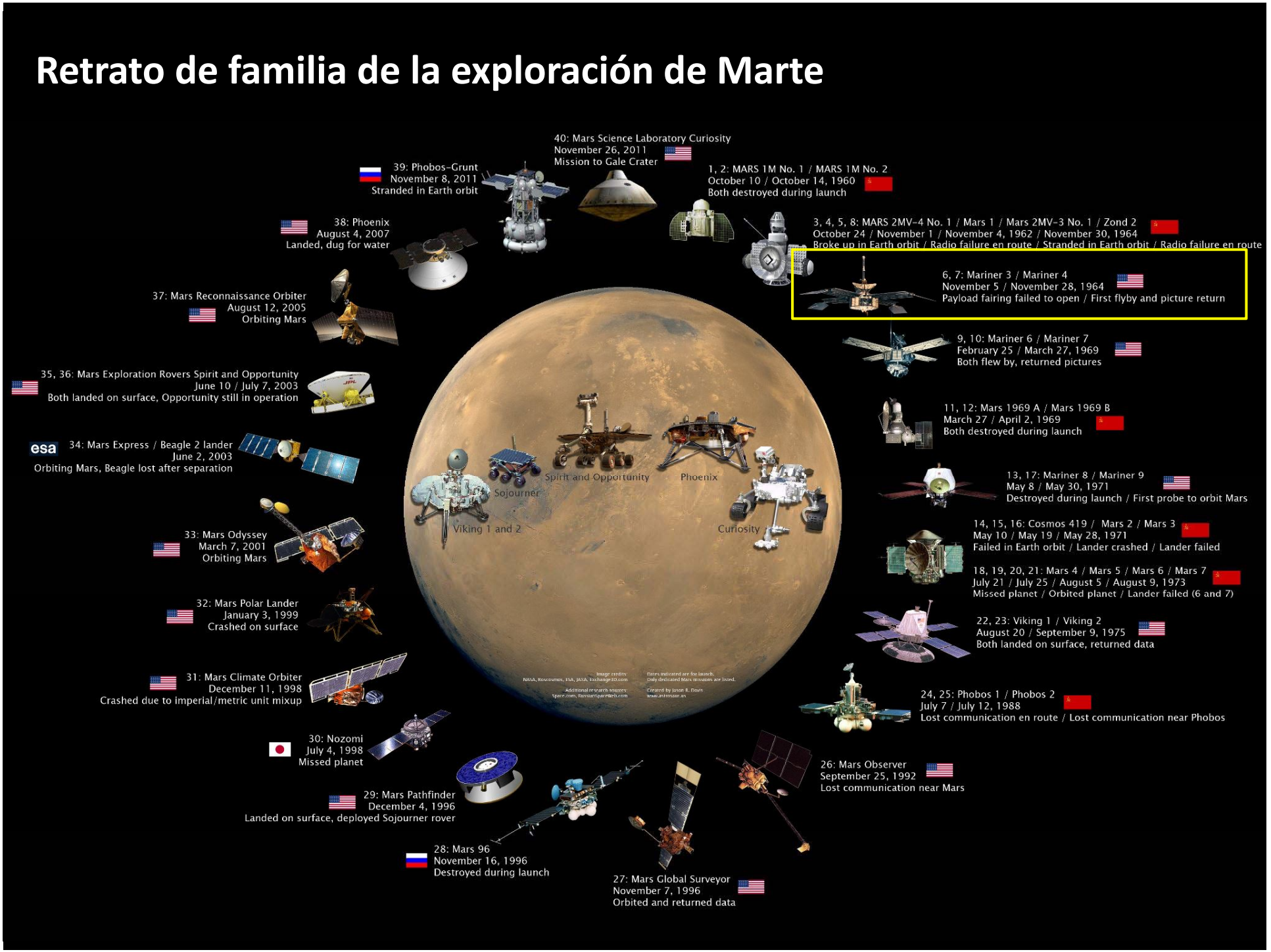



Viajeros del espacio
ALH84001
1996 Mac Kay et al.

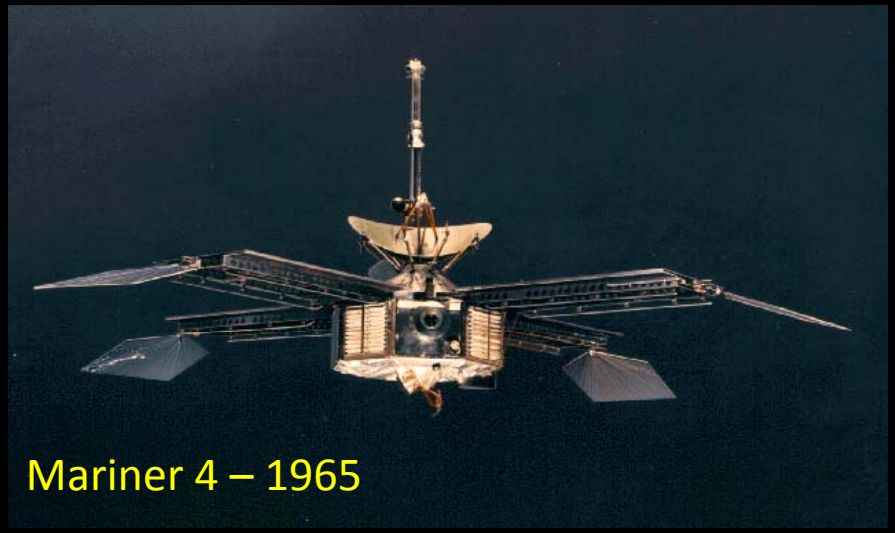
Los otros marcianos

La Guerra de los mundos
1898 H.G. Wells
1938 Orson Wells

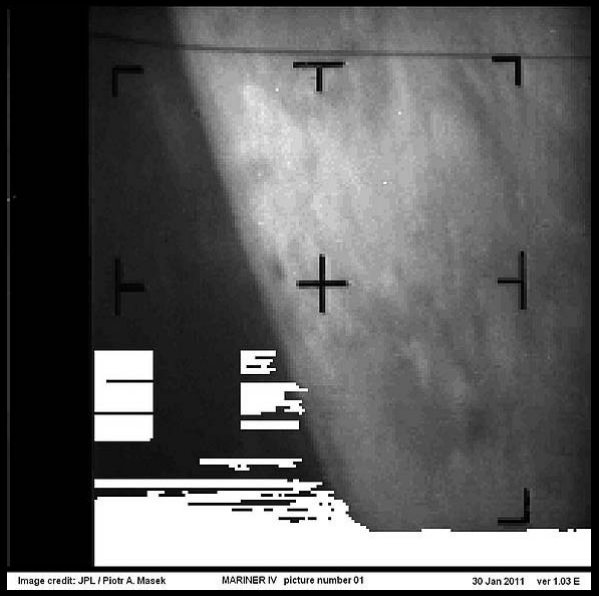
Retrato de familia de la exploración de Marte

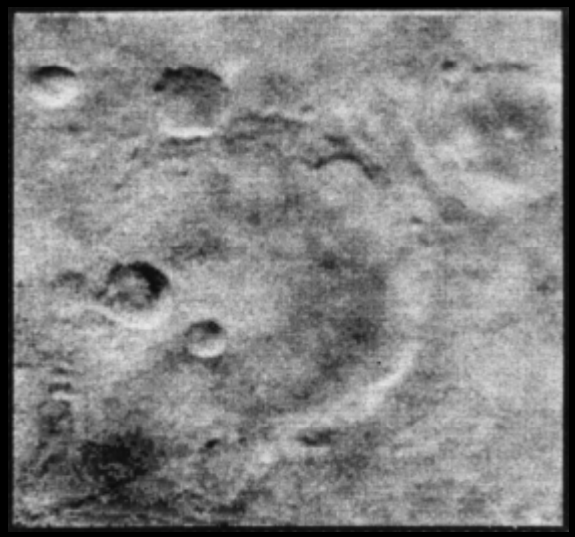


Grandes exploradores: Mariner

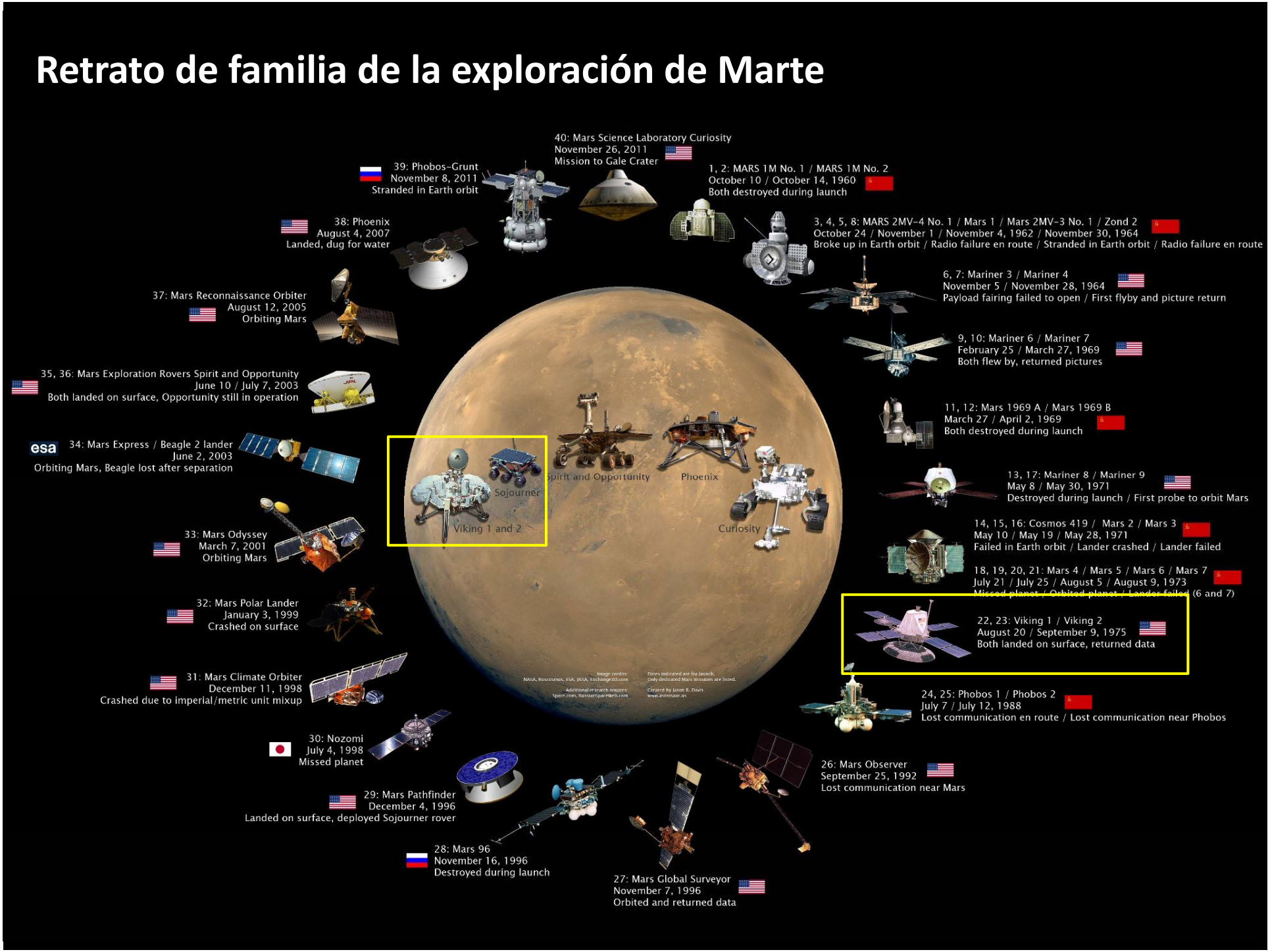


Mariner 4 – 1965

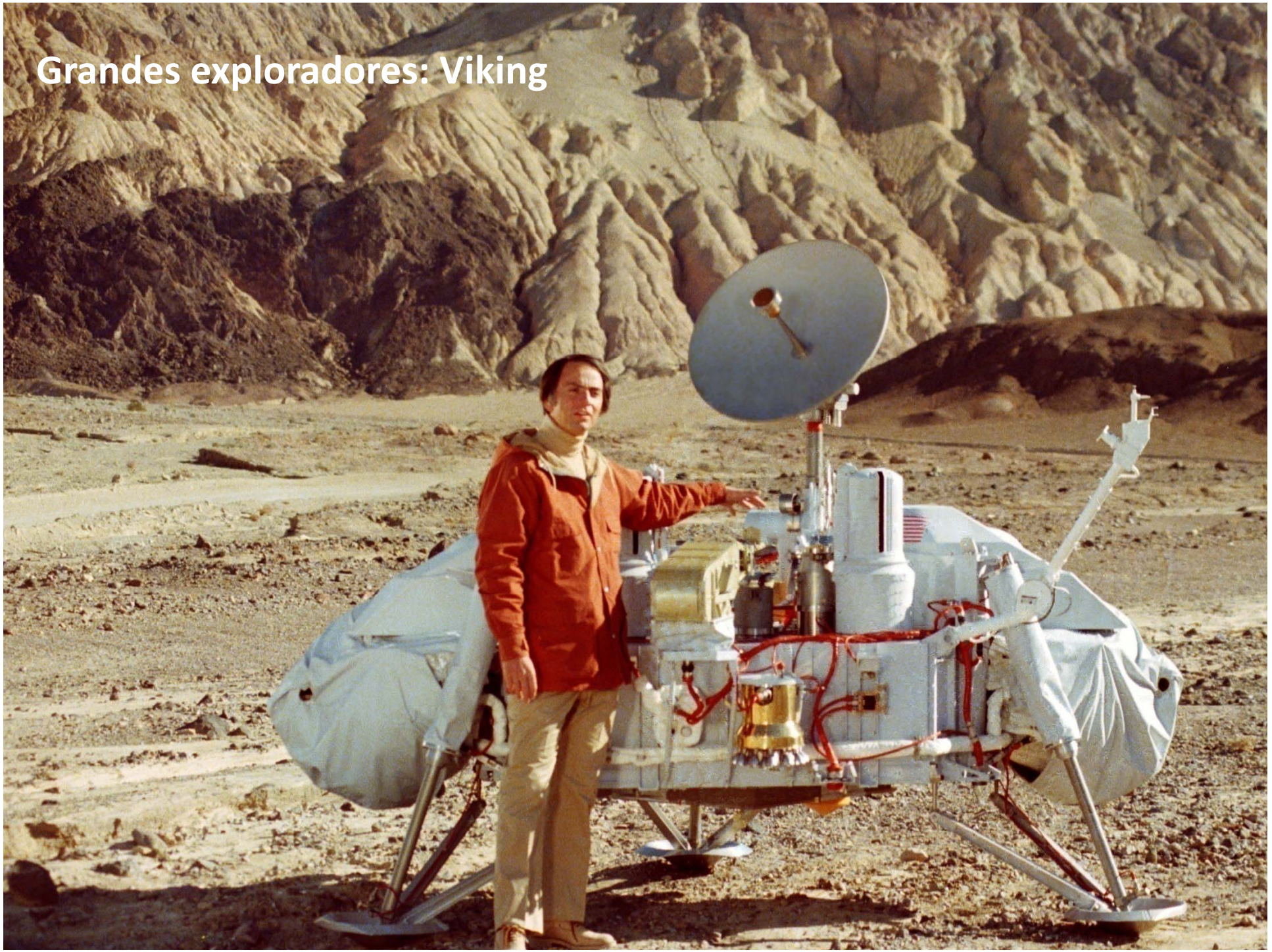




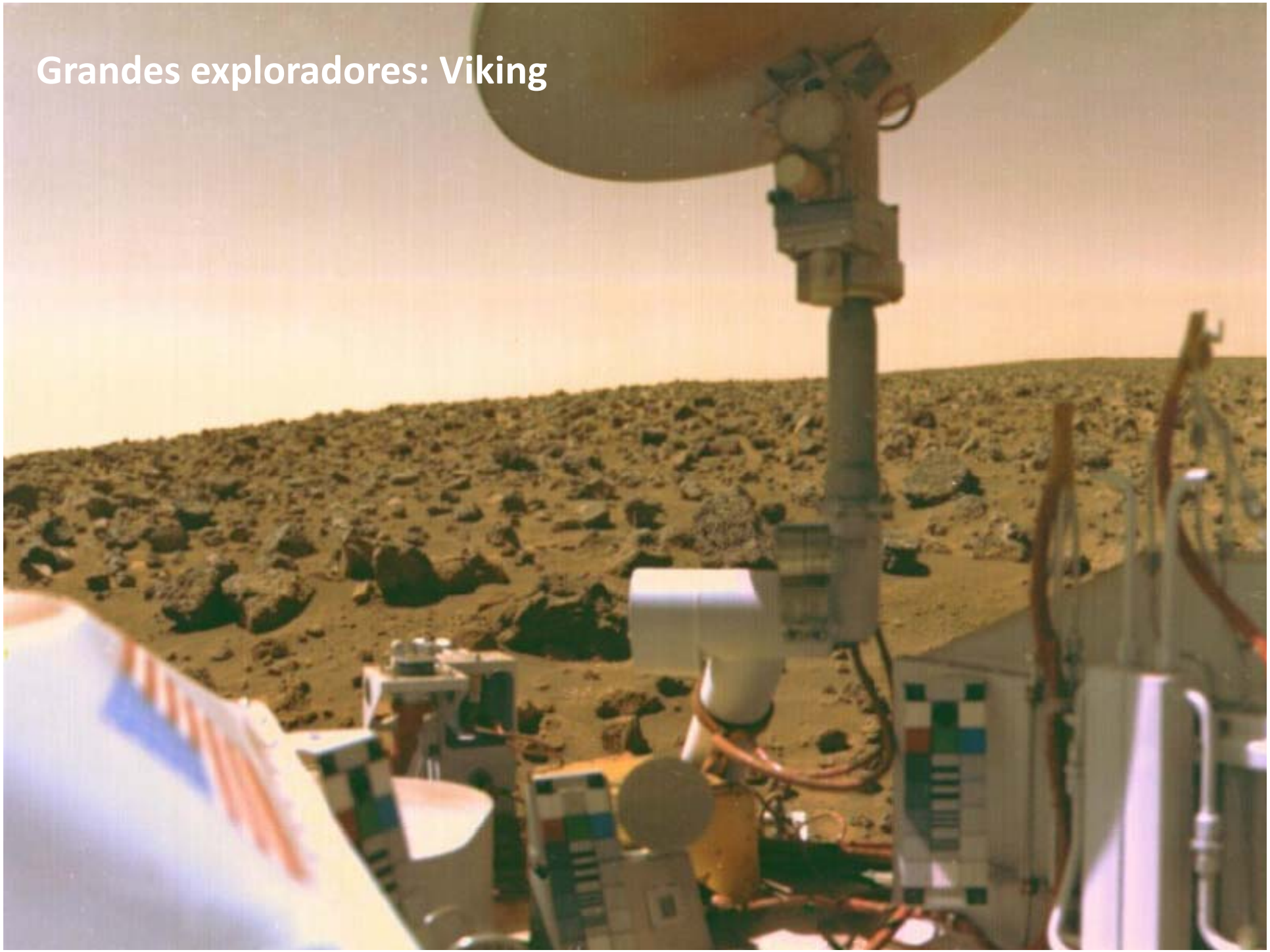
Retrato de familia de la exploración de Marte



