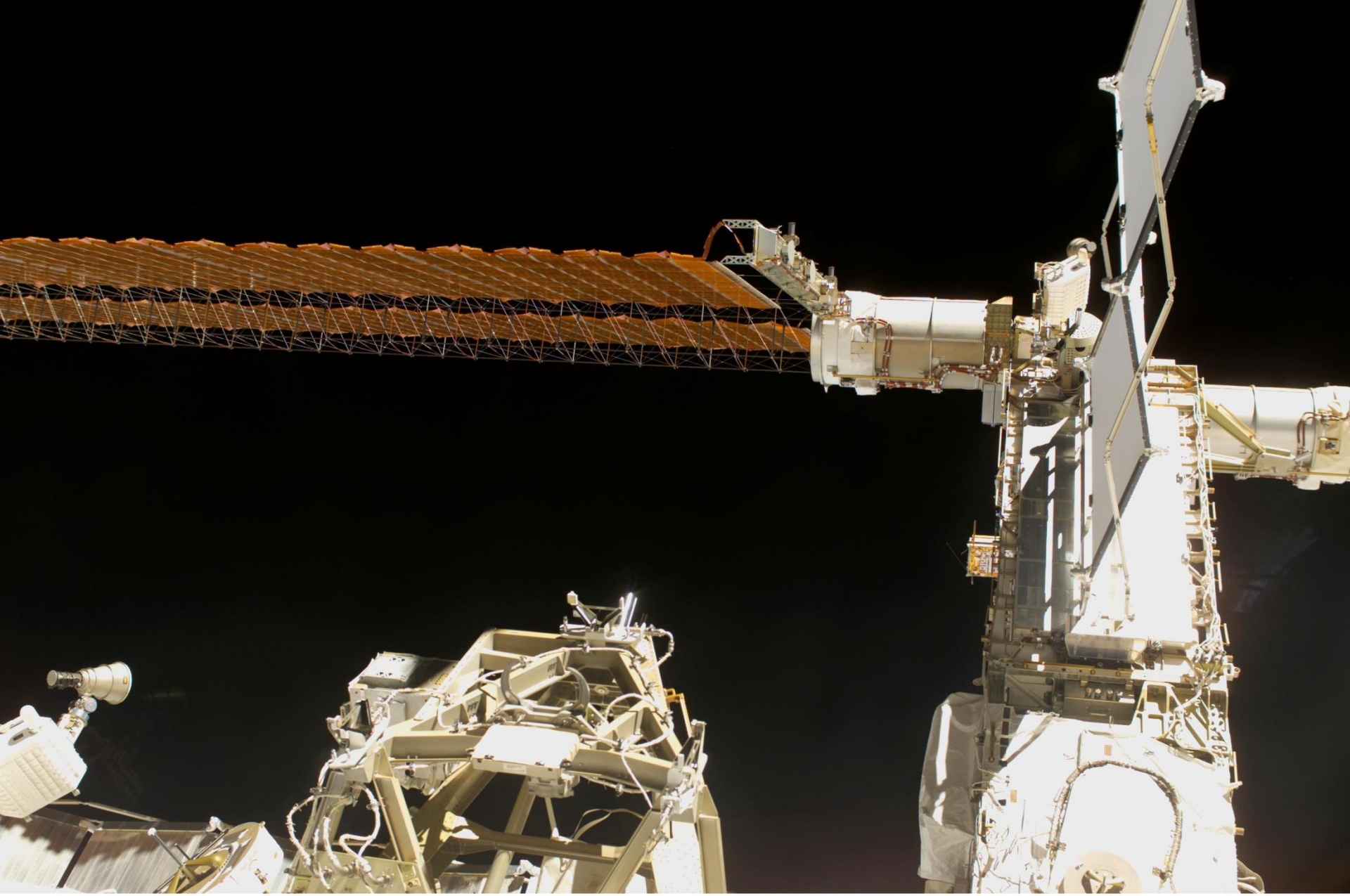
Průzkum blízkého a vzdáleného vesmíru

Prof. Ing. Miroslav Kasal, CSc.
Ústav radioelektroniky
FEKT VUT v Brně
SE7.108
E-mail kasal@feec.vutbr.cz
http://www.urel.feec.vutbr.cz/esl/

http://www.urel.feec.vutbr.cz/esl/files/Othact/U3V/4pr.pdf


ISS
JAPAN



S114E7356



S114E7235



S114E7221

ISS

Délka modulu: 51 metrů
Délka konstrukce: 109 metrů
Délka slunečních panelů: 73 metrů
Hmotnost: 370,290 kilogramů
Obyvatelný prostor: 360 m^3
Tlakovaný objem: 837 m^3
Výkon generátoru: 8 solarních panelů = 84 kW
Počet řádků počítačových kódů: přibližně 2.3 millionu