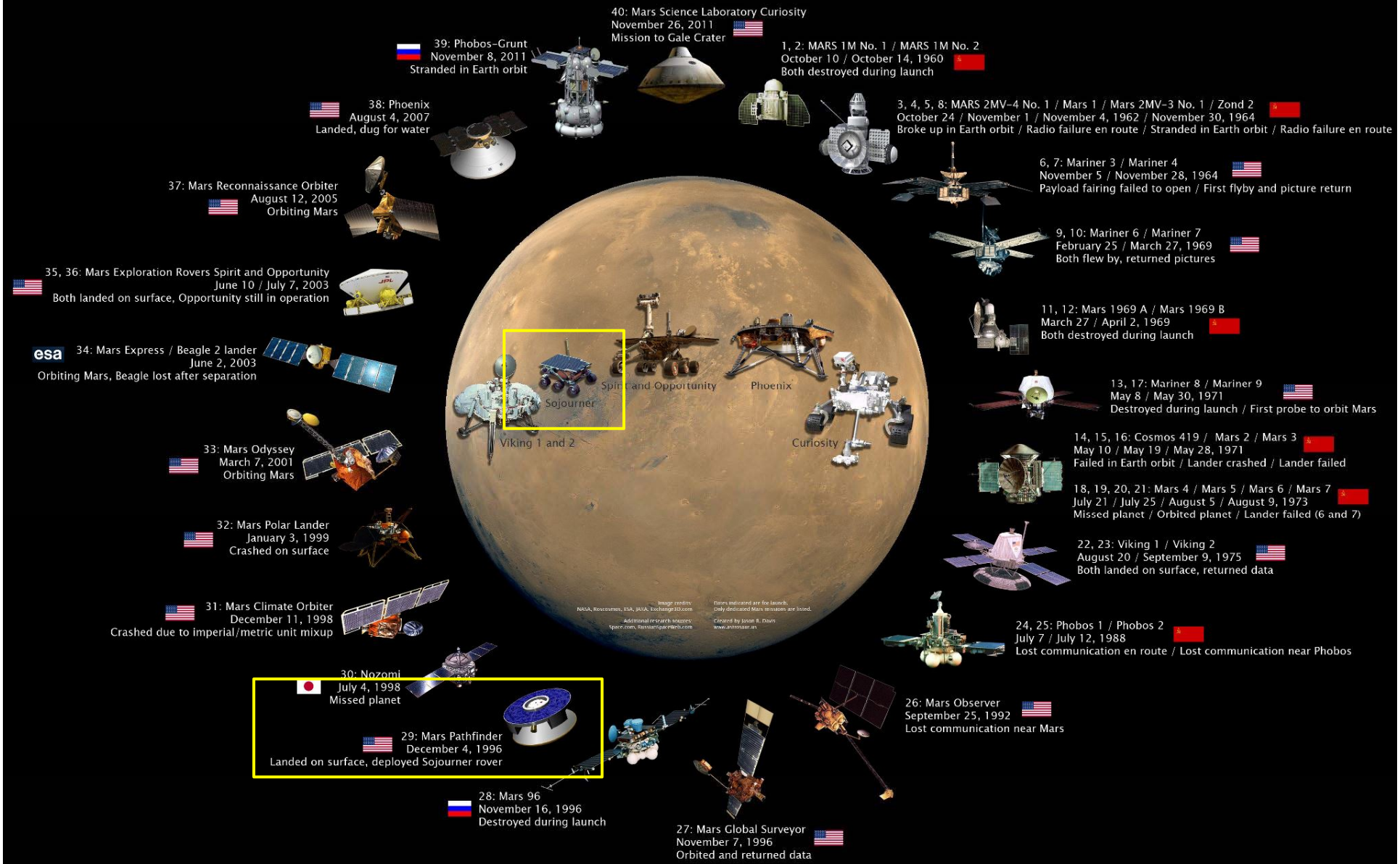
Grandes exploradores: Viking



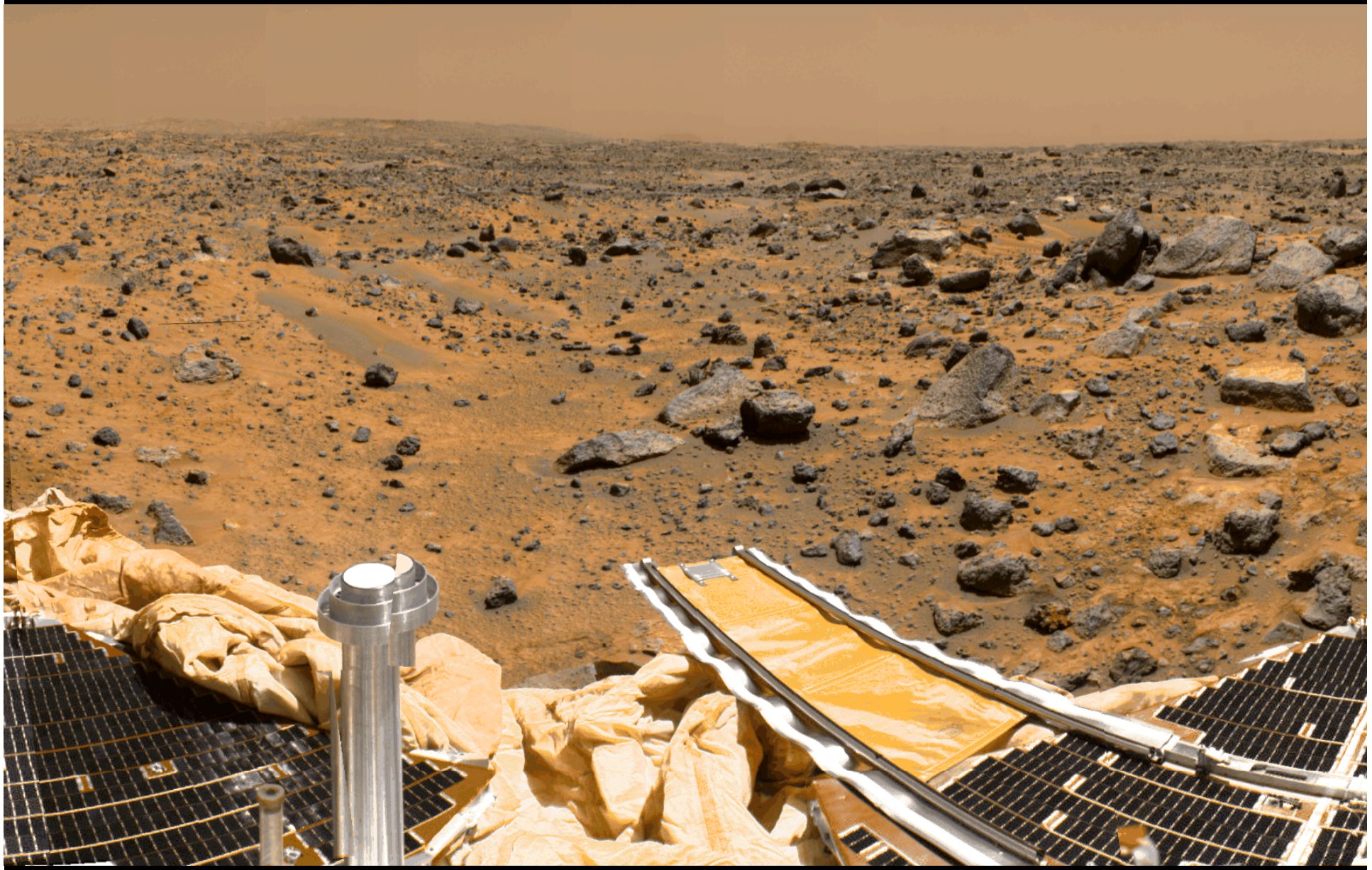
Grandes exploradores: Viking



Retrato de familia de la exploración de Marte

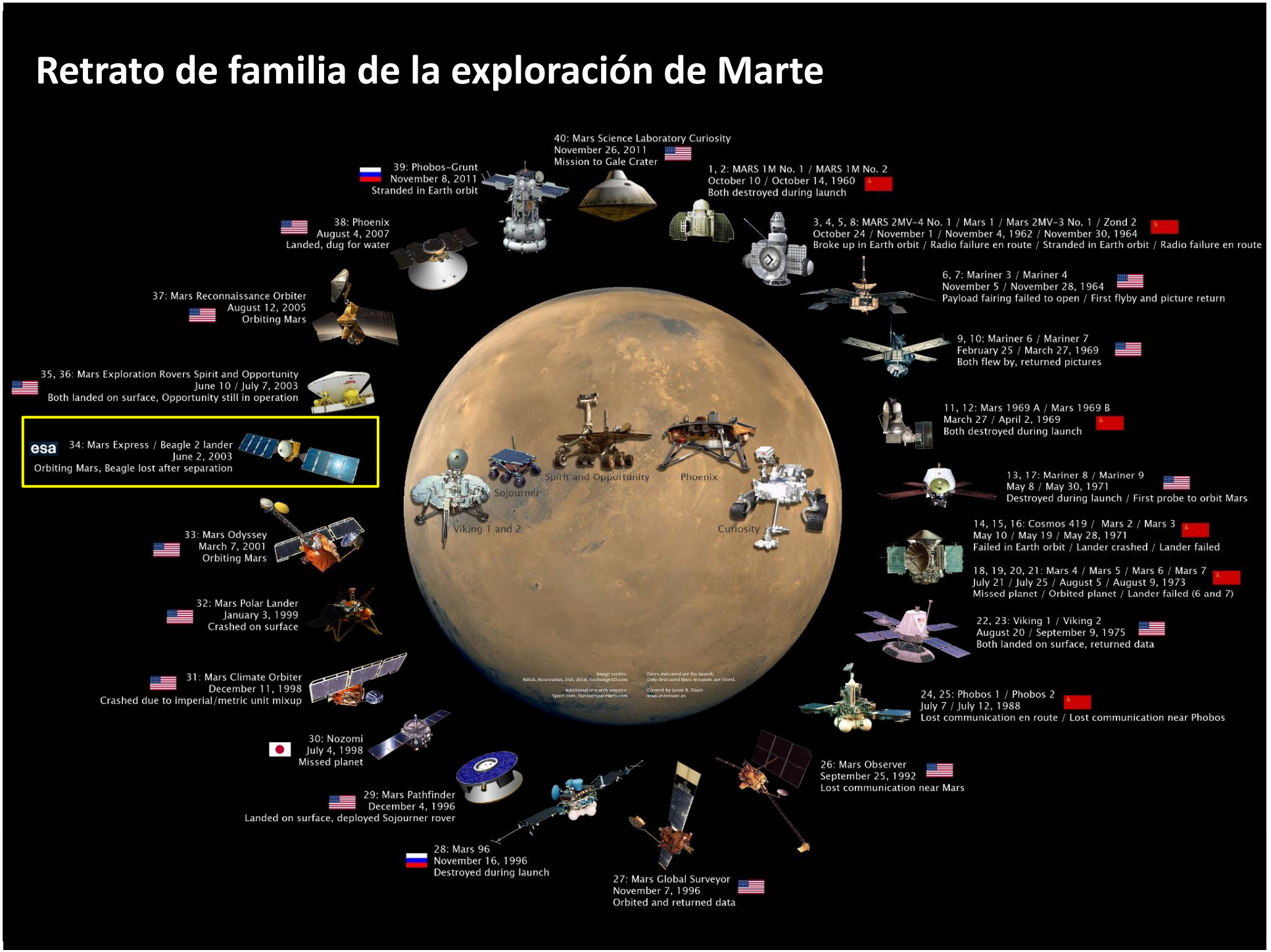


Grandes exploradores: Mars Pathfinder & Sojourner

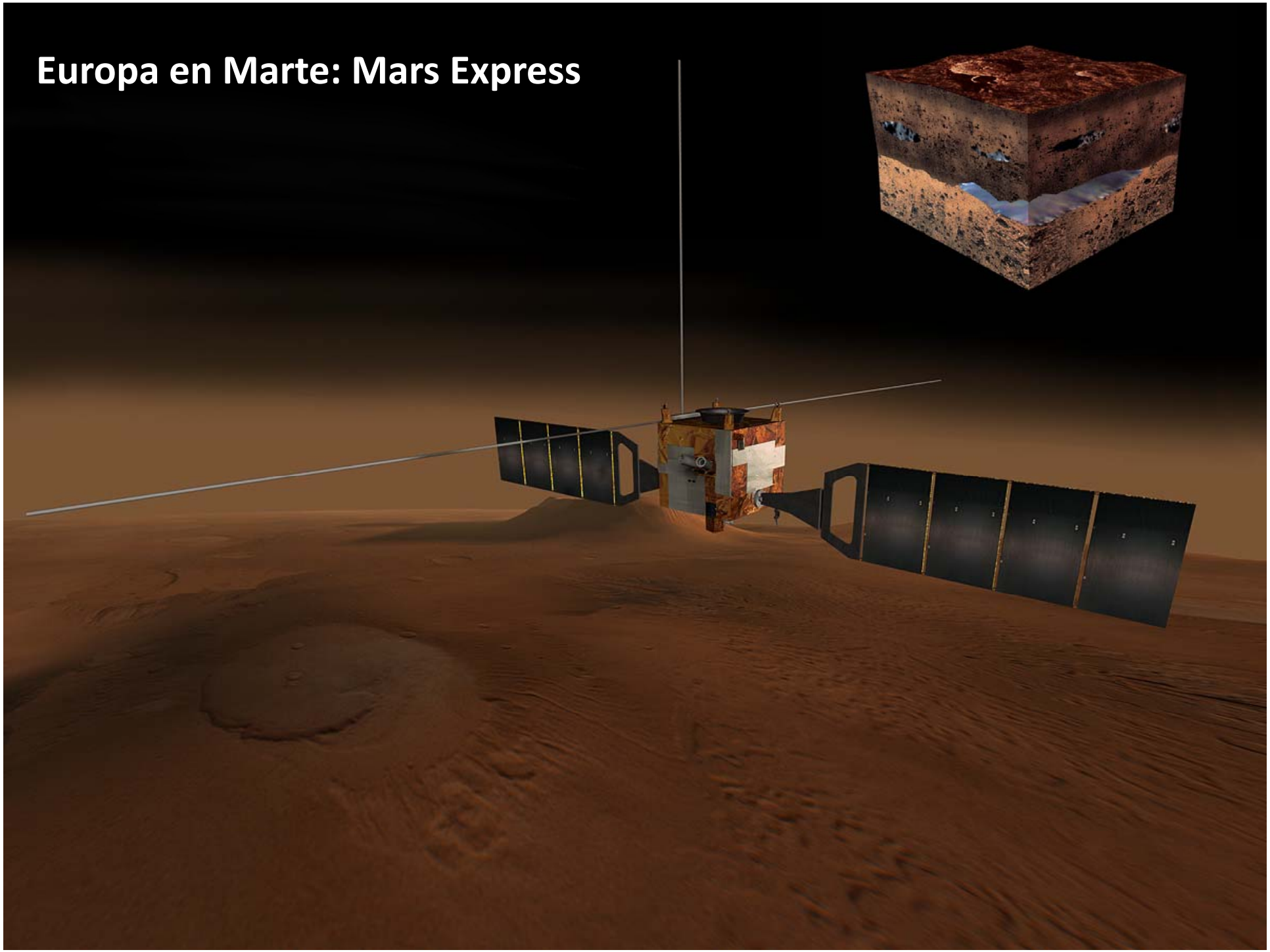


Grandes exploradores: Mars Pathfinder & Sojourner

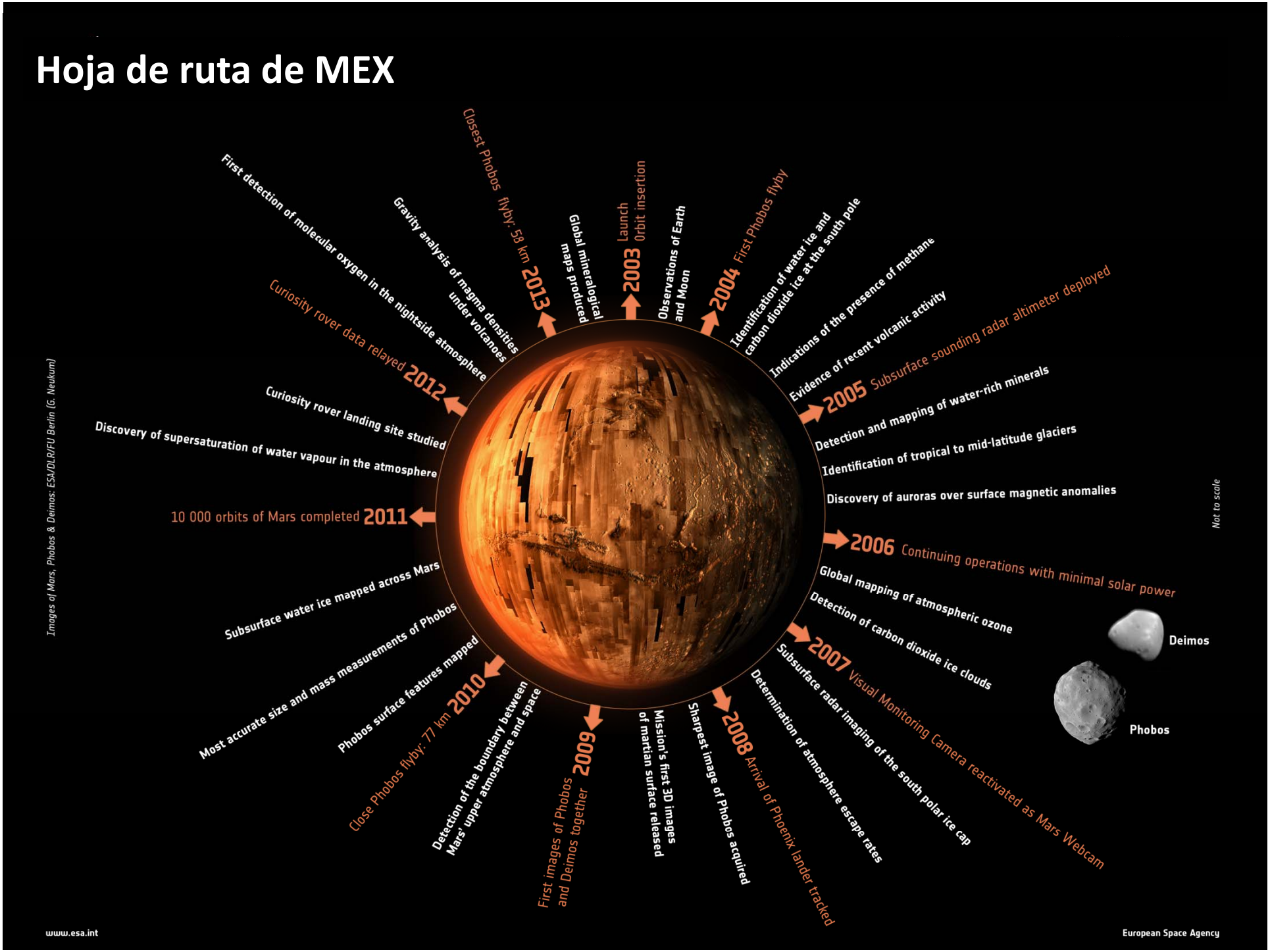
Retrato de familia de la exploración de Marte



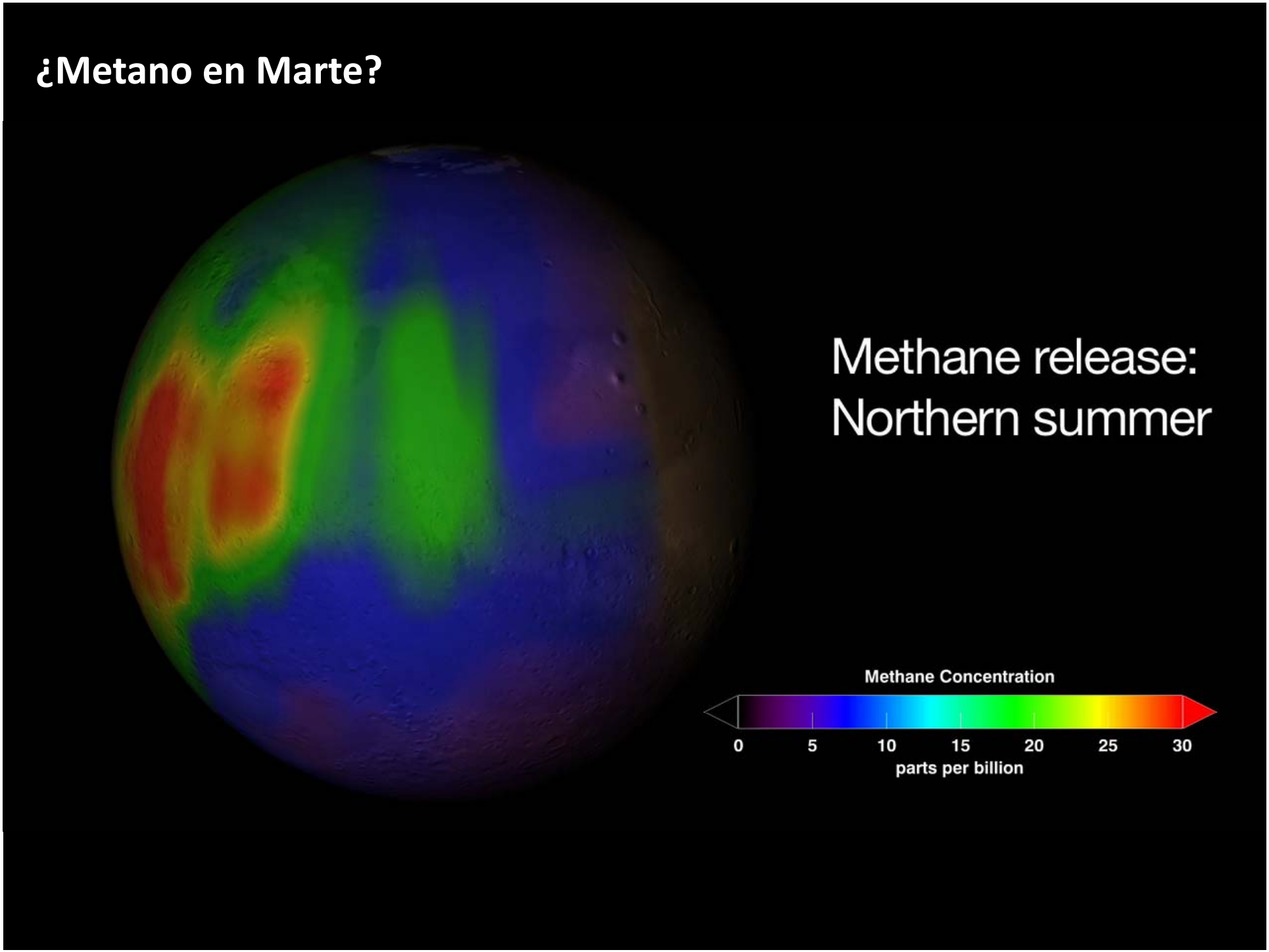
Europa en Marte: Mars Express



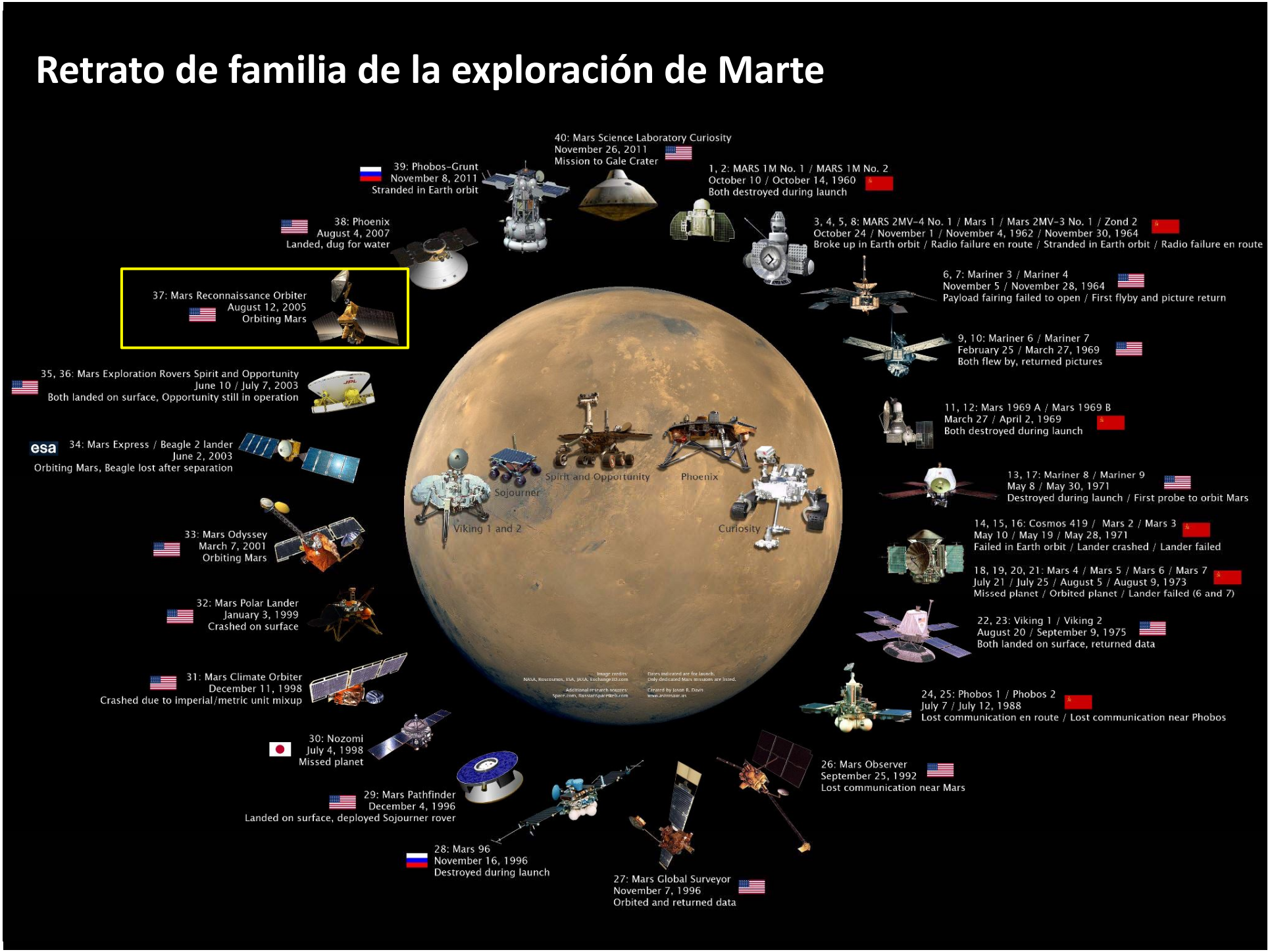
Hoja de ruta de MEX



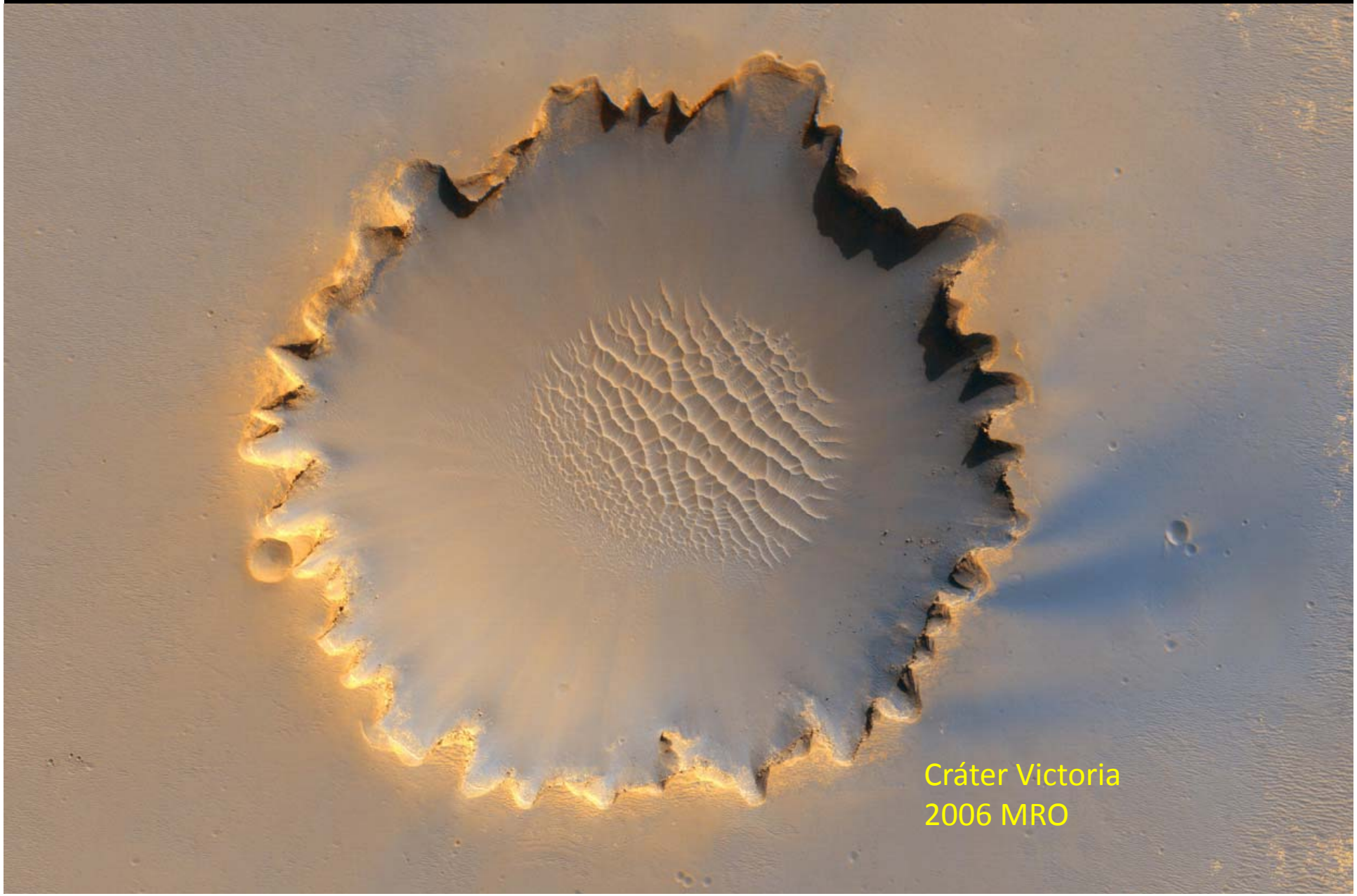
¿Metano en Marte?



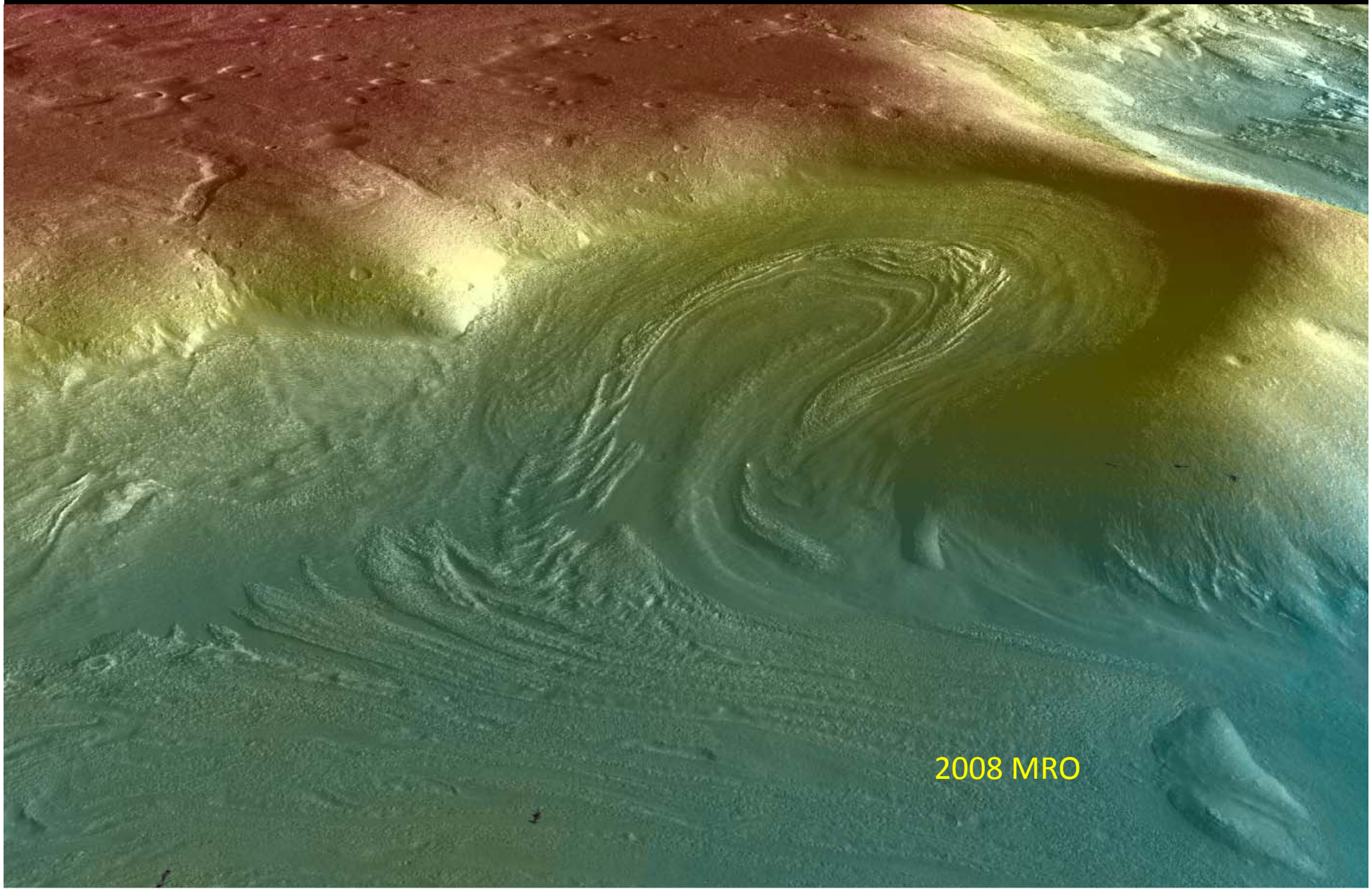
Retrato de familia de la exploración de Marte



Mars Reconnaissance Orbiter



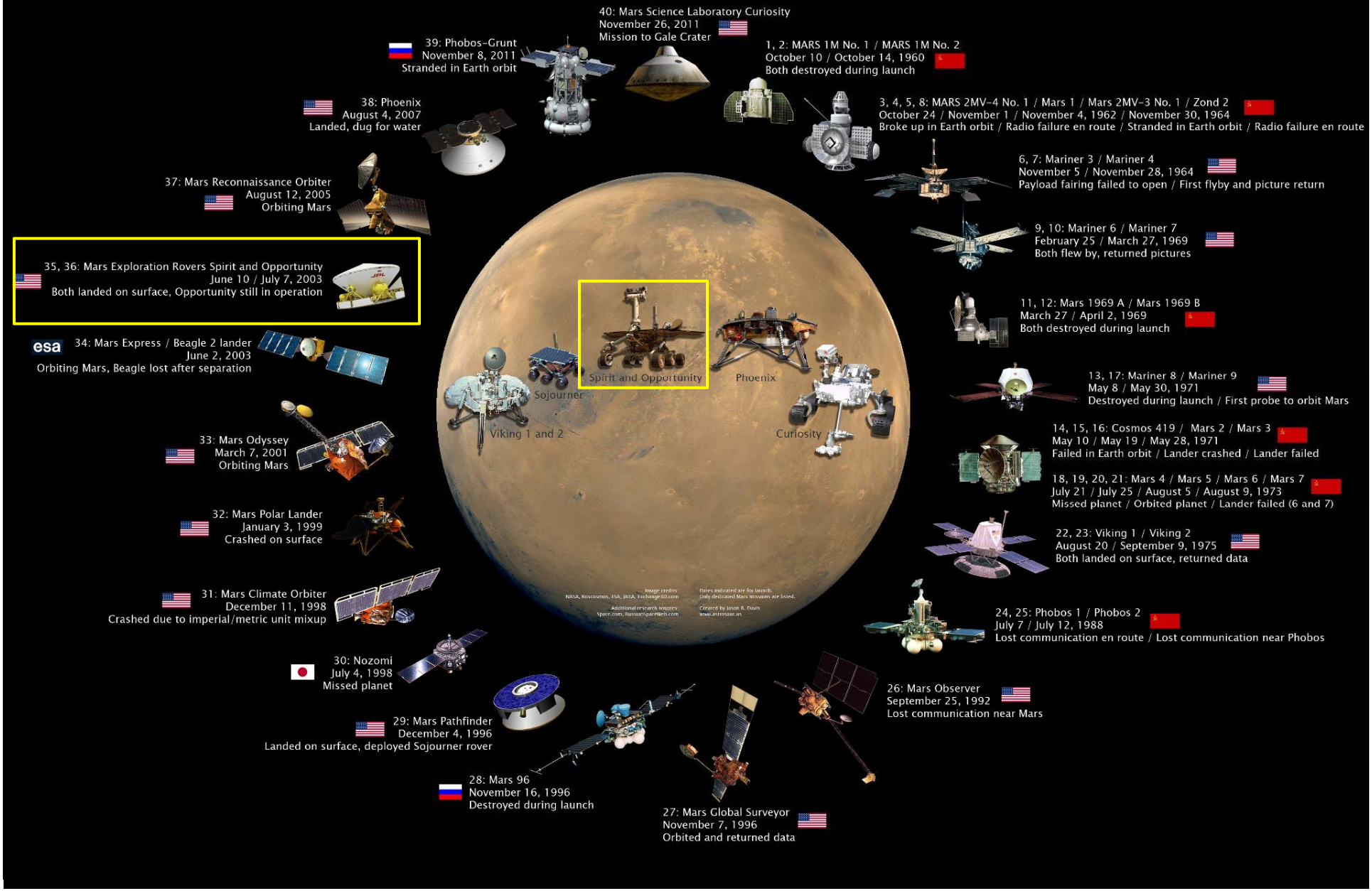
Mars Reconnaissance Orbiter




Mars Reconnaissance Orbiter
Tornado
2012 MRO

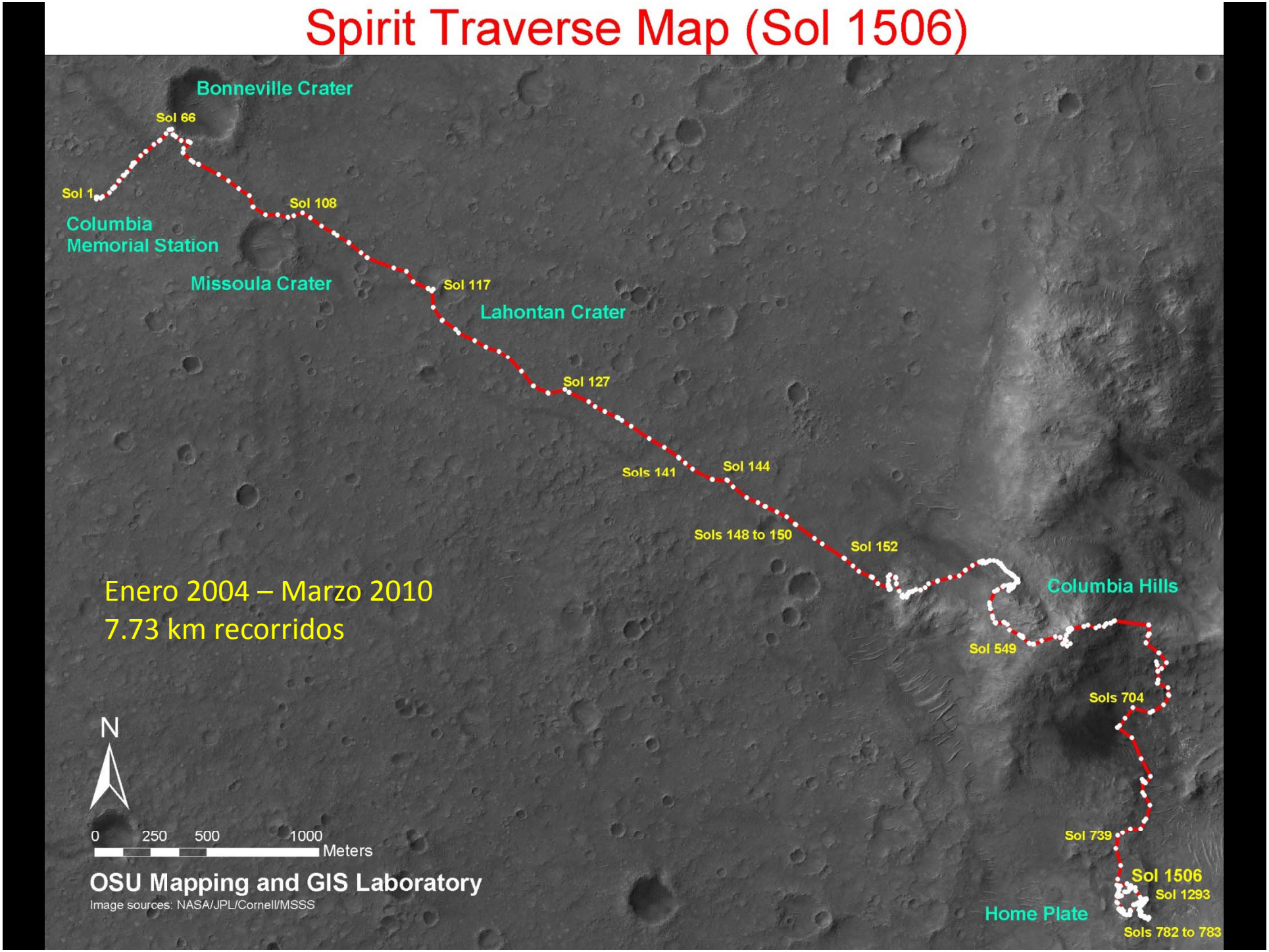
Mars Reconnaissance Orbiter

Retrato de familia de la exploración de Marte

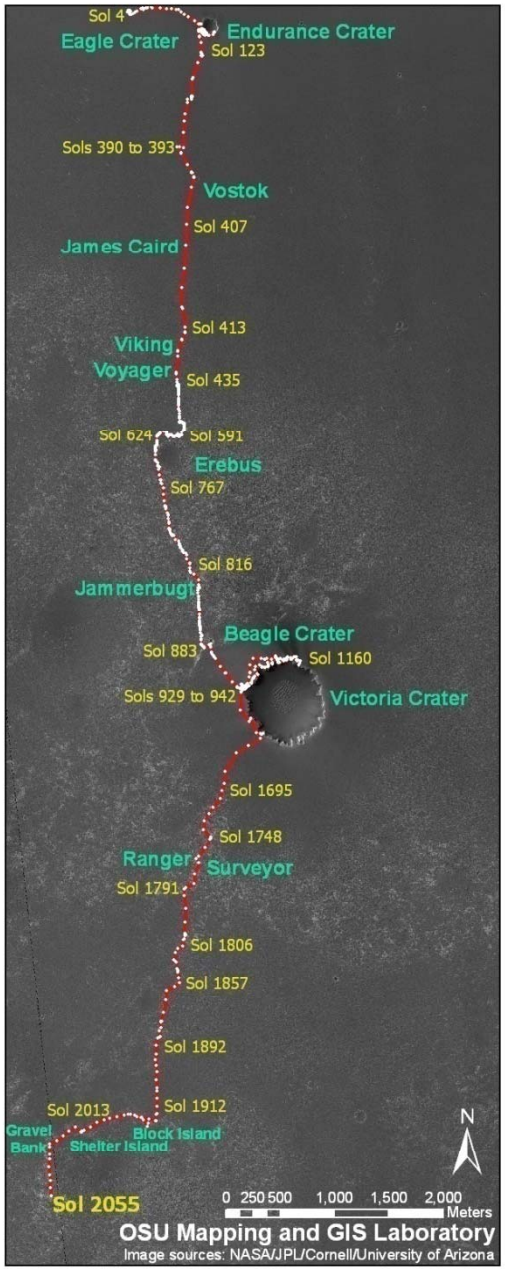


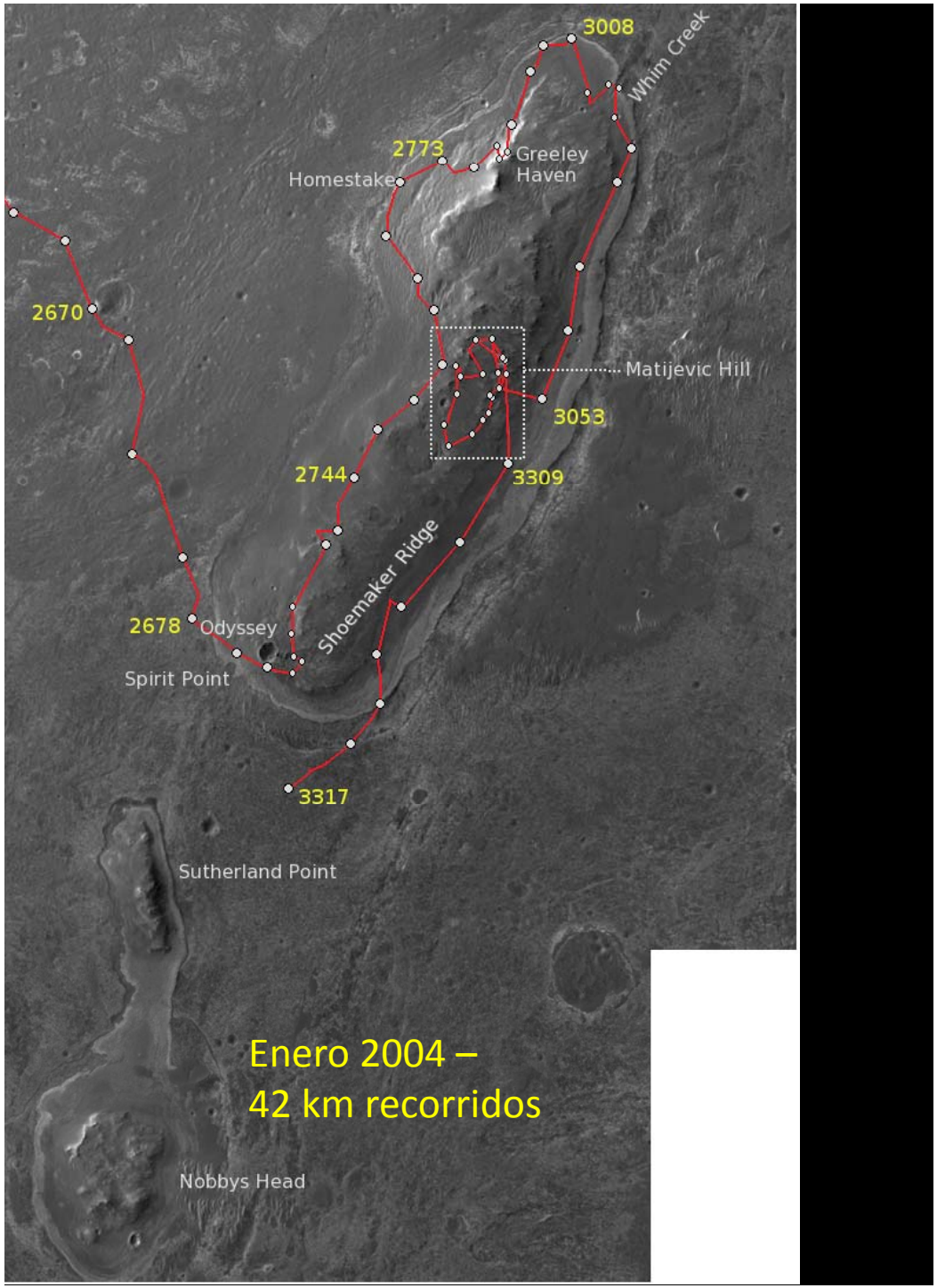

Espíritu y Oportunidad

Spirit Traverse Map (Sol 1506)