Johnson Space Center



Délta Nilu



Florida



Hawaii Island



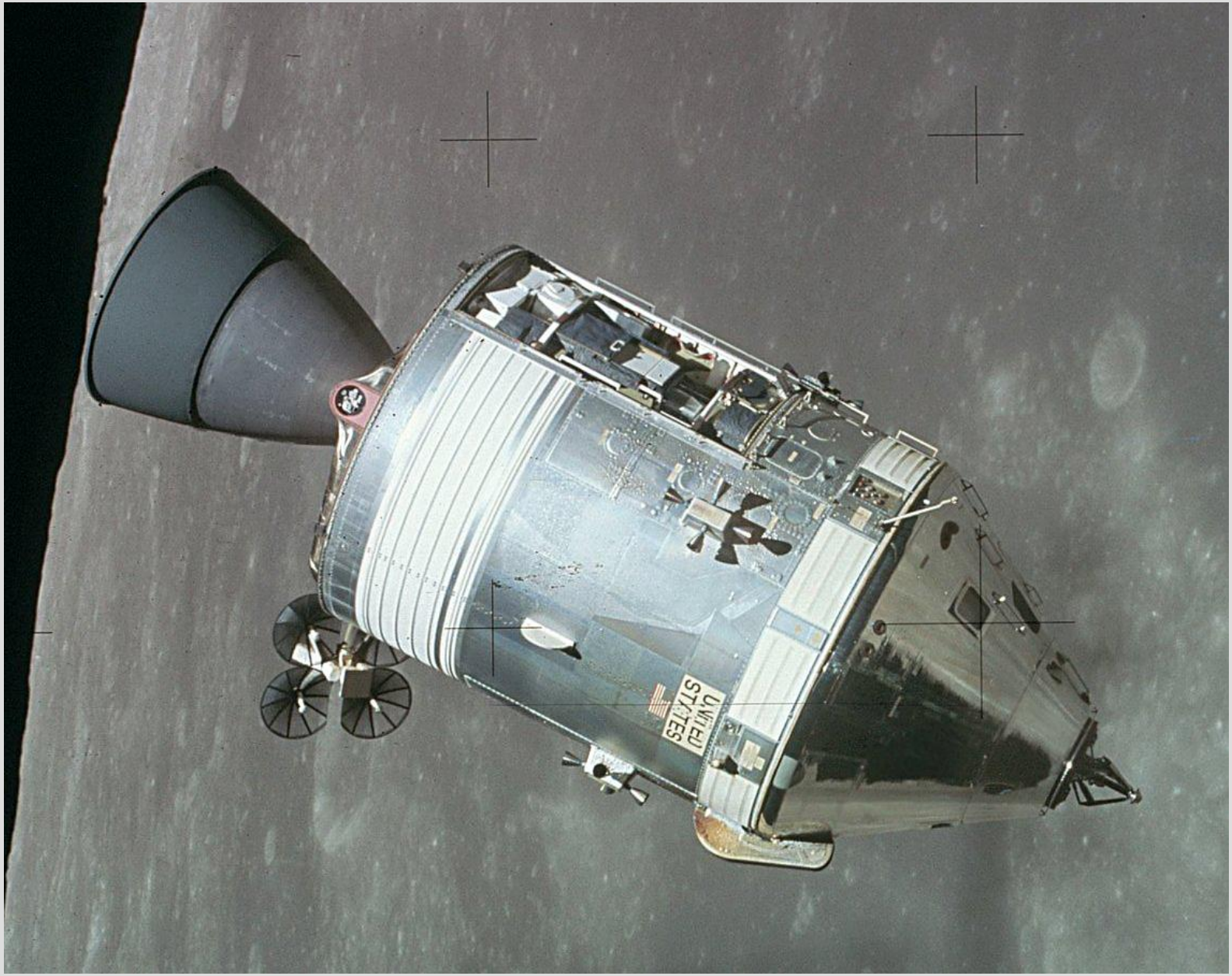
ISS007E14883

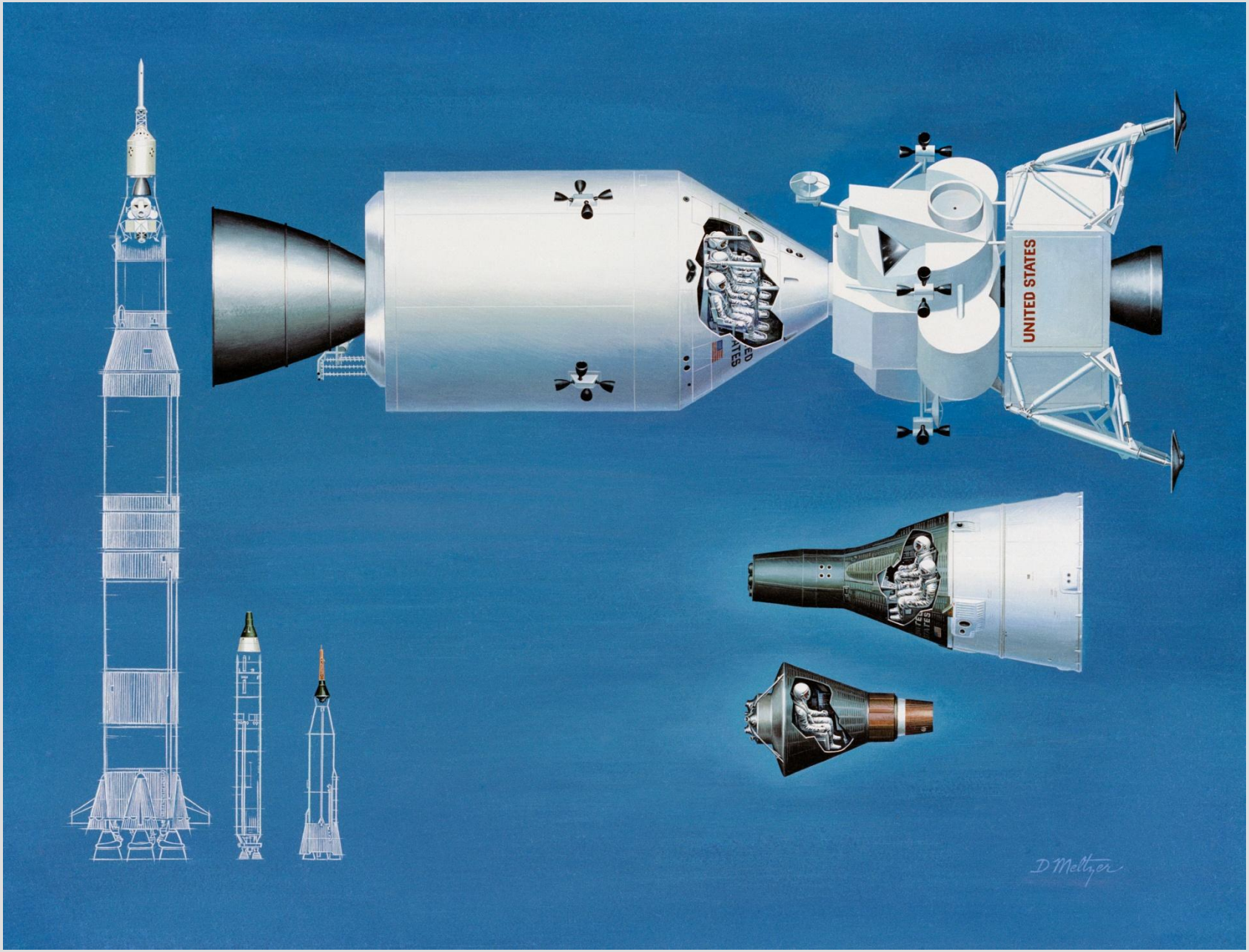
Hurricane Isabel



Měsíc

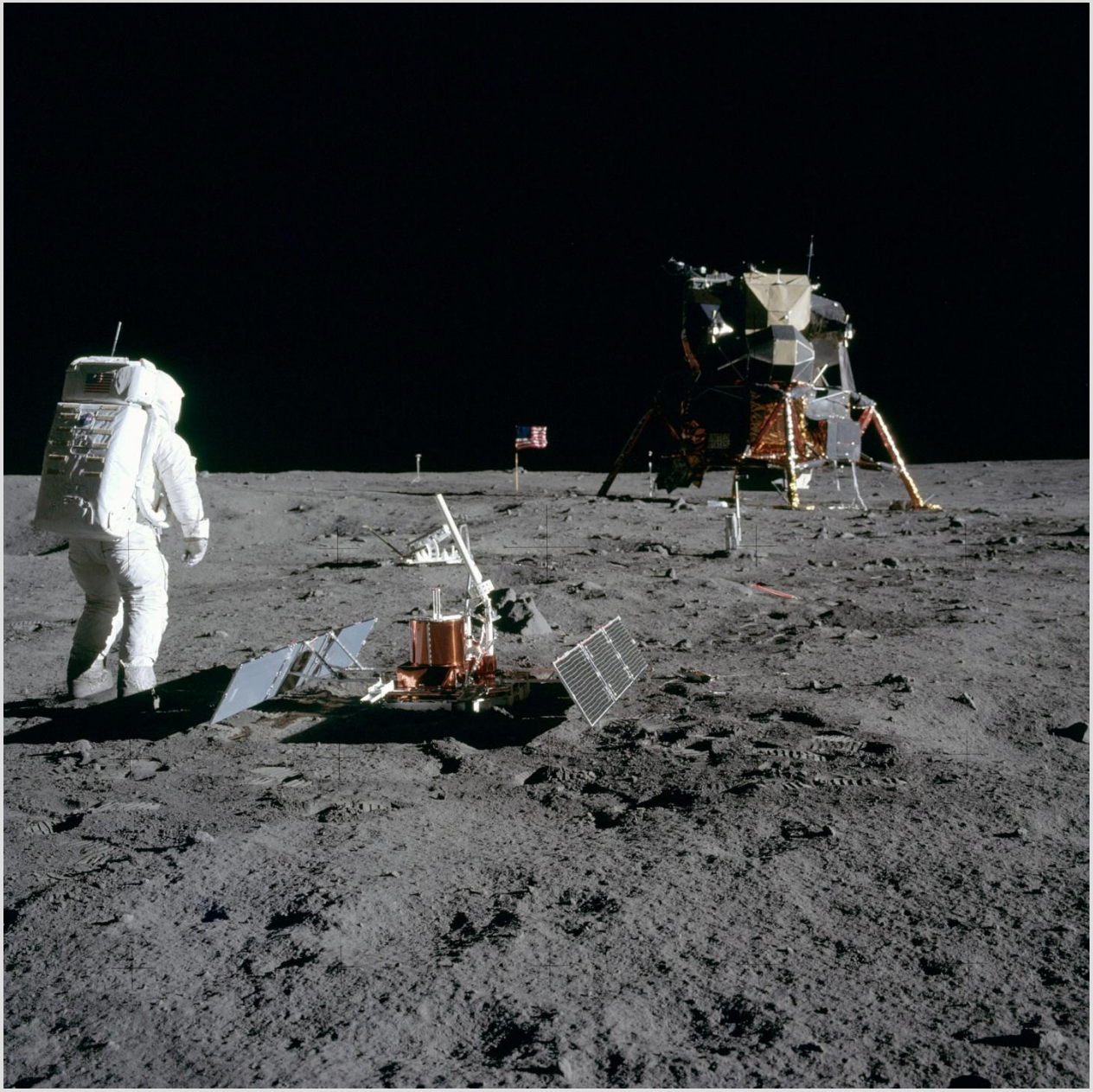
První lidská stopa

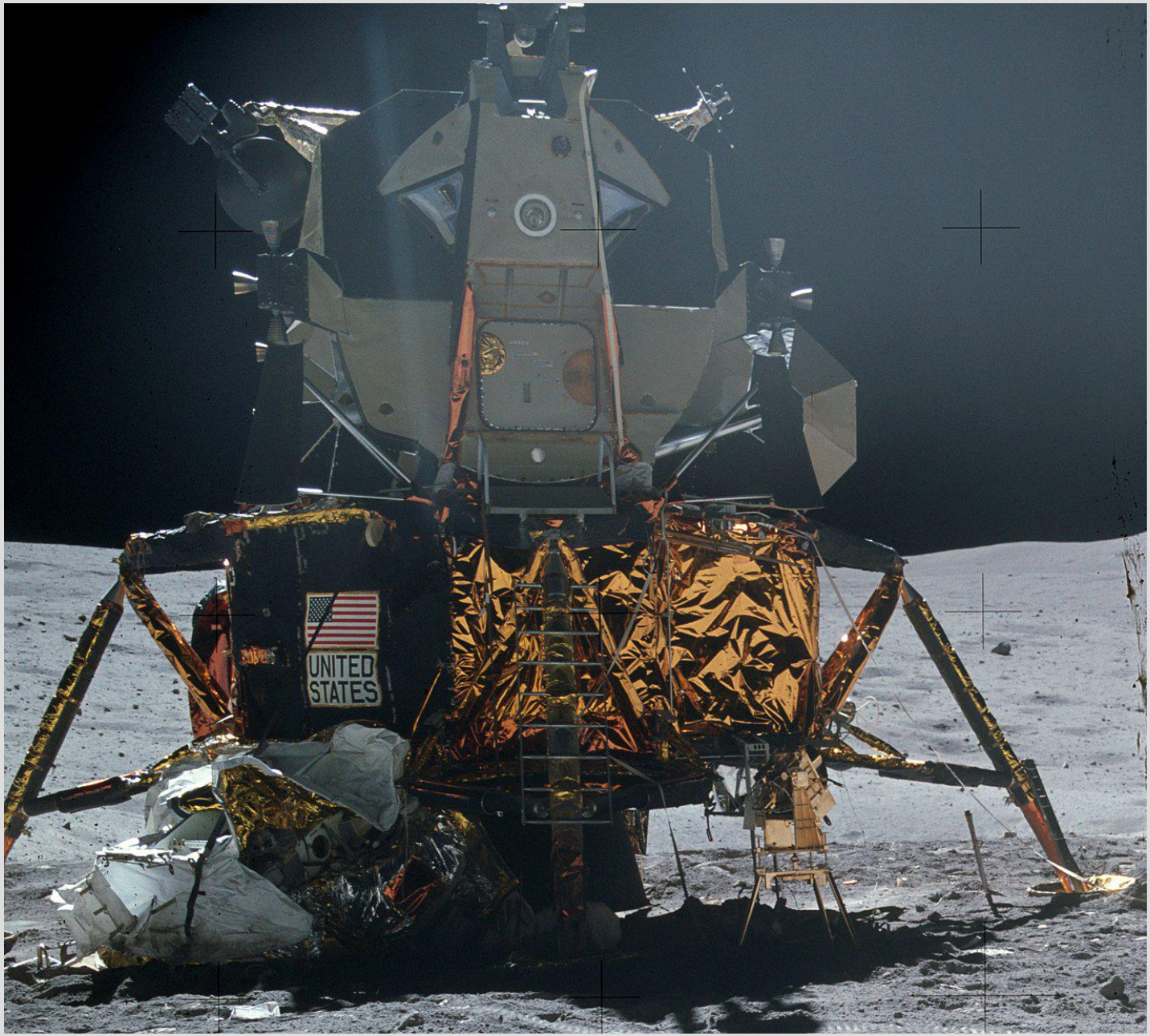

UNITED
STATES


UNITED STATES
D Meltzer



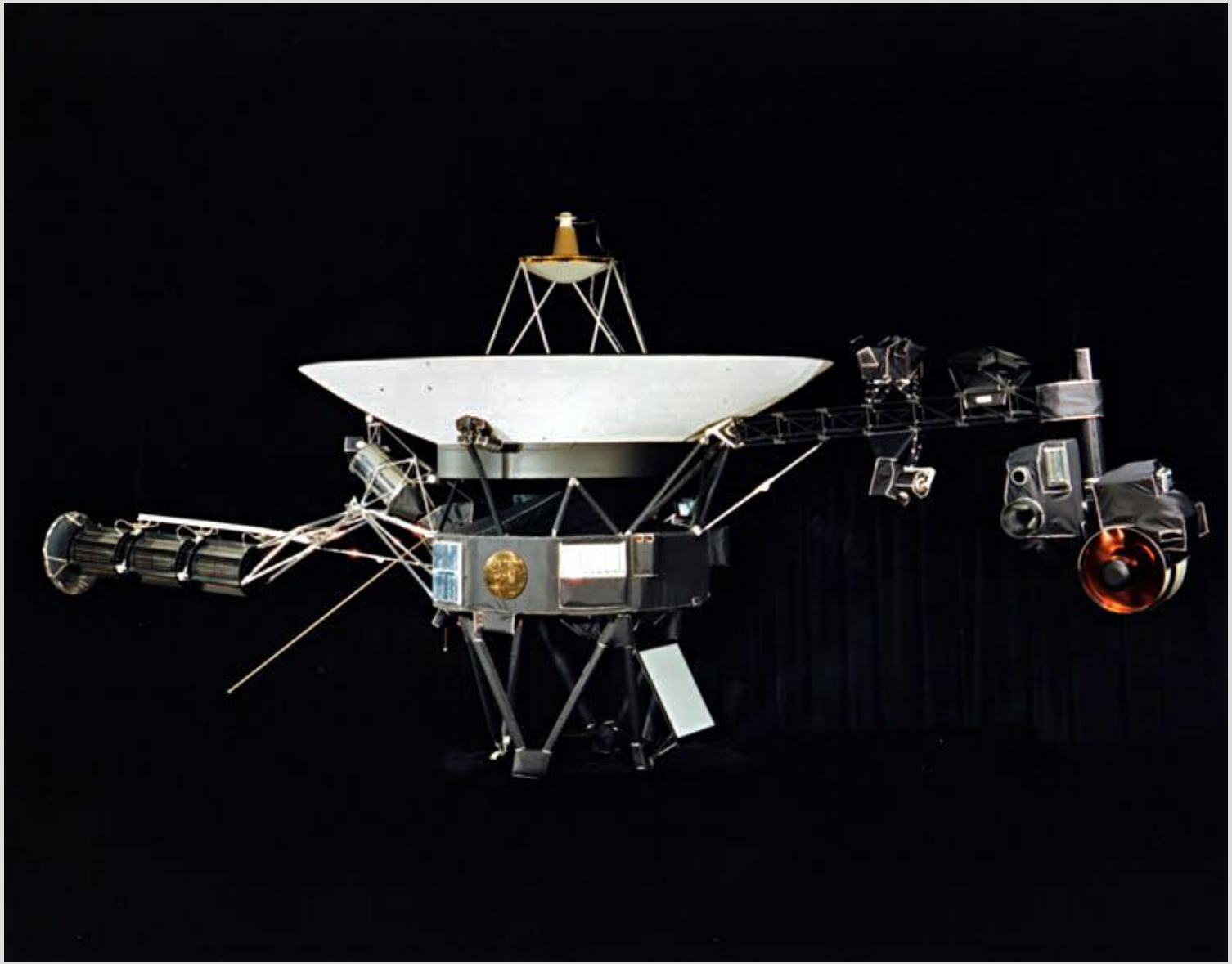




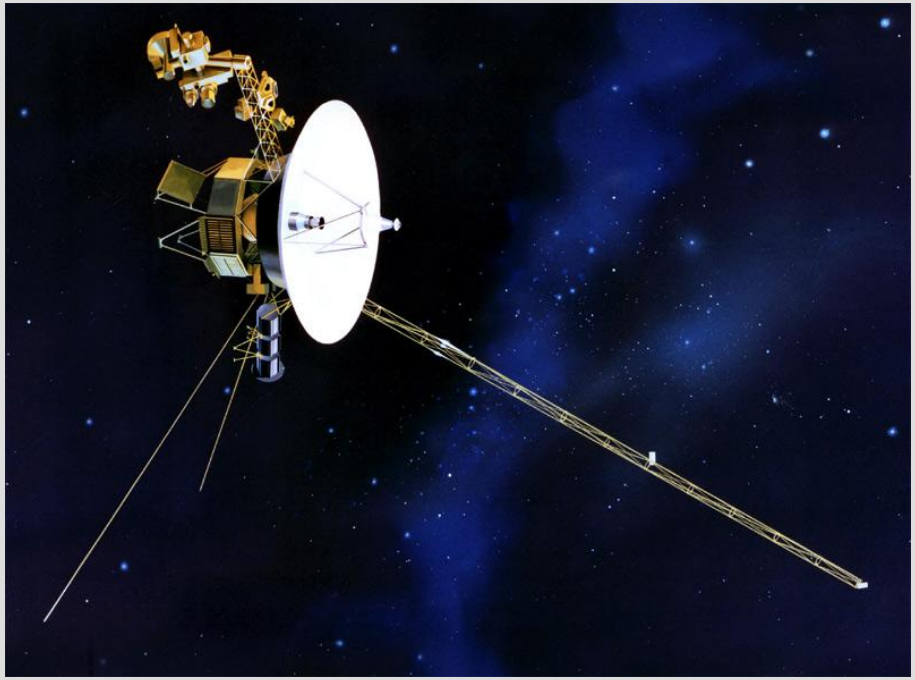

UNITED
STATES

Cesta Voyageru 1 nebyla plánována, aby došla k nějaké určité hvězdě, ale za 40 000 let by měl proletět kolem hvězdy AC+79 3888 ve vzdálenosti 1,6 světelného roku. Tato hvězda je v současnosti v Žirafy. Za několik desítek milionů let pravděpodobně opustí i Mléčnou dráhu.

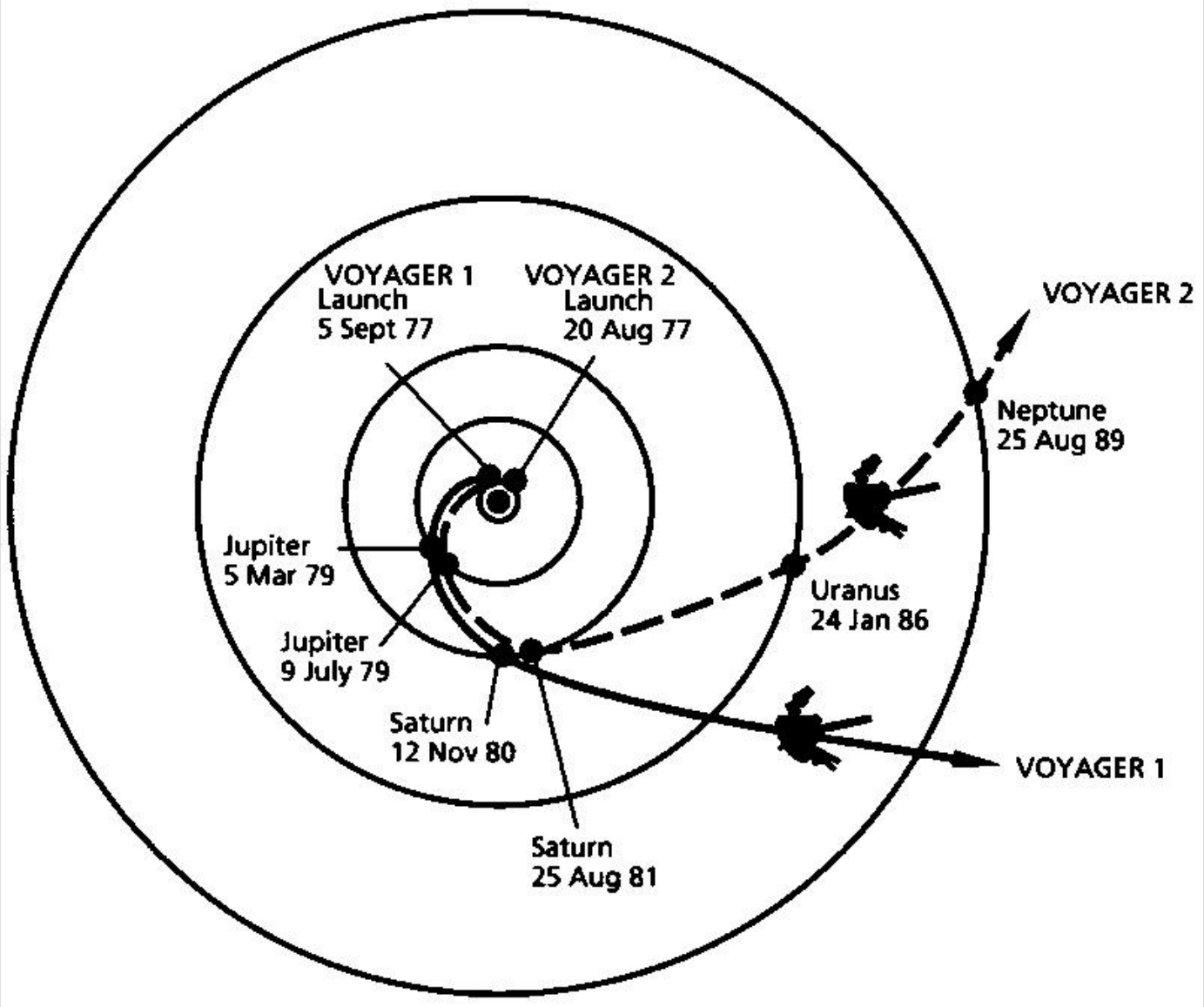
Voyager 2 - 4 planety – Jupiter, Saturn, Uran, Neptun
Launch: Voyager 2 launched on August 20, 1977, from Cape Canaveral, Florida aboard a Titan-Centaur rocket. On September 5, Voyager 1 launched, also from Cape Canaveral aboard a Titan-Centaur rocket.