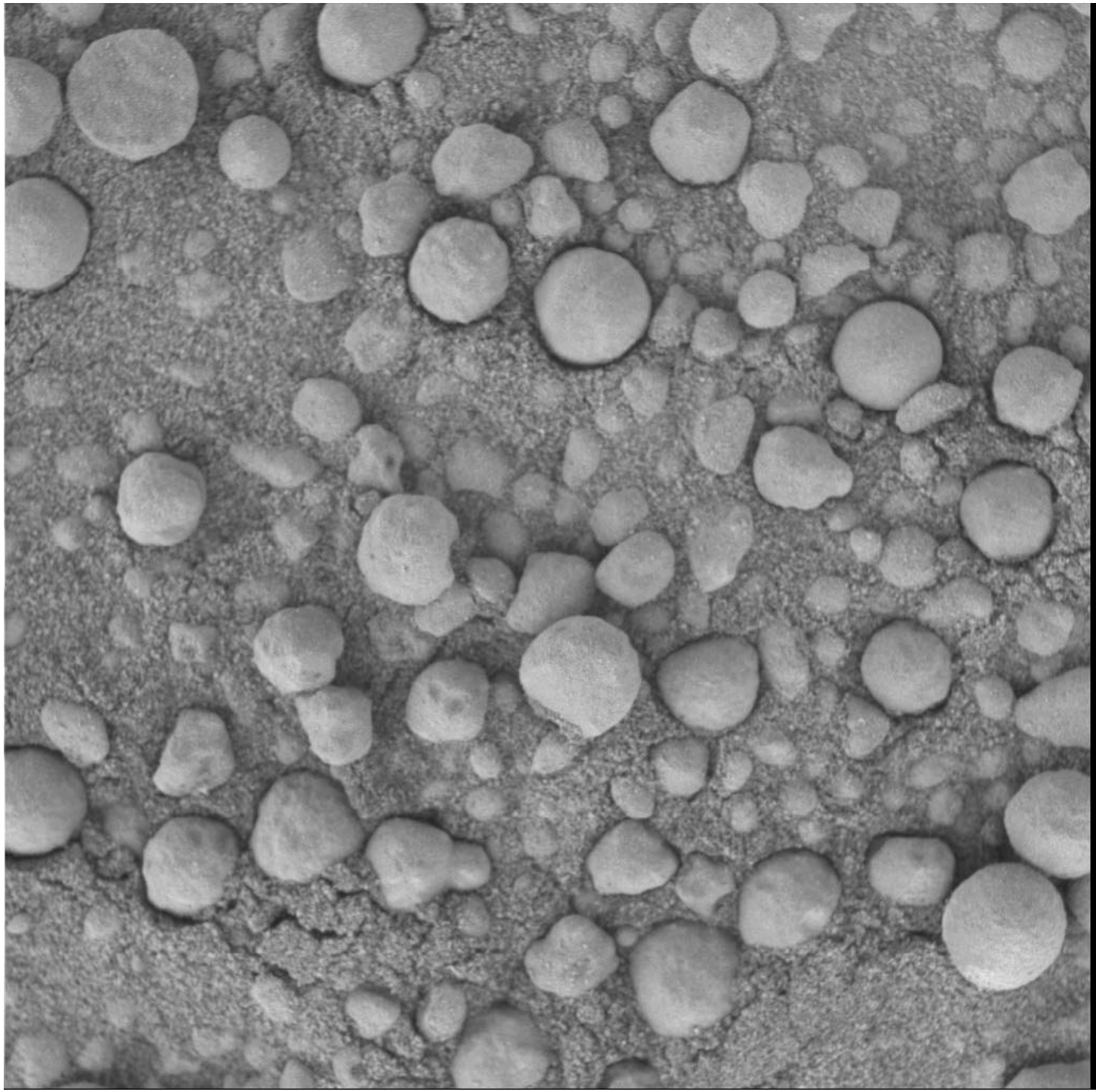


Opportunity Traverse Map (Sol 2055)