Voyager 1



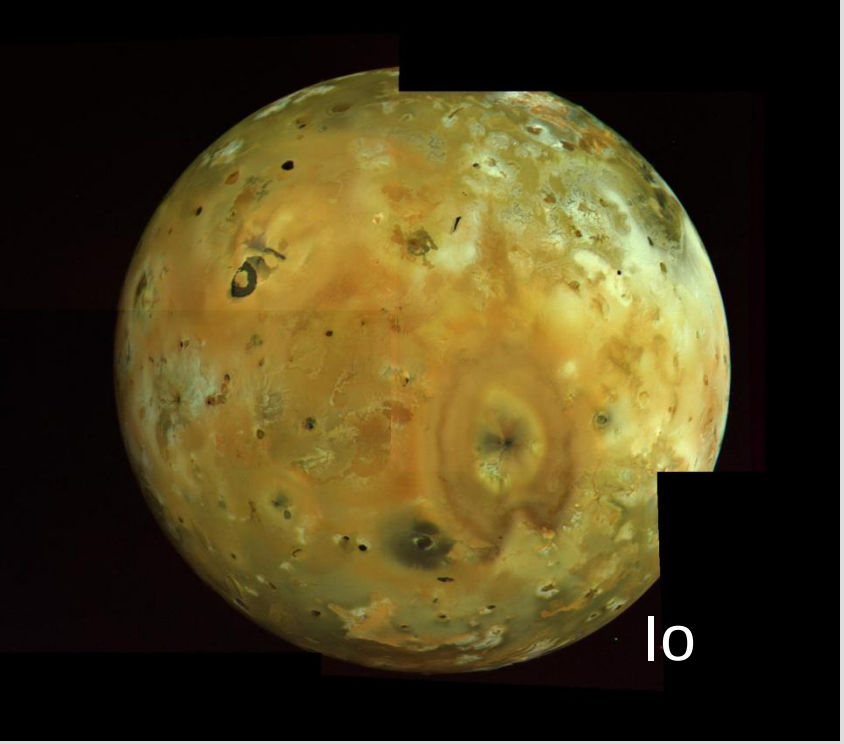
Science instruments: Dual cameras, infrared spectrometer and radiometer, ultraviolet spectrometer, photopolarimeter, plasma detector, low-energy charged particle detector, cosmic ray detector, magnetometer, planetary radio astronomy, plasma wave detector.

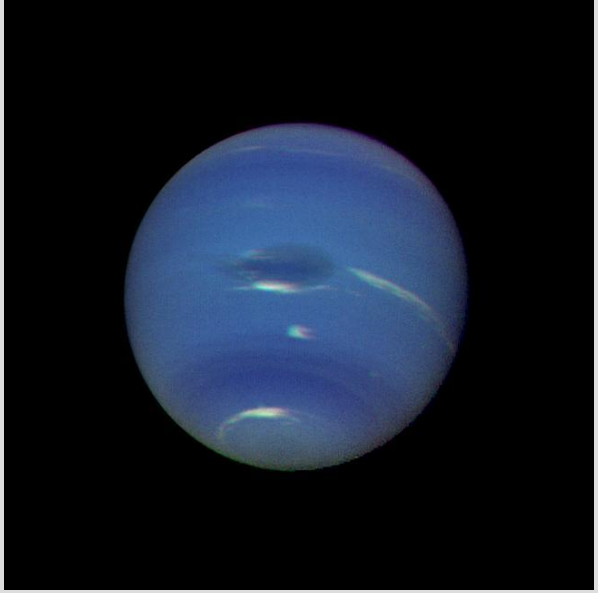

VOYAGER 1
Launch
5 Sept 77
VOYAGER 2
Launch
20 Aug 77
VOYAGER 2
Neptune
25 Aug 89
Jupiter
5 Mar 79
Uranus
24 Jan 86
Jupiter
9 July 79
Saturn
12 Nov 80
VOYAGER 1
Saturn
25 Aug 81