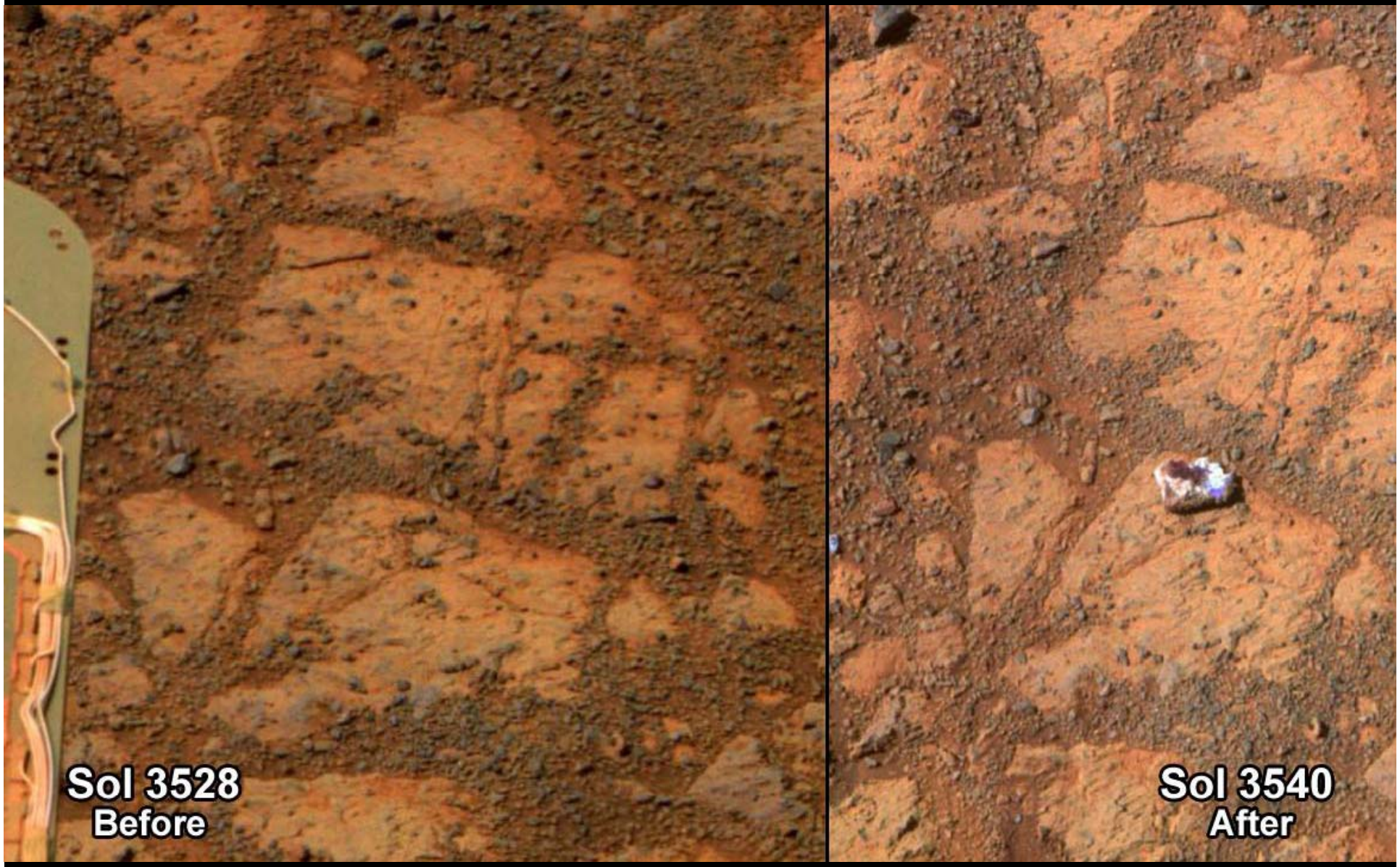
Cae la noche en Marte



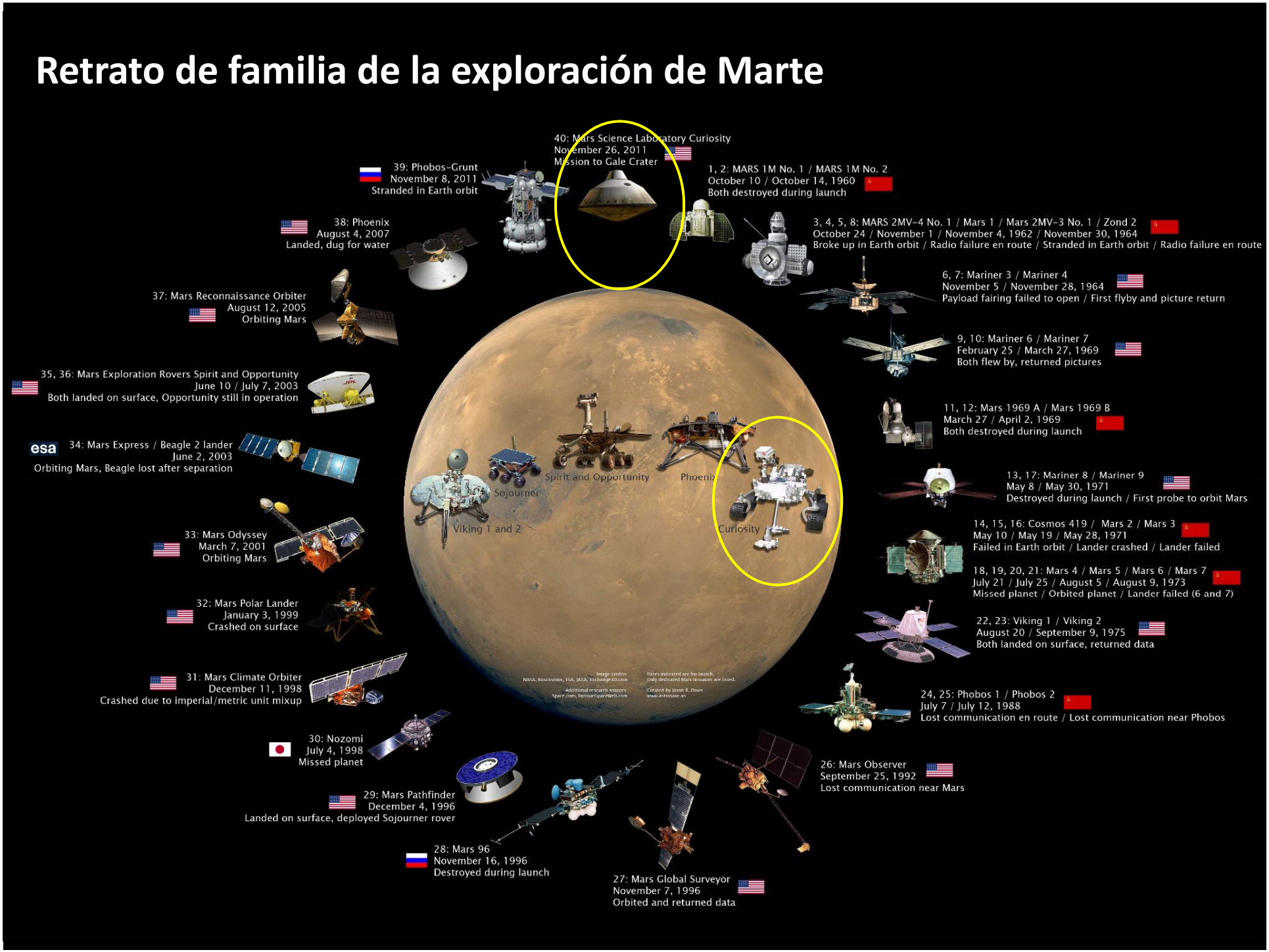
Sigue el agua

Dentro de la tormenta

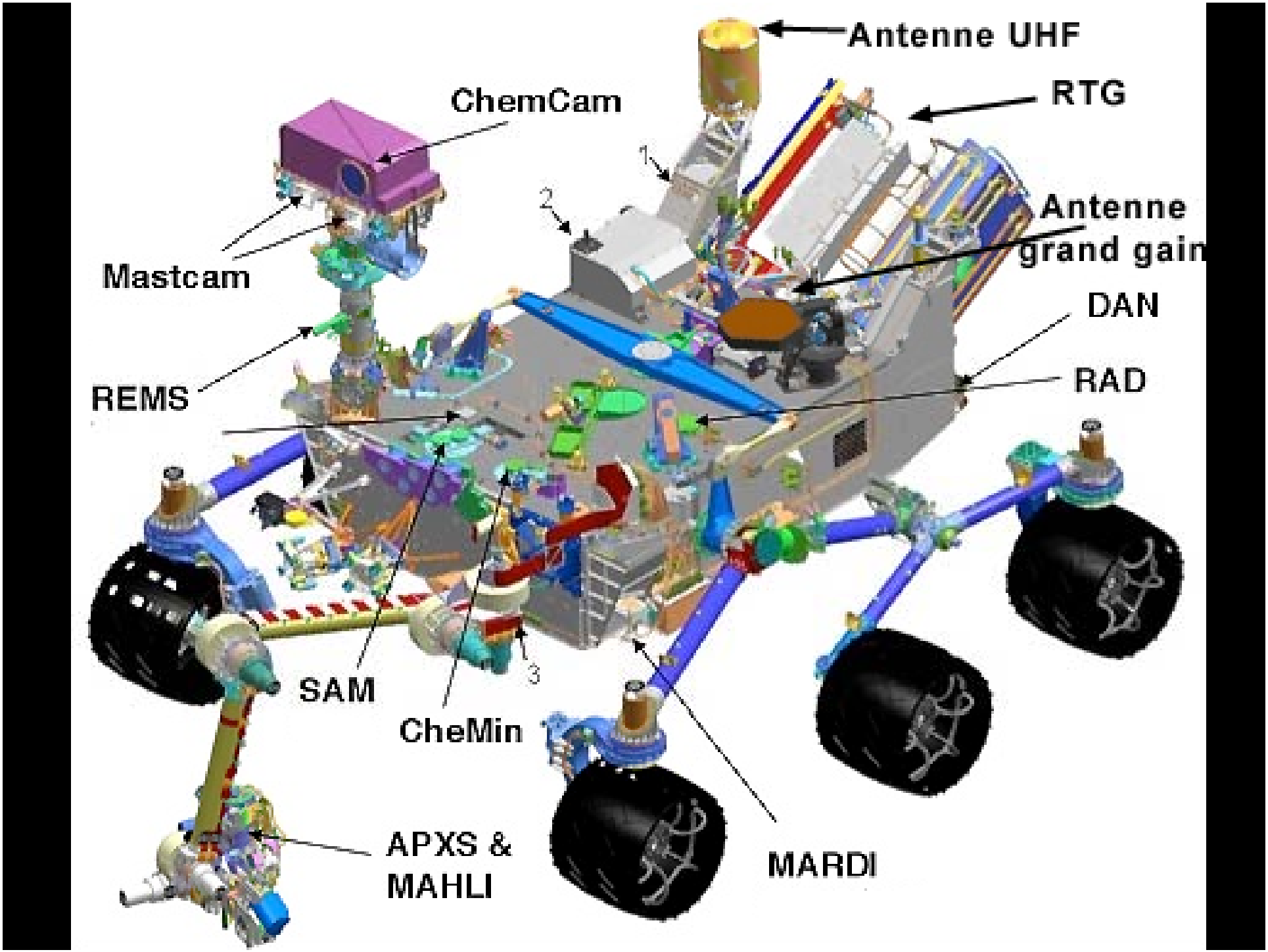
Una roca misteriosa



Retrato de familia de la exploración de Marte

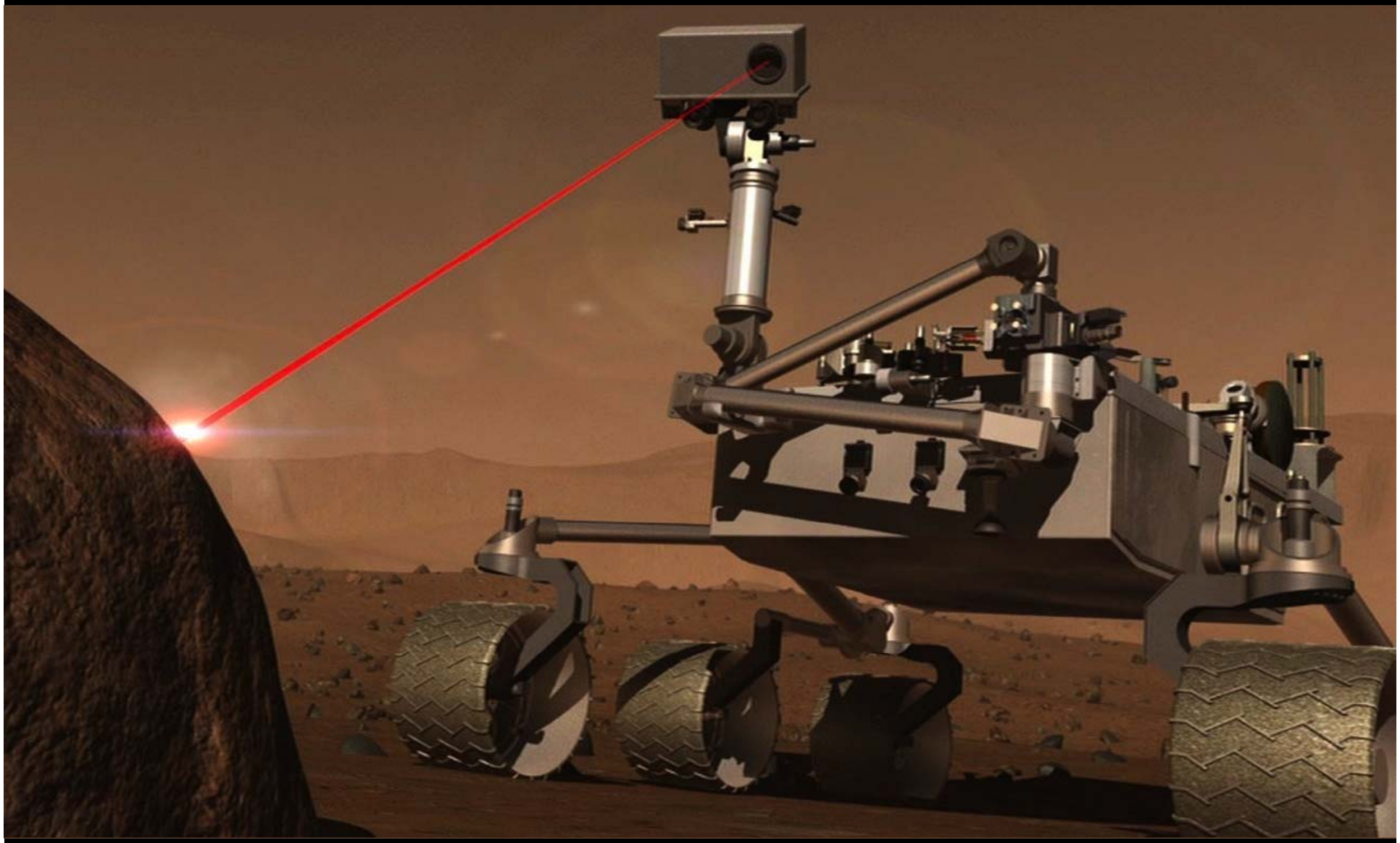


La hora de la Curiosidad

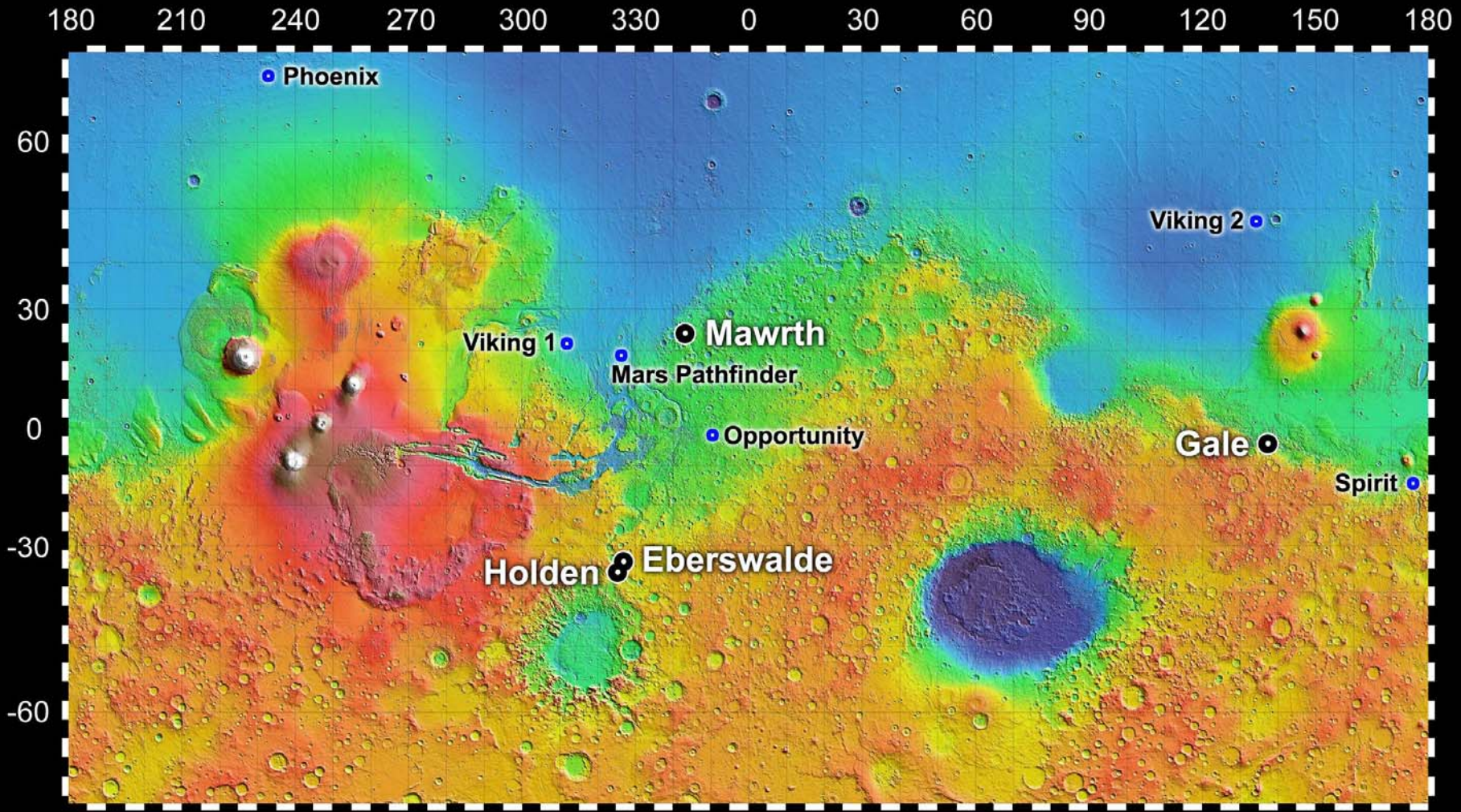

Antenne UHF
RTG
ChemCam
Antenne
grand gain
Mastcam
DAN
REMS
RAD
SAM
CheMin
APXS &
MAHLI
MARDI

¡Abran fuego!