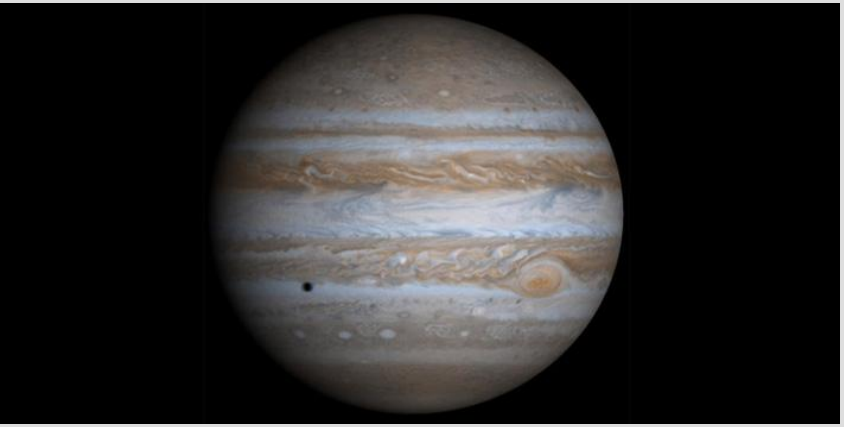
Voyager 1

12 mil. km
18.9.1977



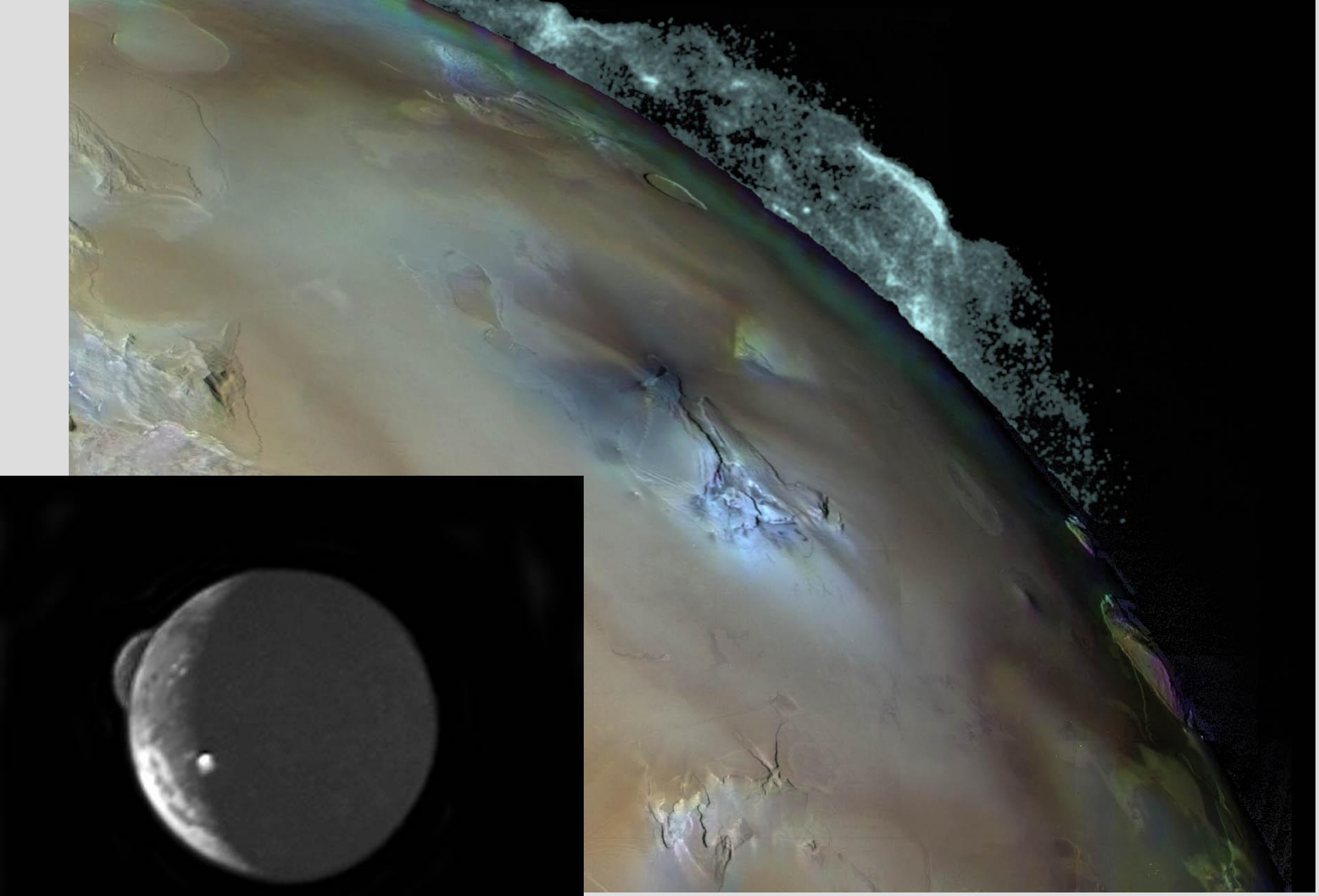


Neptun





Jupiter

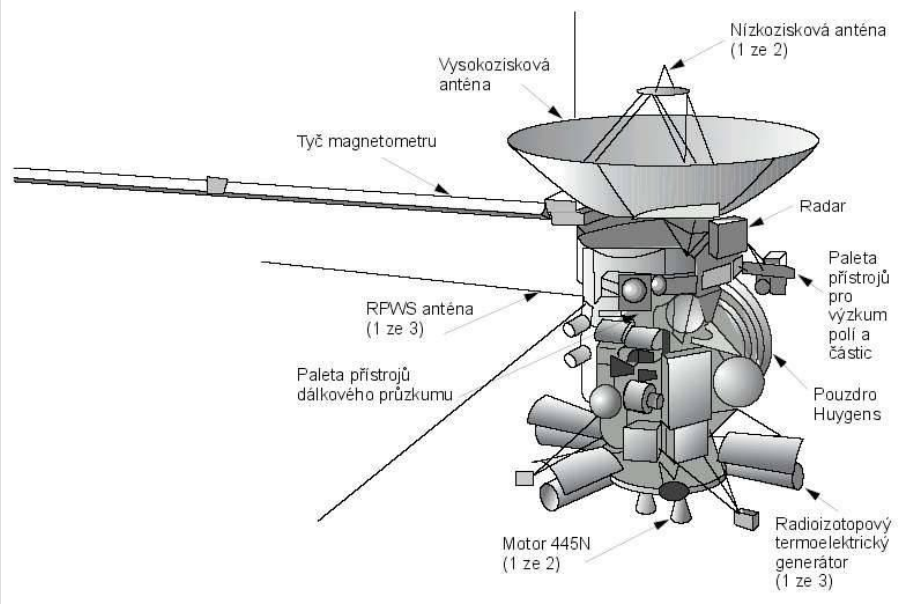

IO Plume Discovery Image
© Copyright Calvin J. Hamilton

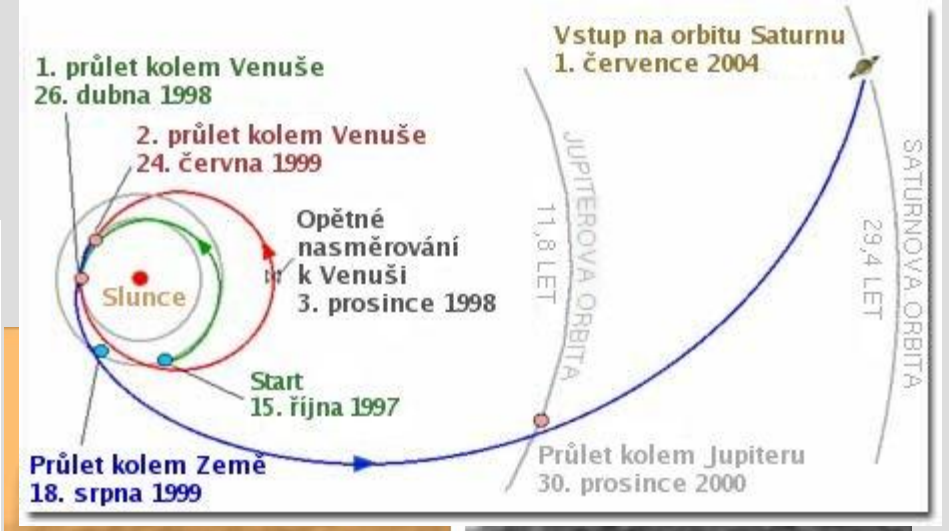
Sun
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Termination Shock
Heliopause
Oort Cloud
α-Centauri
AC +79 3888
1
10
100
1,000
10,000
100,000
1,000,000
Voyager 1
Heliosphere
Interstellar Space

Cesta Voyageru 1 nebyla plánována, aby došla k nějaké určité hvězdě, ale za 40 000 let by měl proletět kolem hvězdy AC+79 3888 ve vzdálenosti 1,6 světelného roku. Tato hvězda je v současnosti v Žirafy. Za několik desítek milionů let pravděpodobně opustí i Mléčnou dráhu.

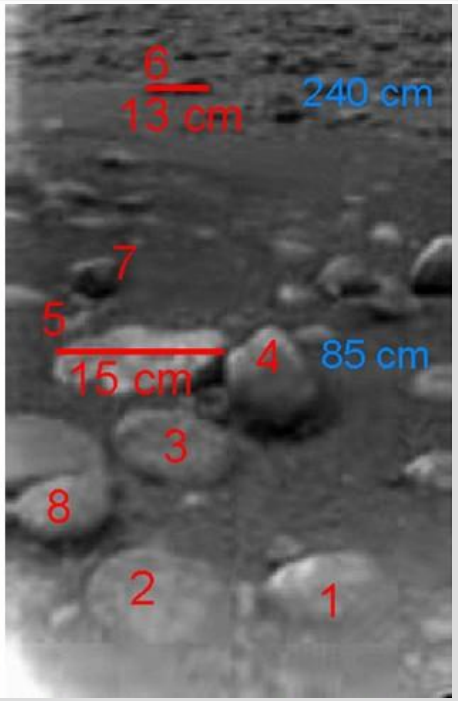
Voyager 2 - 4 planety – Jupiter, Saturn, Uran, Neptun
Launch: Voyager 2 launched on August 20, 1977, from Cape Canaveral, Florida aboard a Titan-Centaur rocket. On September 5, Voyager 1 launched, also from Cape Canaveral aboard a Titan-Centaur rocket.

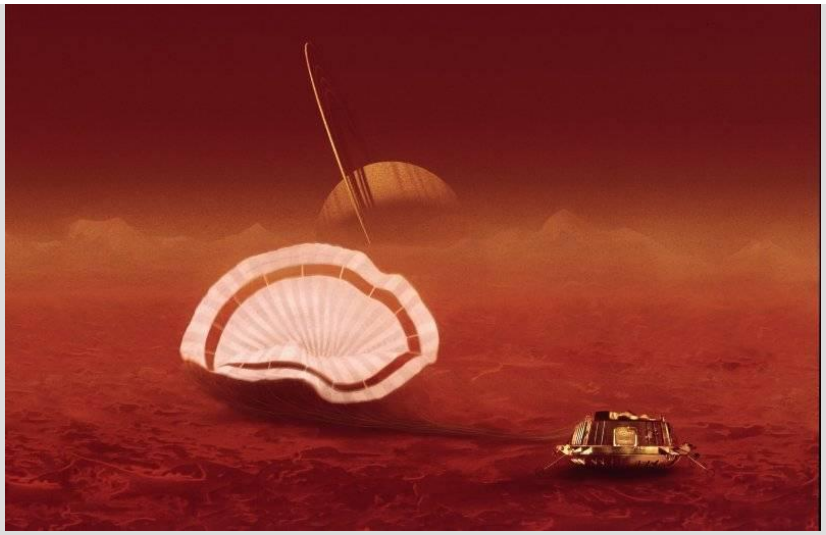
Cassini & Huygens







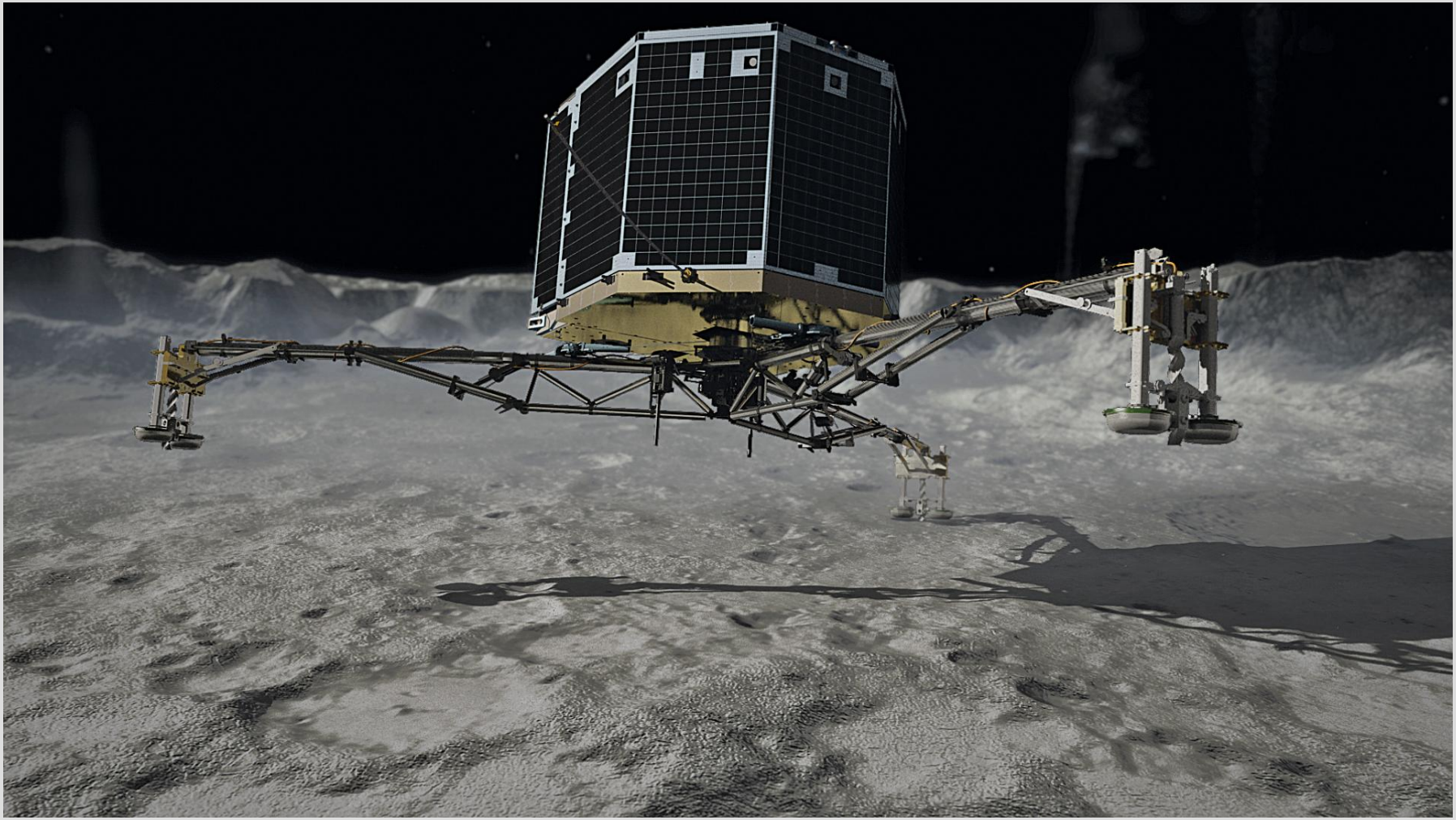




Titan

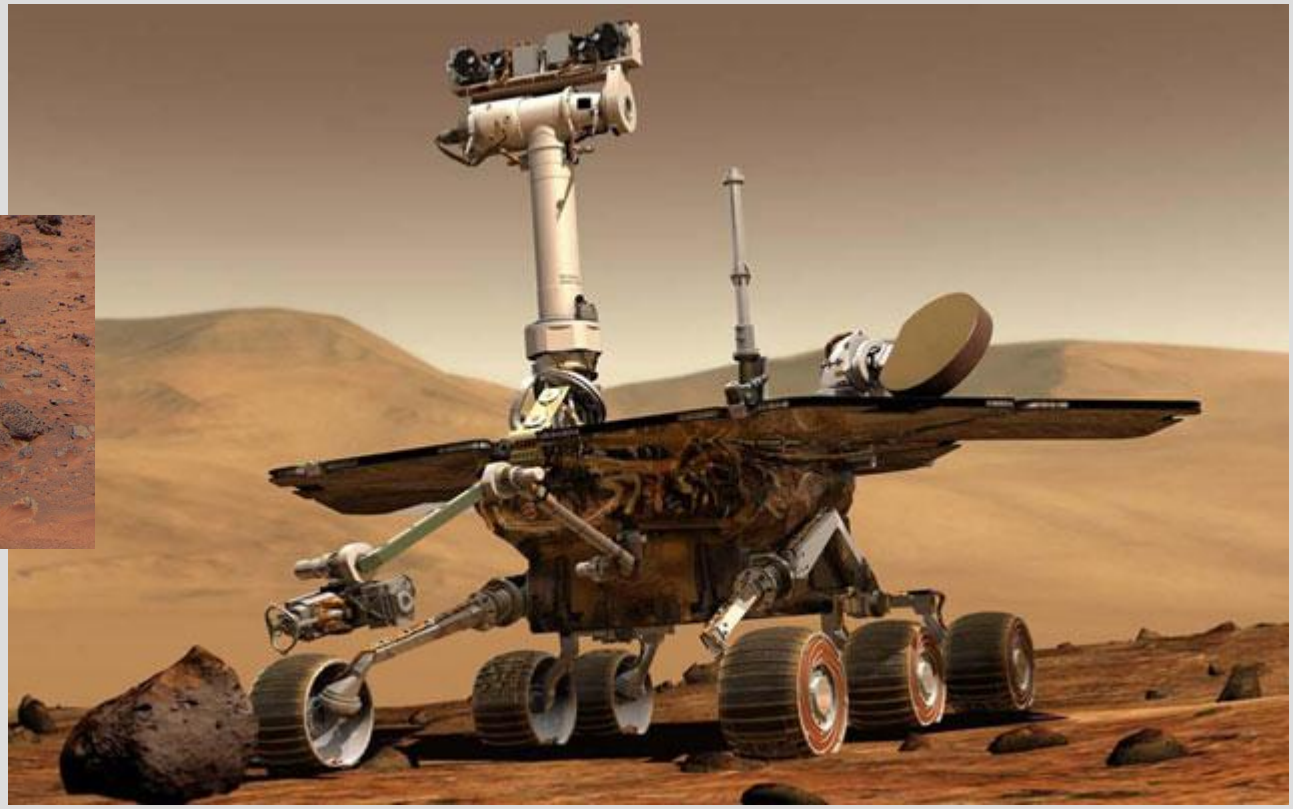
Rosetta & Philae

Kometa 67P Churyumov-Gerasimenko



MARS

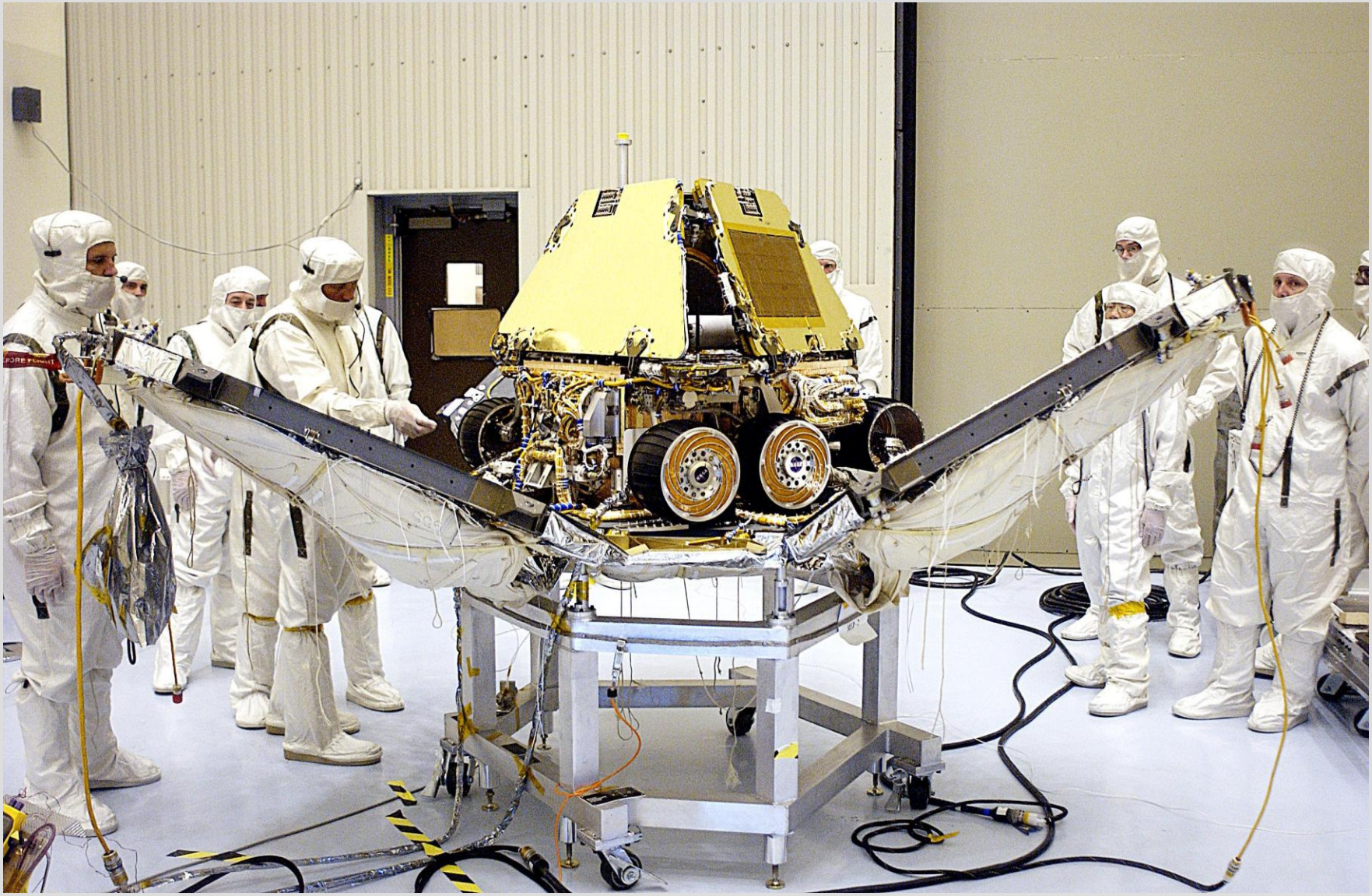
Spirit & Oportunity 2005



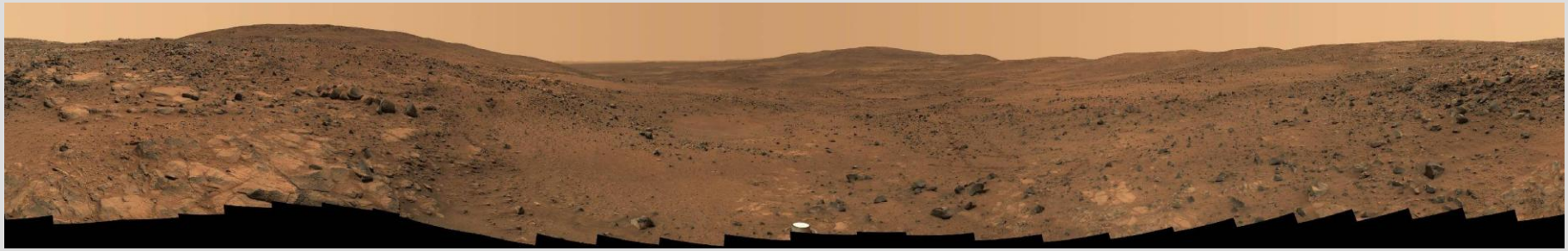
Pathfinder 1997

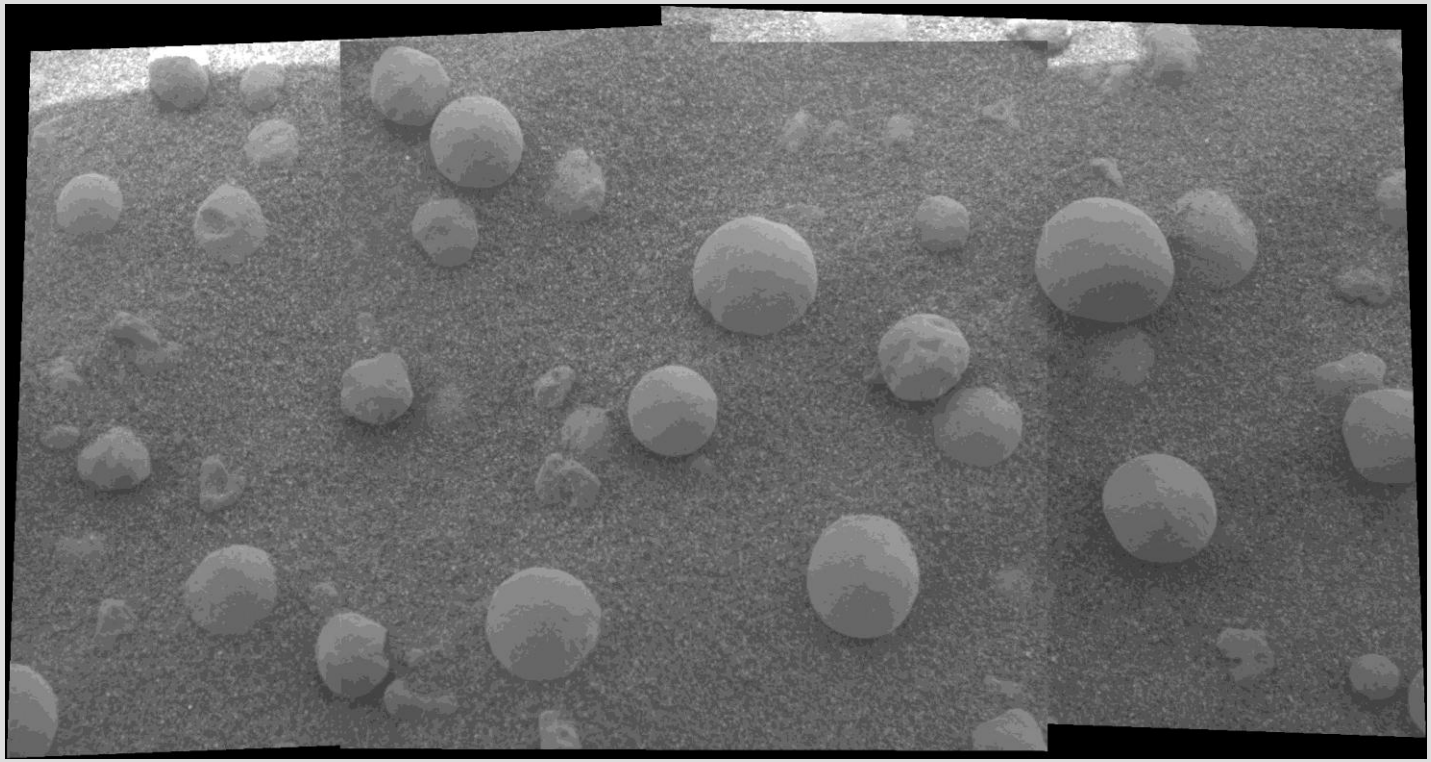


Science instruments: Panoramic camera, miniature thermal emission spectrometer, Mössbauer spectrometer, alpha proton X-ray spectrometer, microscopic imager