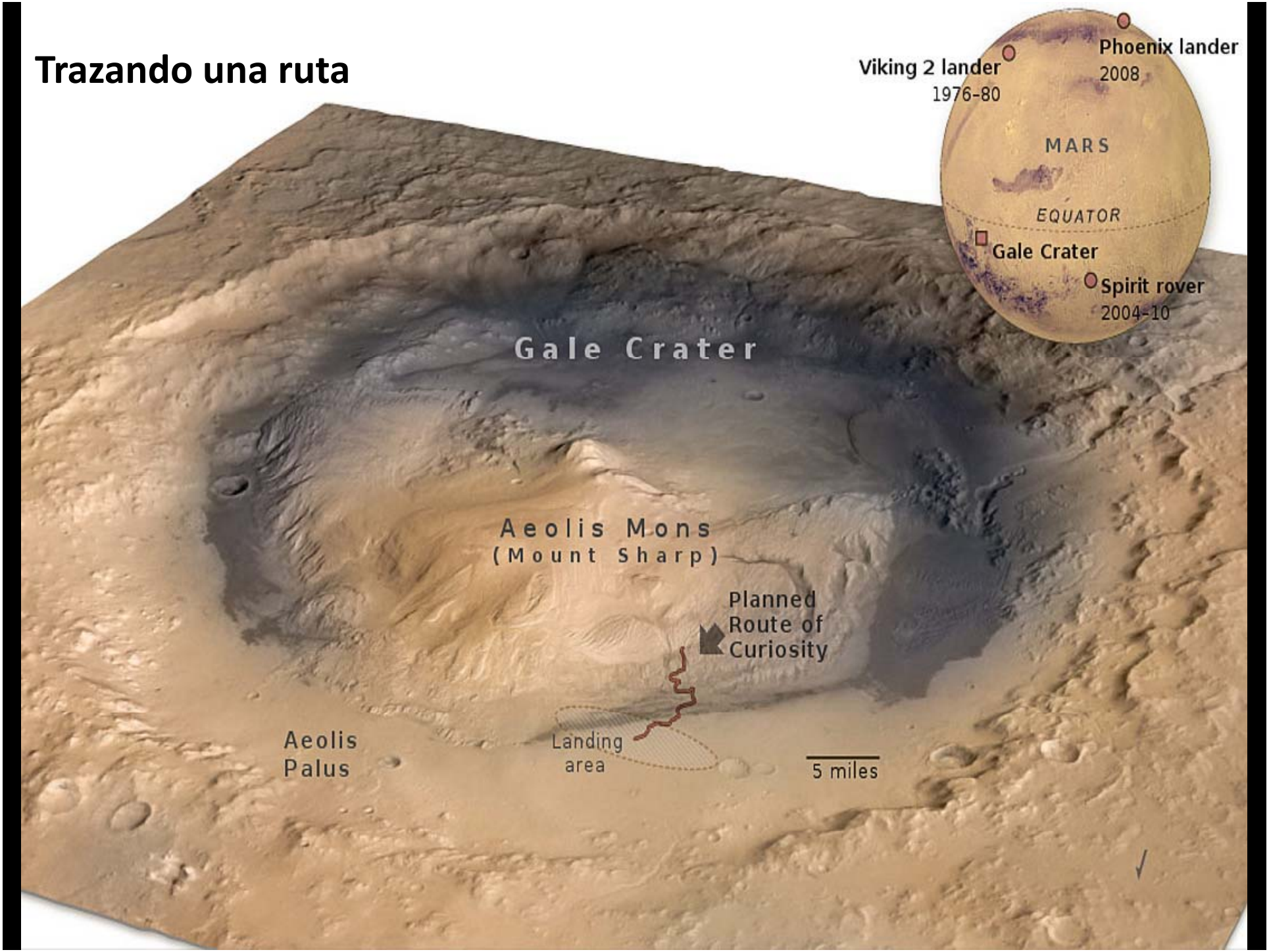
¡Abran fuego!



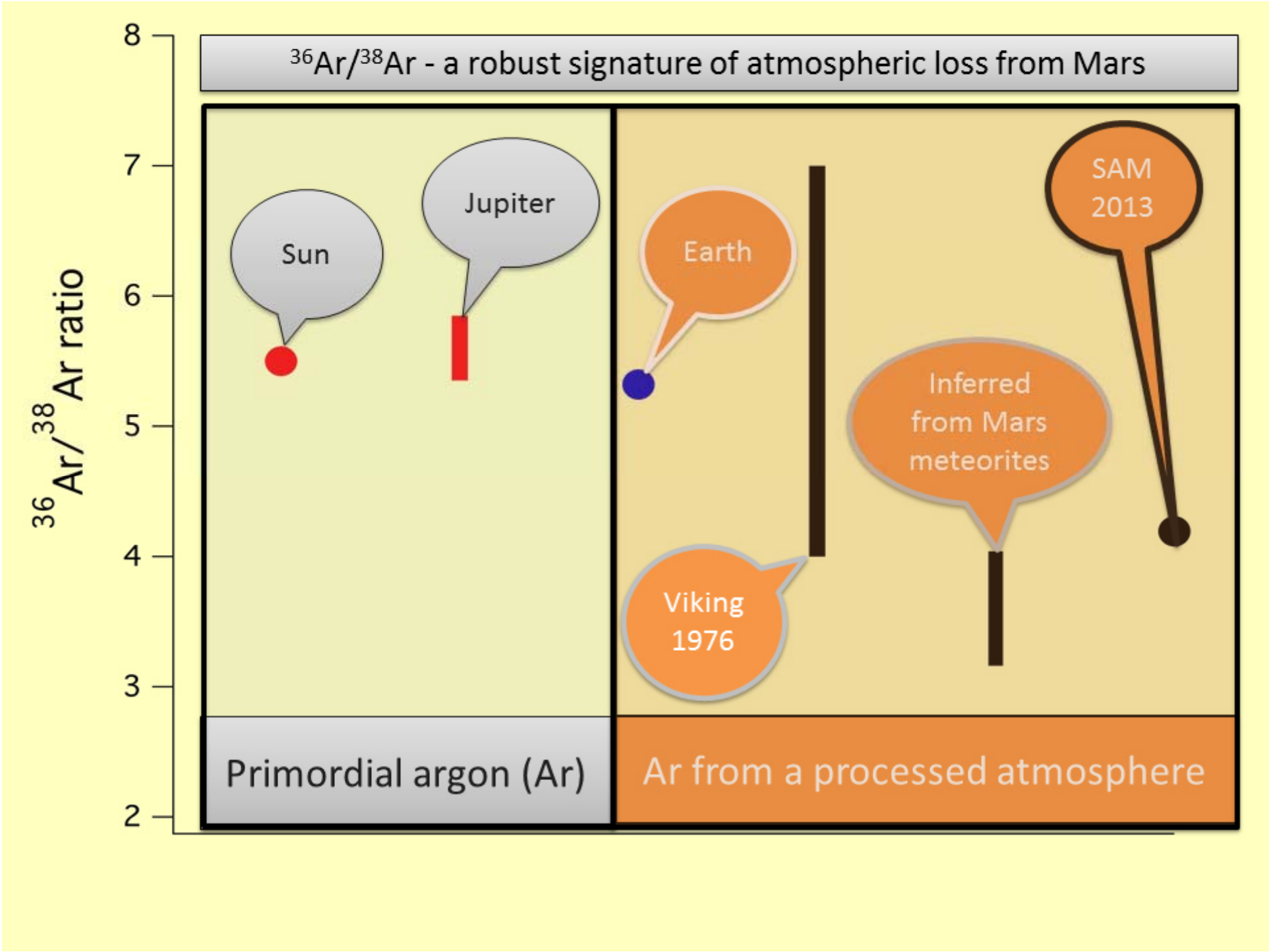
Buscando una pista de aterrizaje

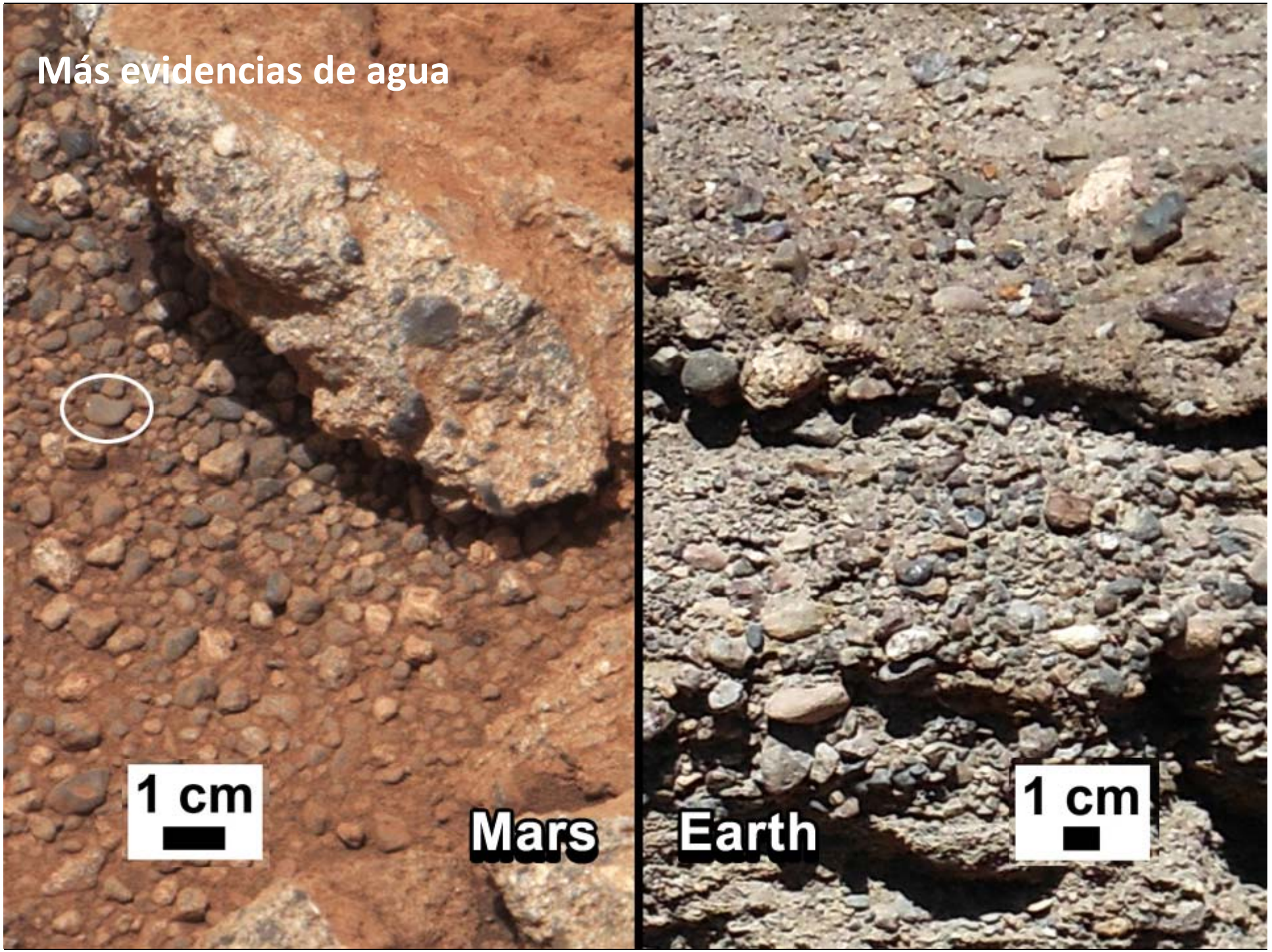


Trazando una ruta

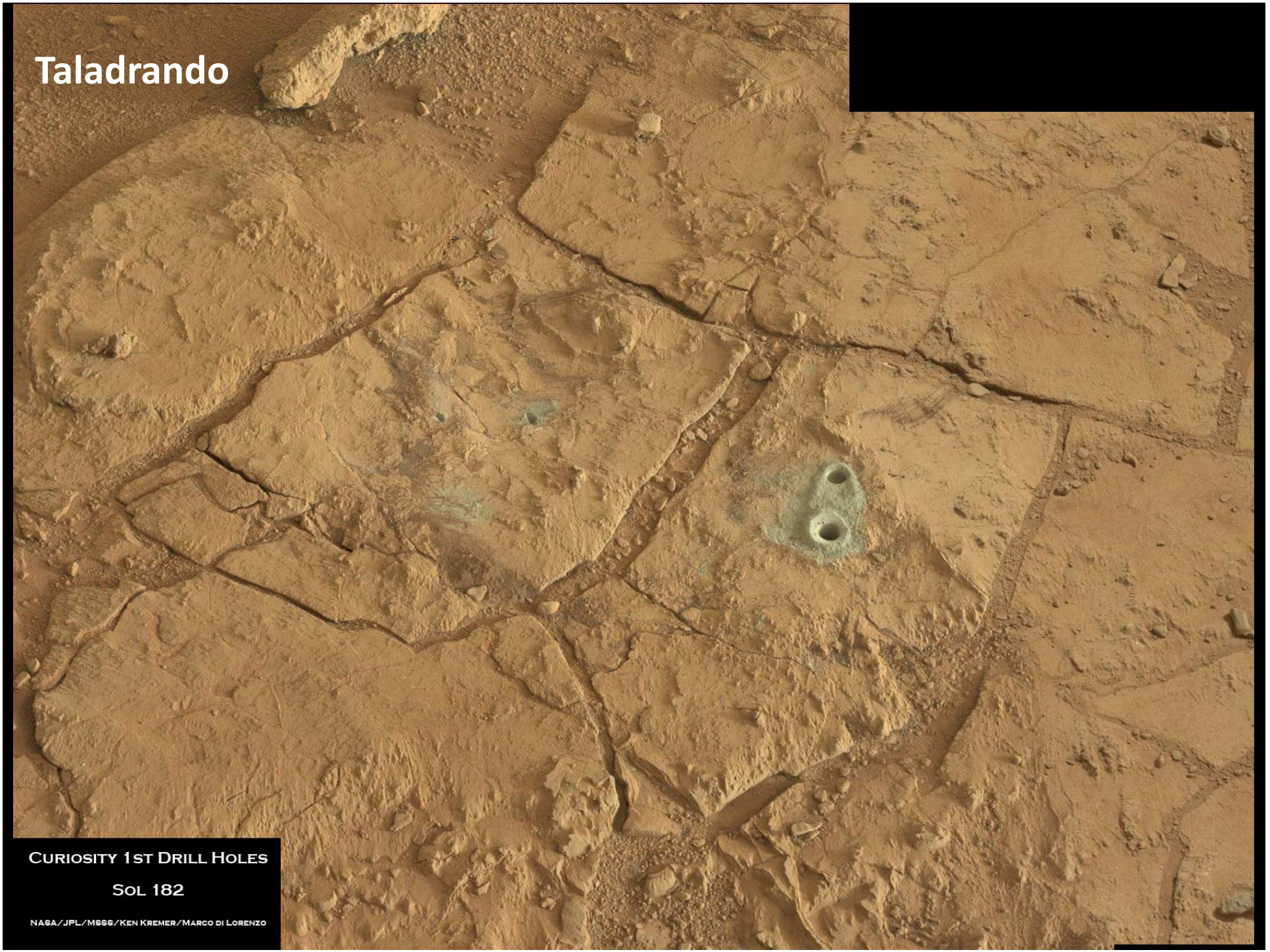


Aeolius Mons – Mount Sharp


$^{36}Ar/^{38}Ar$ - a robust signature of atmospheric loss from Mars
$^{36}Ar/^{38}Ar$ ratio
8
7
6
5
4
3
2
Sun
Jupiter
Earth
Viking 1976
Inferred from Mars meteorites
SAM 2013
Primordial argon (Ar)
Ar from a processed atmosphere


Más evidencias de agua
1 cm
Mars
Earth
1 cm

Taladrando

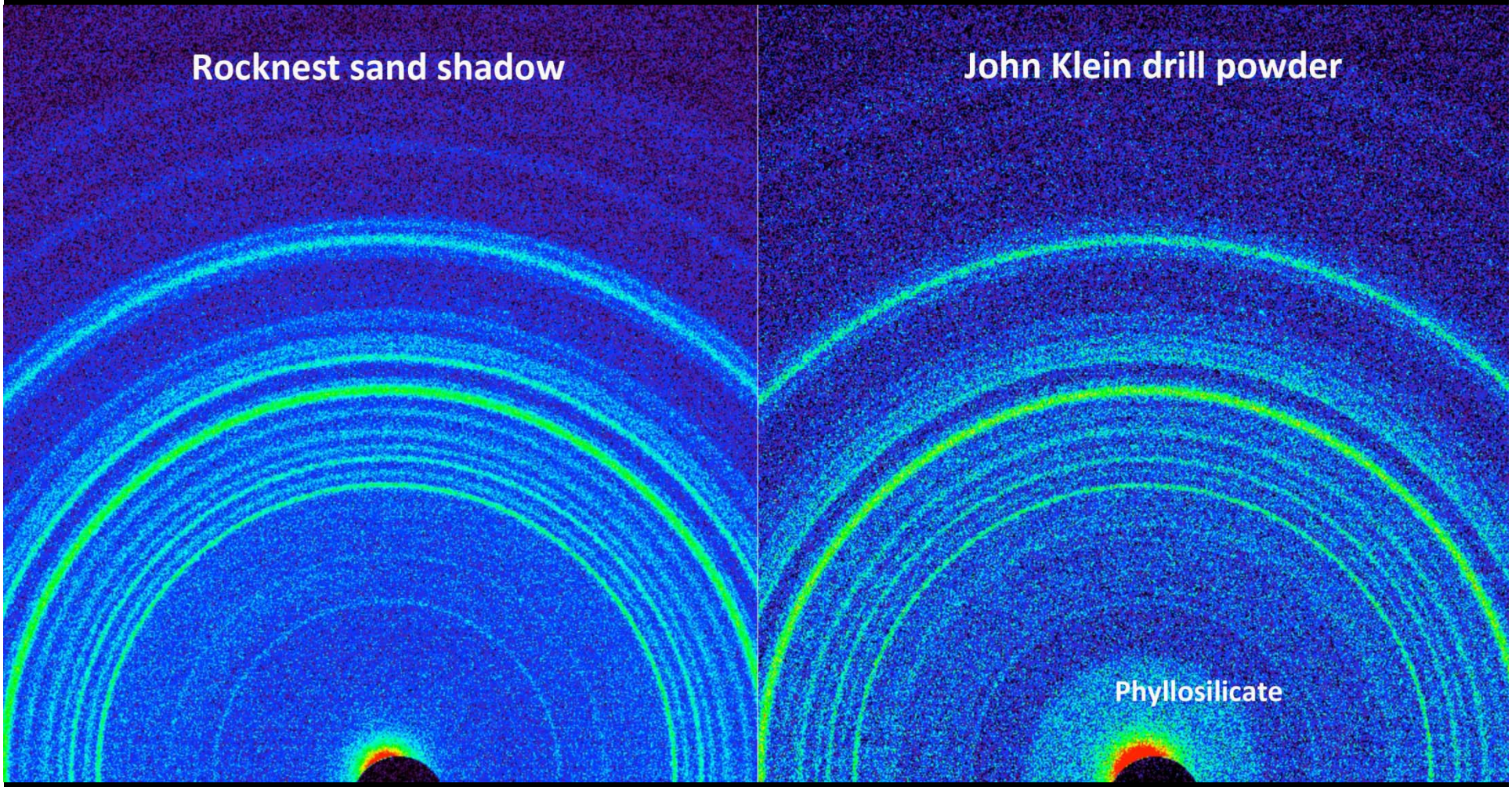


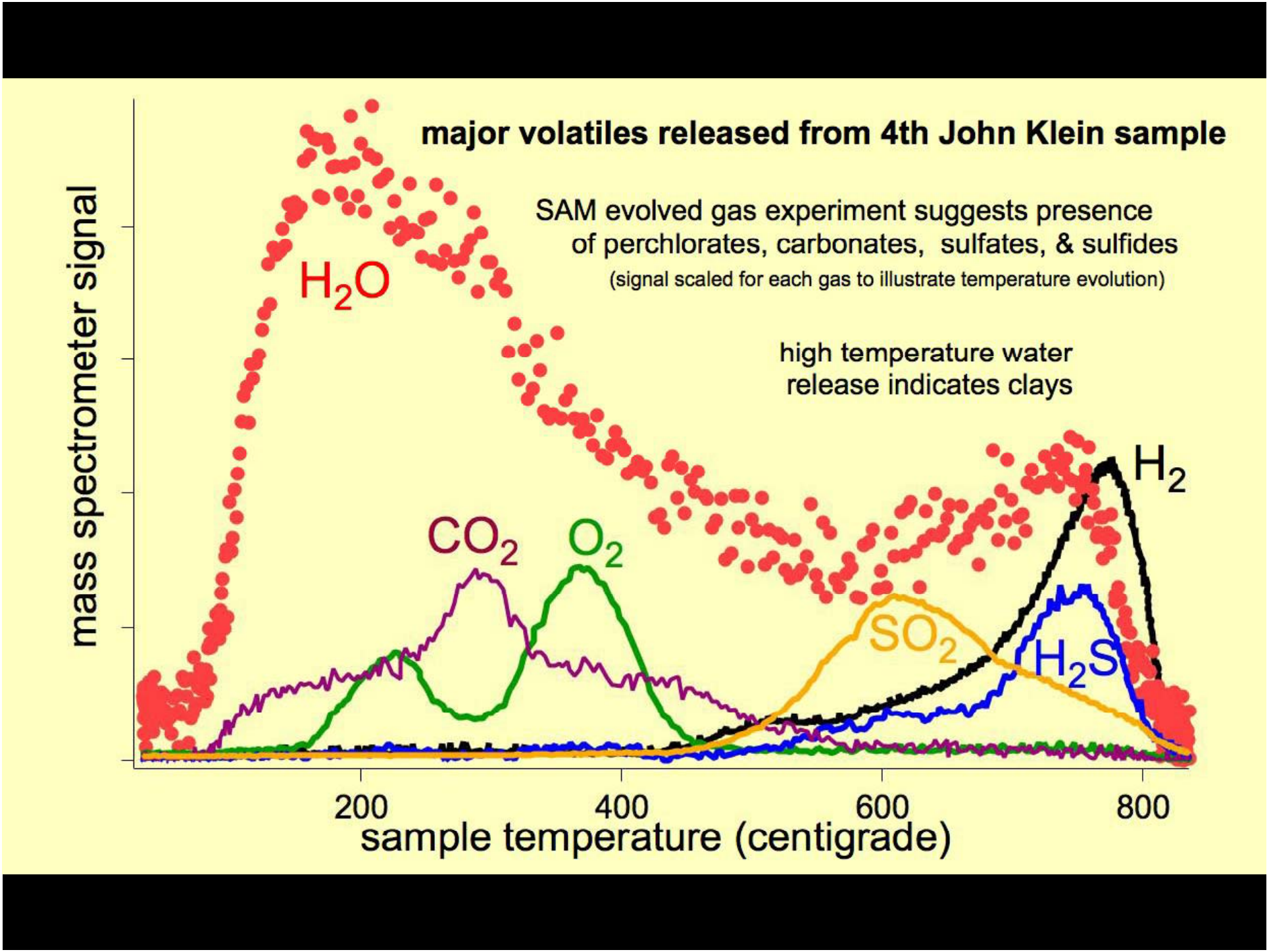
CURIOSITY 1ST DRILL HOLES

SOL 182

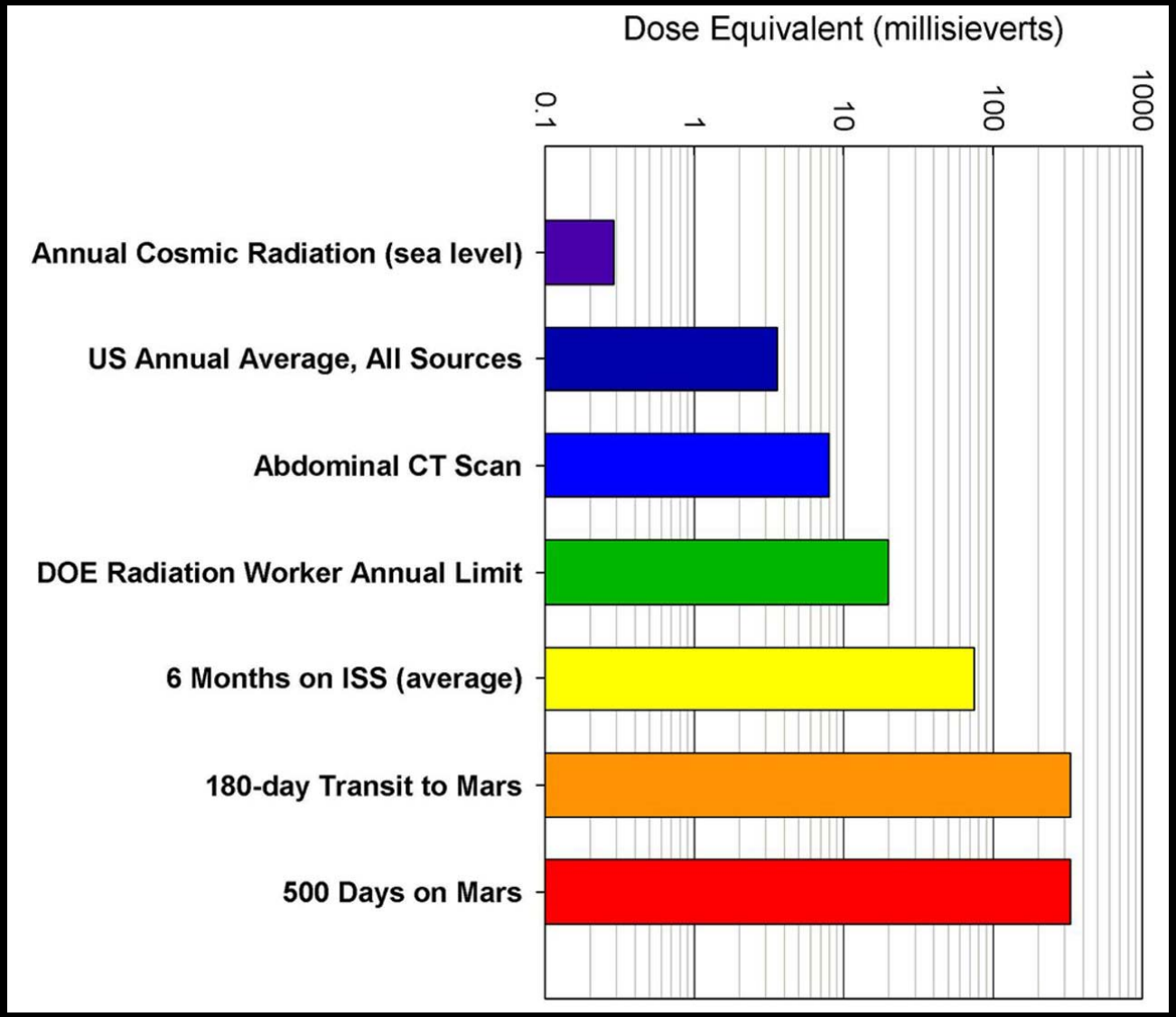
NASA/JPL/MSSS/KEN KREMER/MARCO DI LORENZO

Analizando los resultados



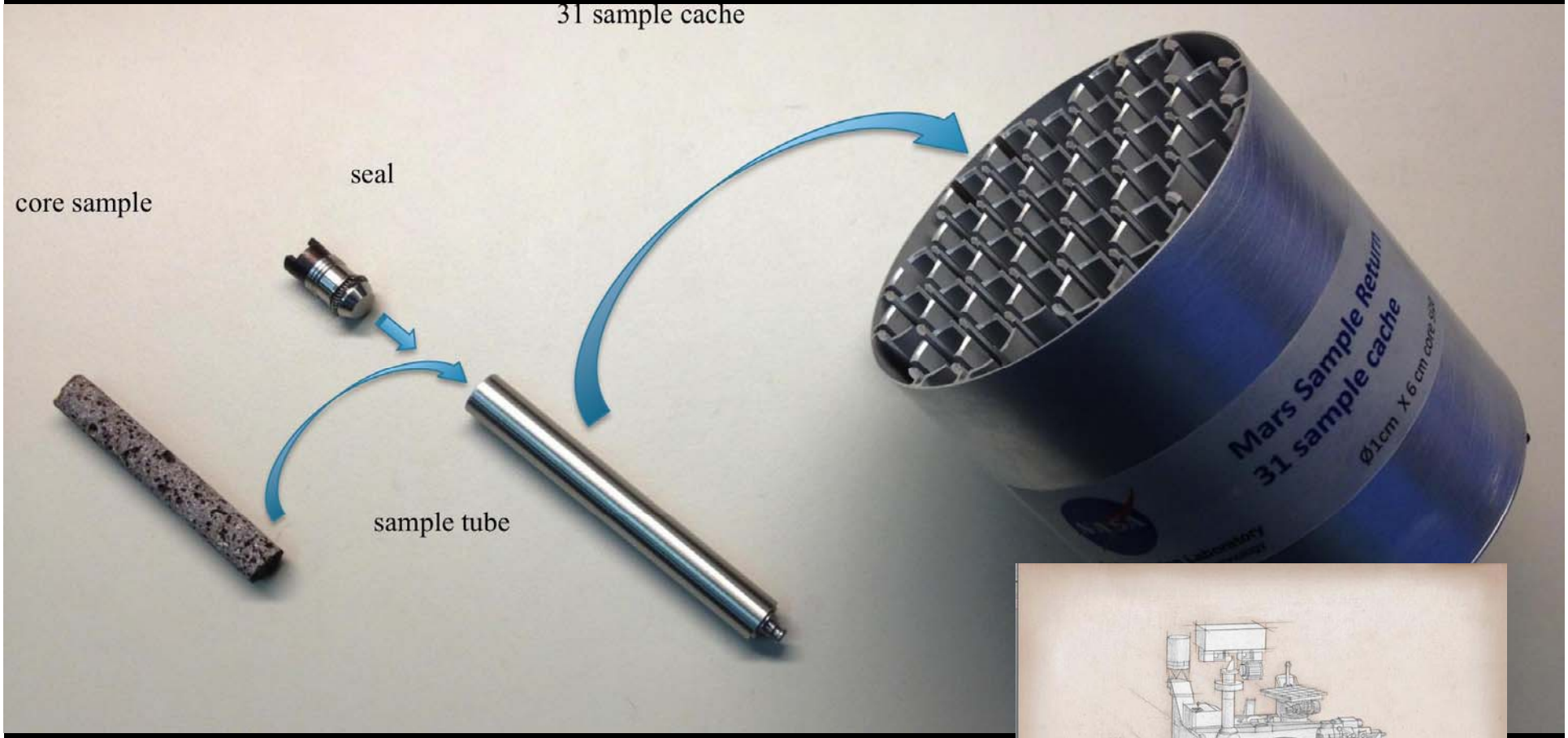

major volatiles released from 4th John Klein sample
SAM evolved gas experiment suggests presence
of perchlorates, carbonates, sulfates, & sulfides
(signal scaled for each gas to illustrate temperature evolution)
high temperature water
release indicates clays
mass spectrometer signal
H2O
CO2
O2
SO2
H2S
H2
200
400
600
800
sample temperature (centigrade)