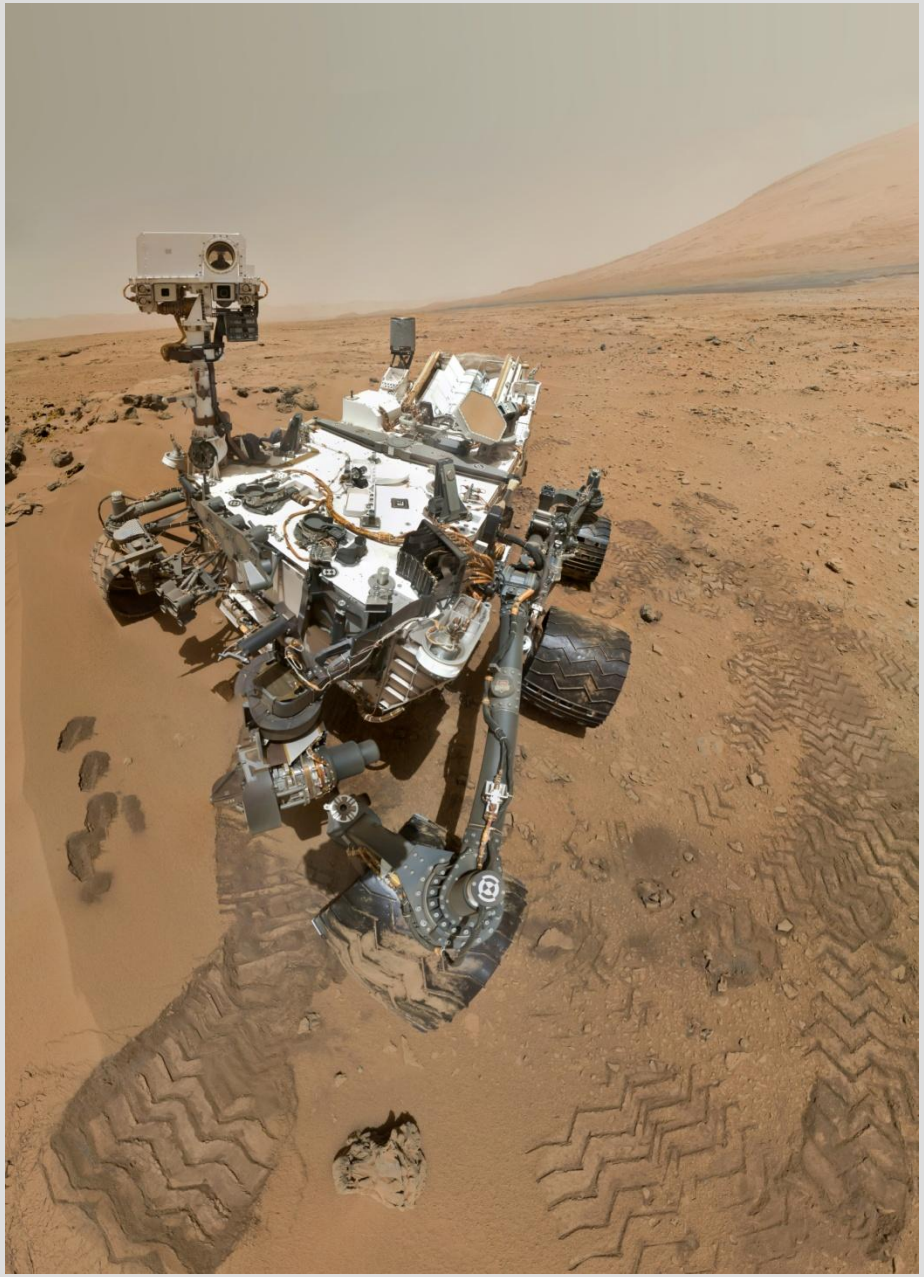
Opportunity

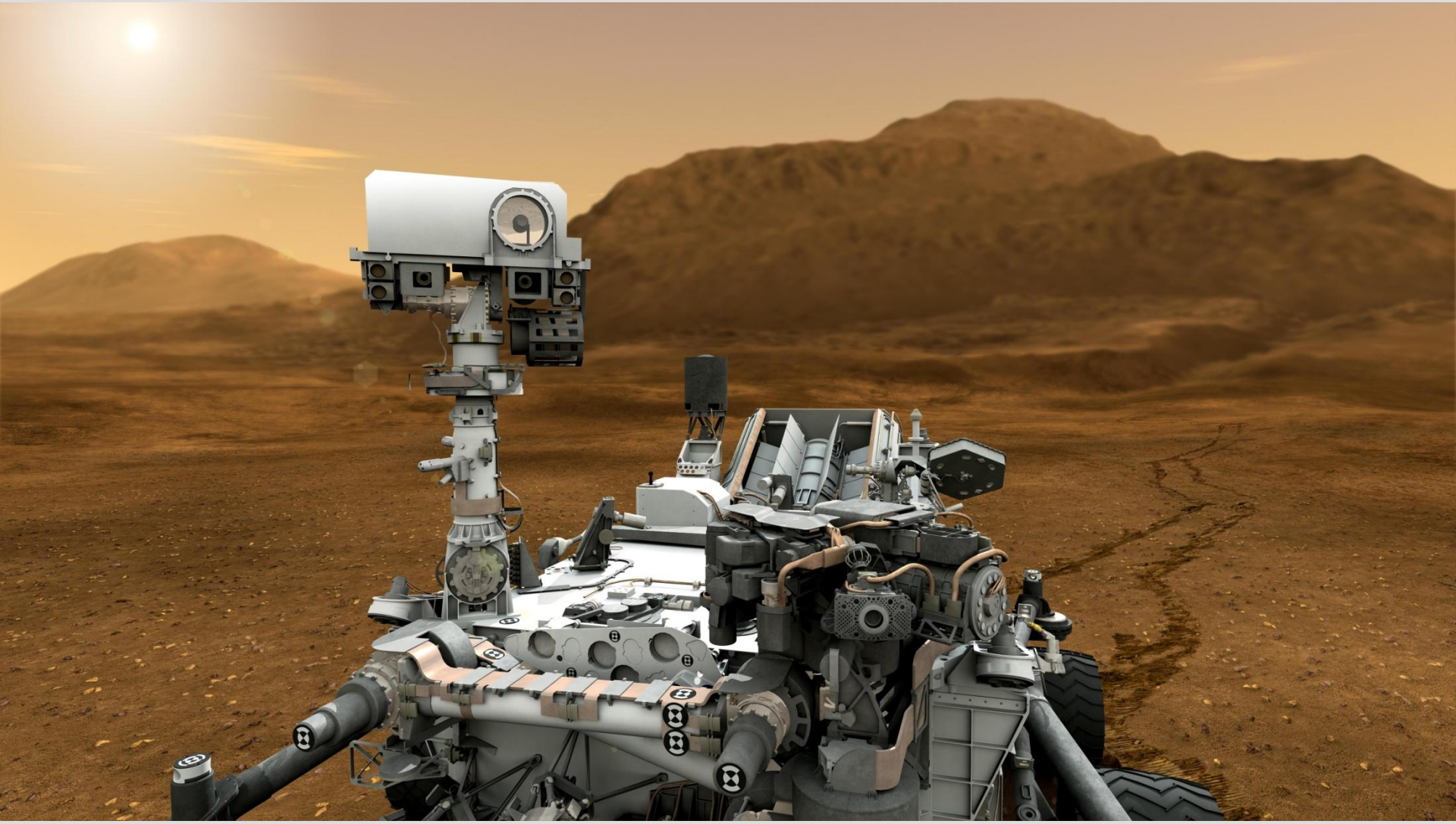


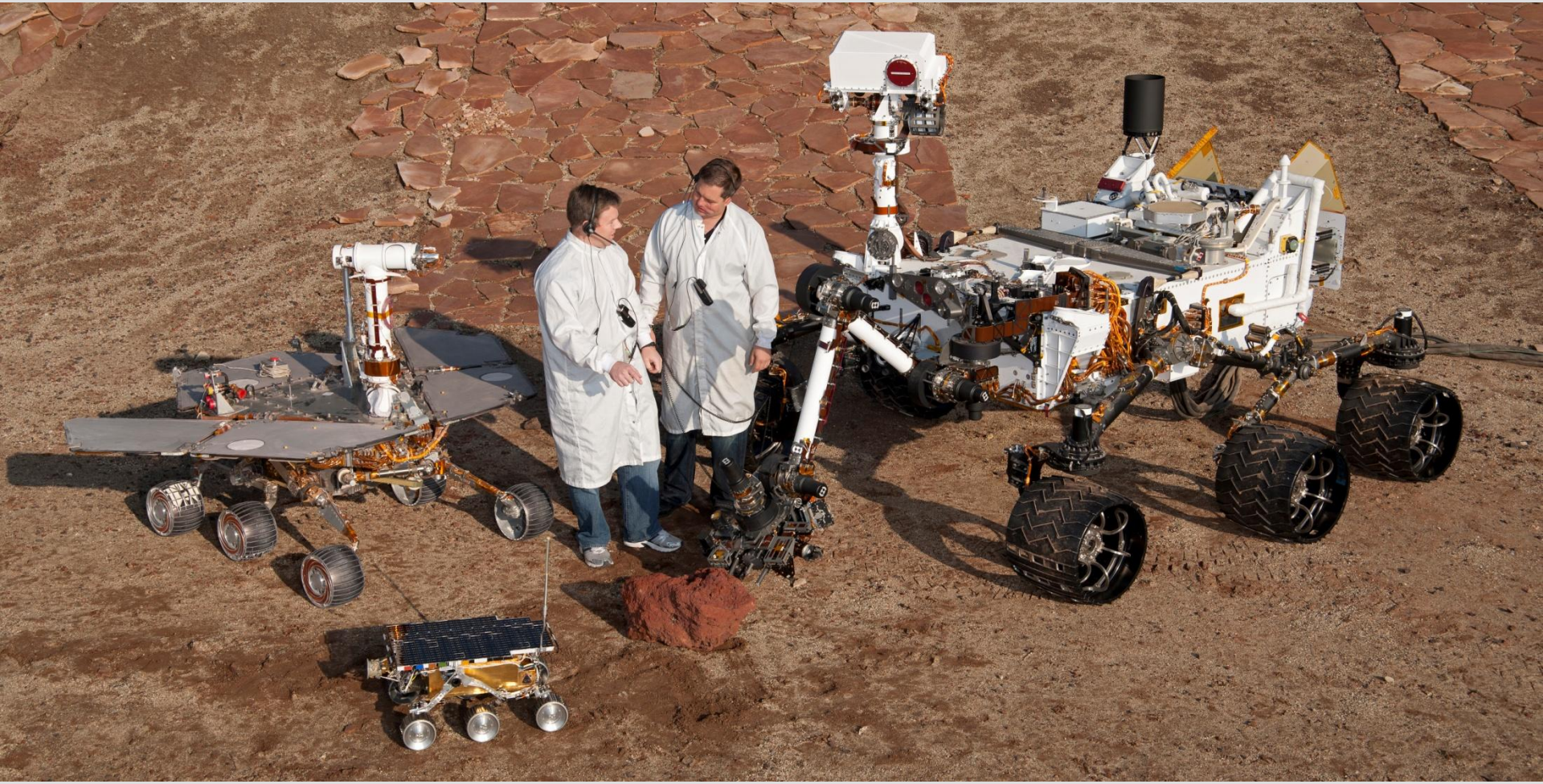


Curiosity self potrait

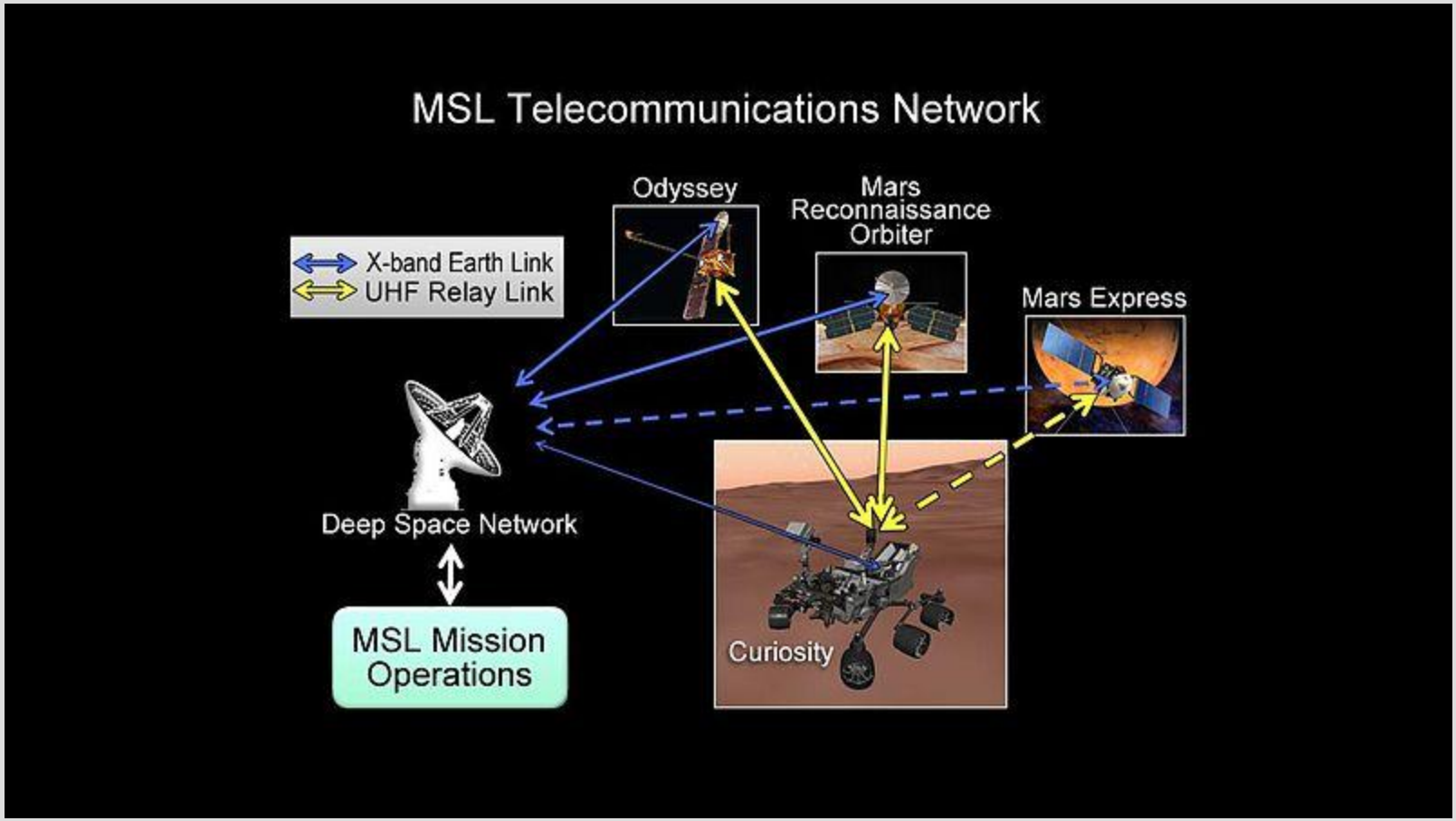
2012