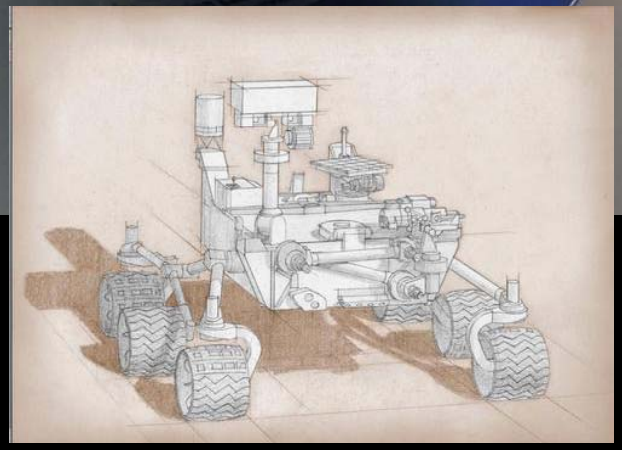
Sobrevivir en Marte

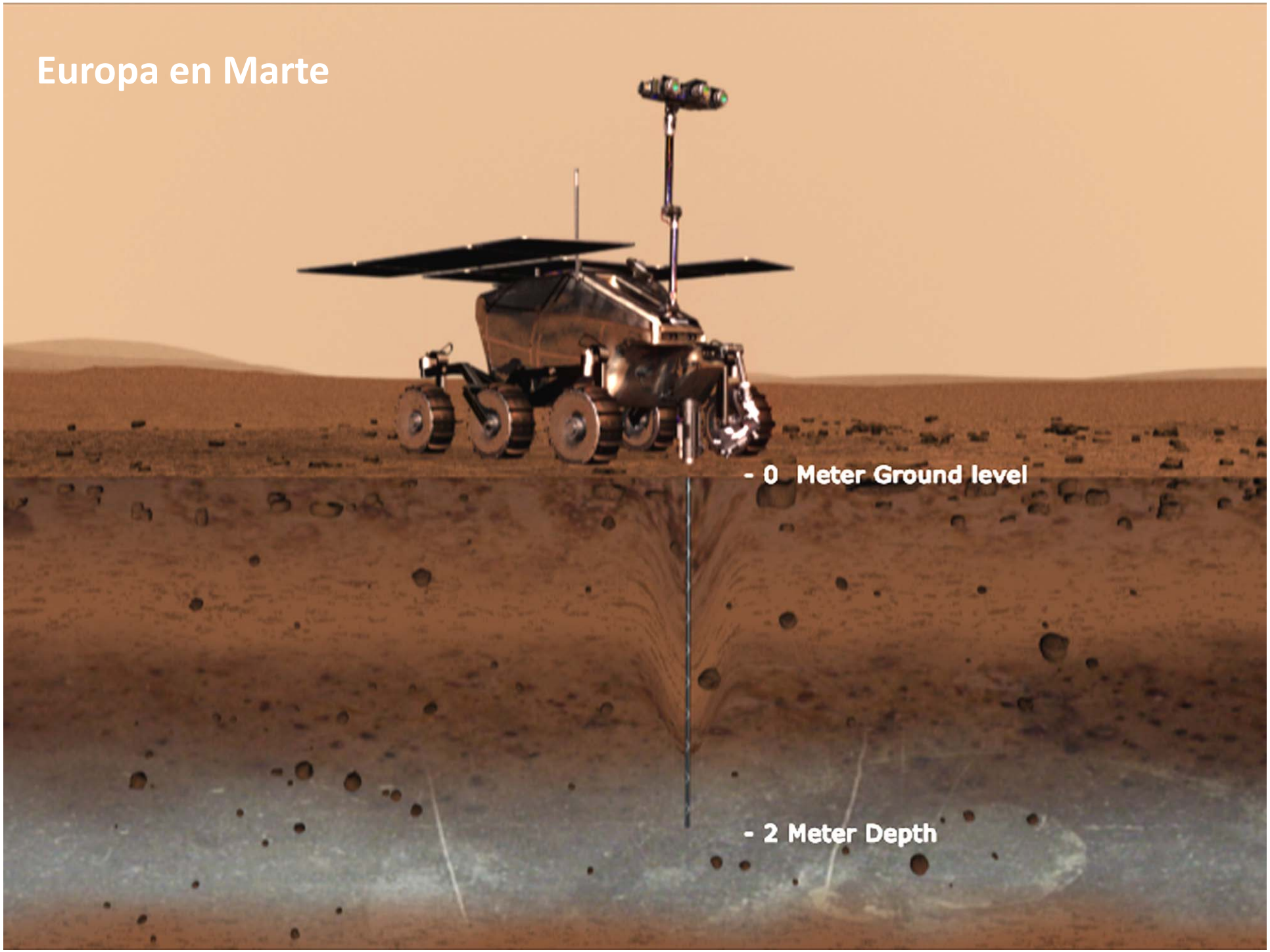


El camino por delante

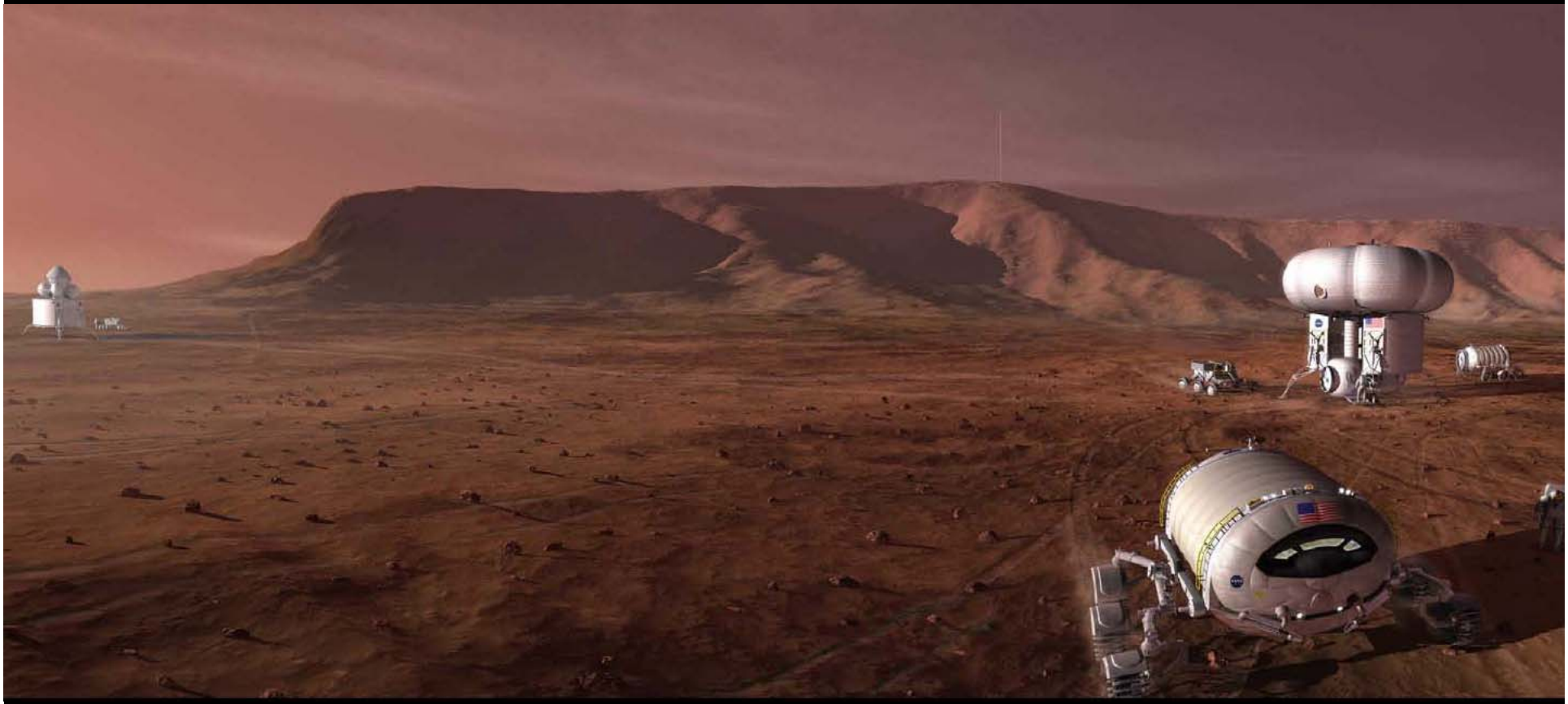
El Marte de mañana



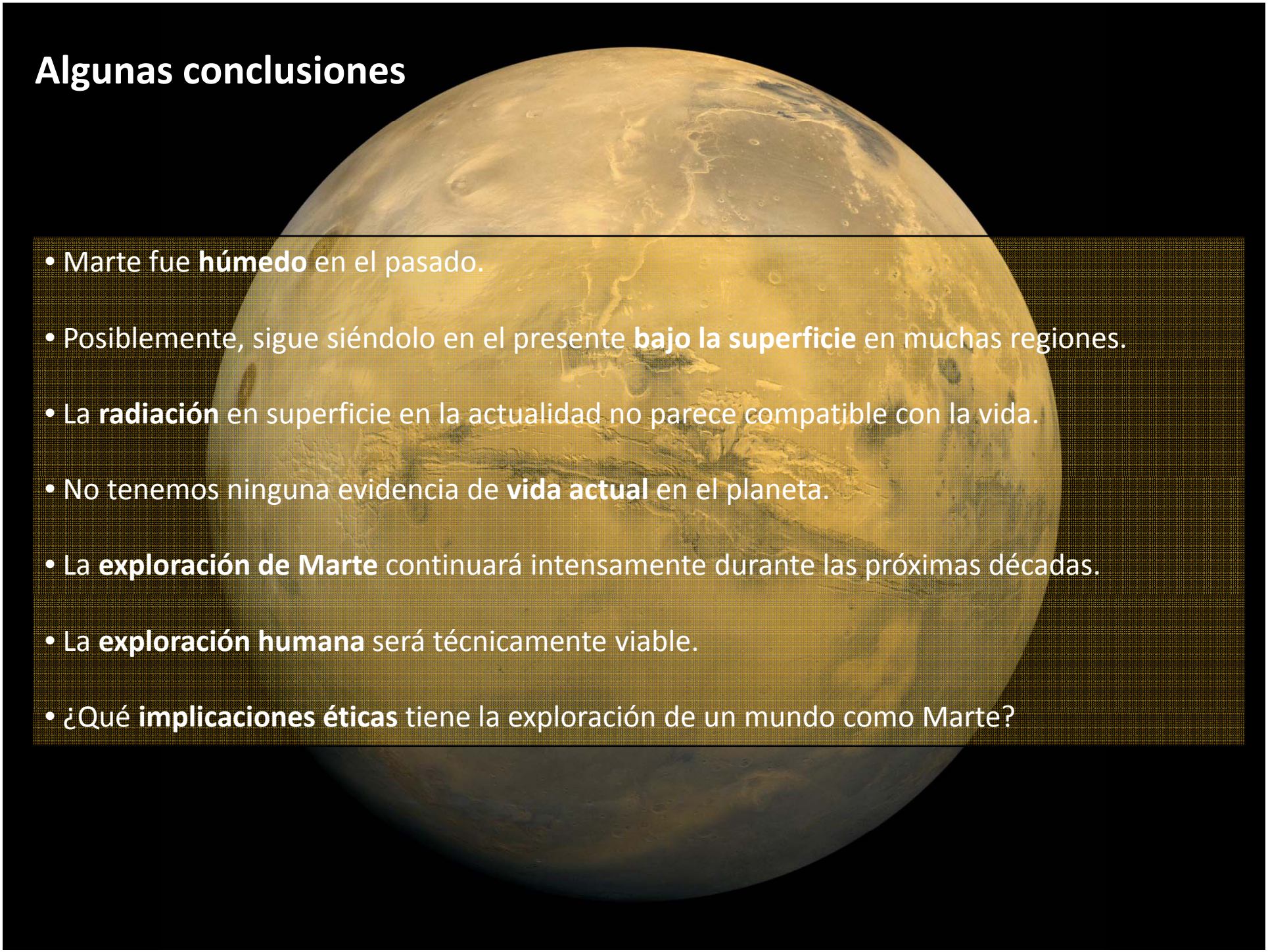



Europa en Marte
- 0 Meter Ground level
- 2 Meter Depth

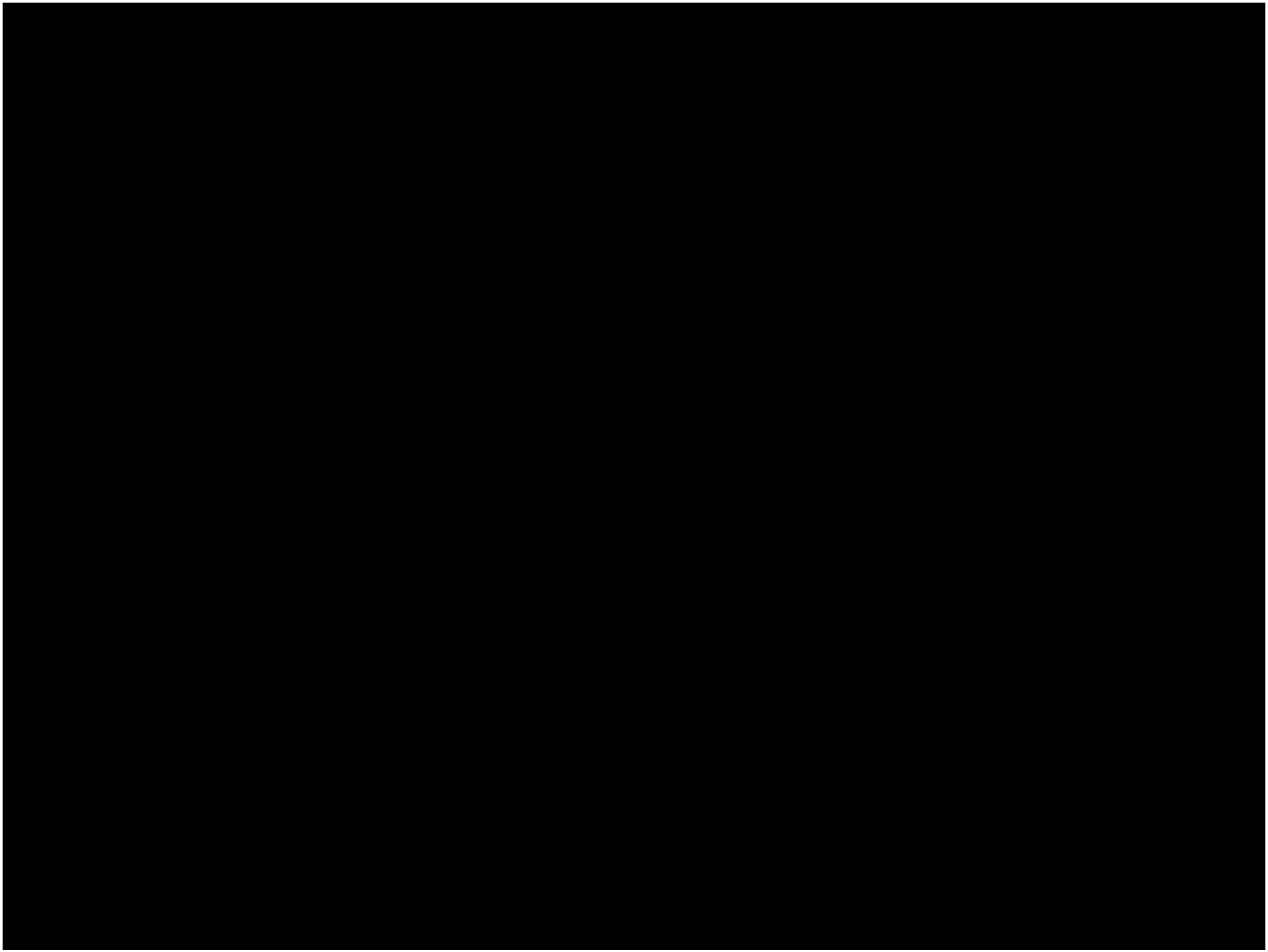
Exploración humana: ¿a Marte para quedarse?



Algunas conclusiones



- Marte fue **húmedo** en el pasado.
- Posiblemente, sigue siéndolo en el presente **bajo la superficie** en muchas regiones.
- La **radiación** en superficie en la actualidad no parece compatible con la vida.
- No tenemos ninguna evidencia de **vida actual** en el planeta.
- La **exploración de Marte** continuará intensamente durante las próximas décadas.
- La **exploración humana** será técnicamente viable.
- ¿Qué **implicaciones éticas** tiene la exploración de un mundo como Marte?



La cara de Marte y otros ejemplos