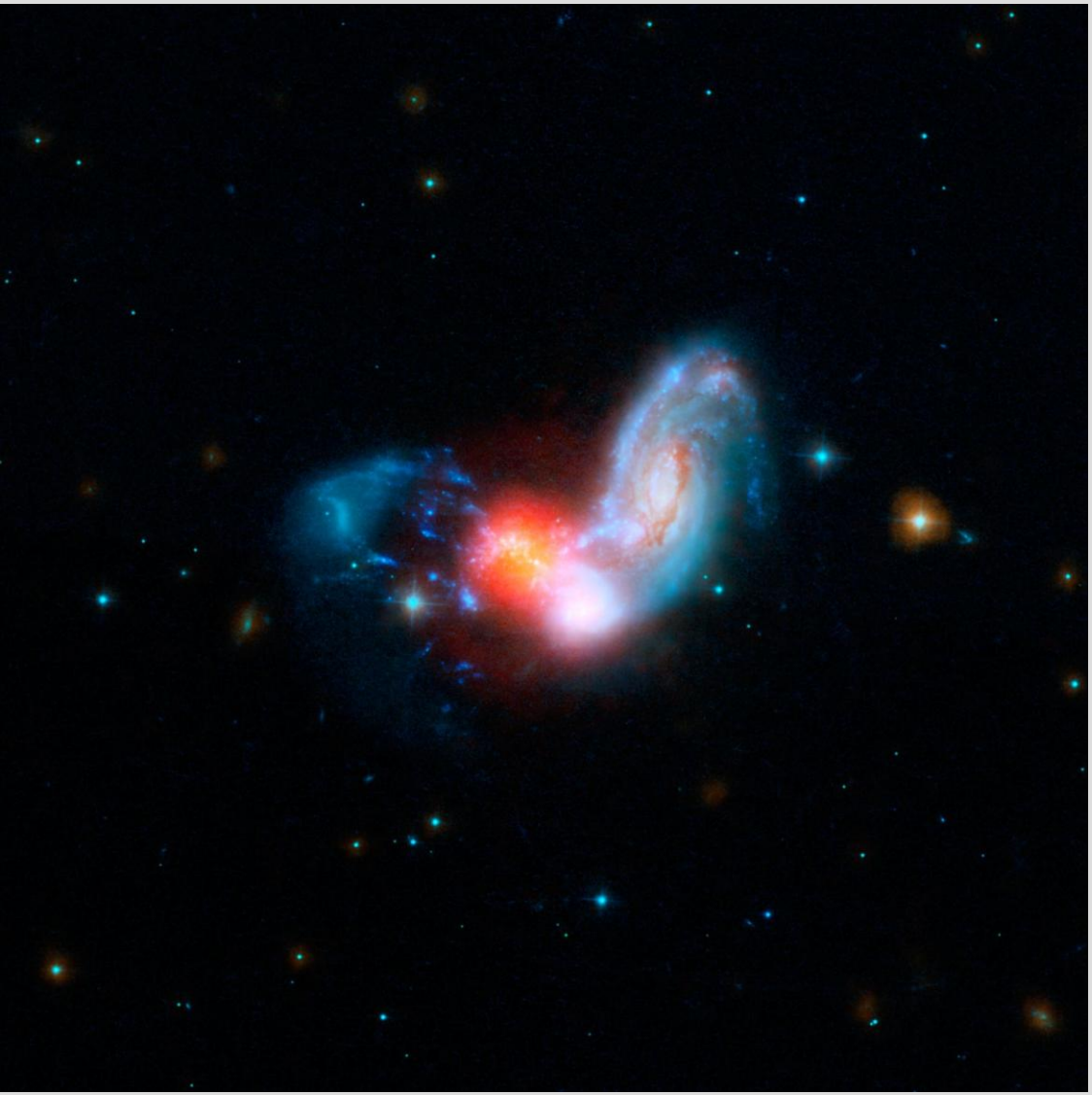



MSL Telecommunications Network
Odyssey
Mars Reconnaissance Orbiter
Mars Express
X-band Earth Link
UHF Relay Link
Deep Space Network
MSL Mission Operations
Curiosity

HUBBLE TELESCOPE



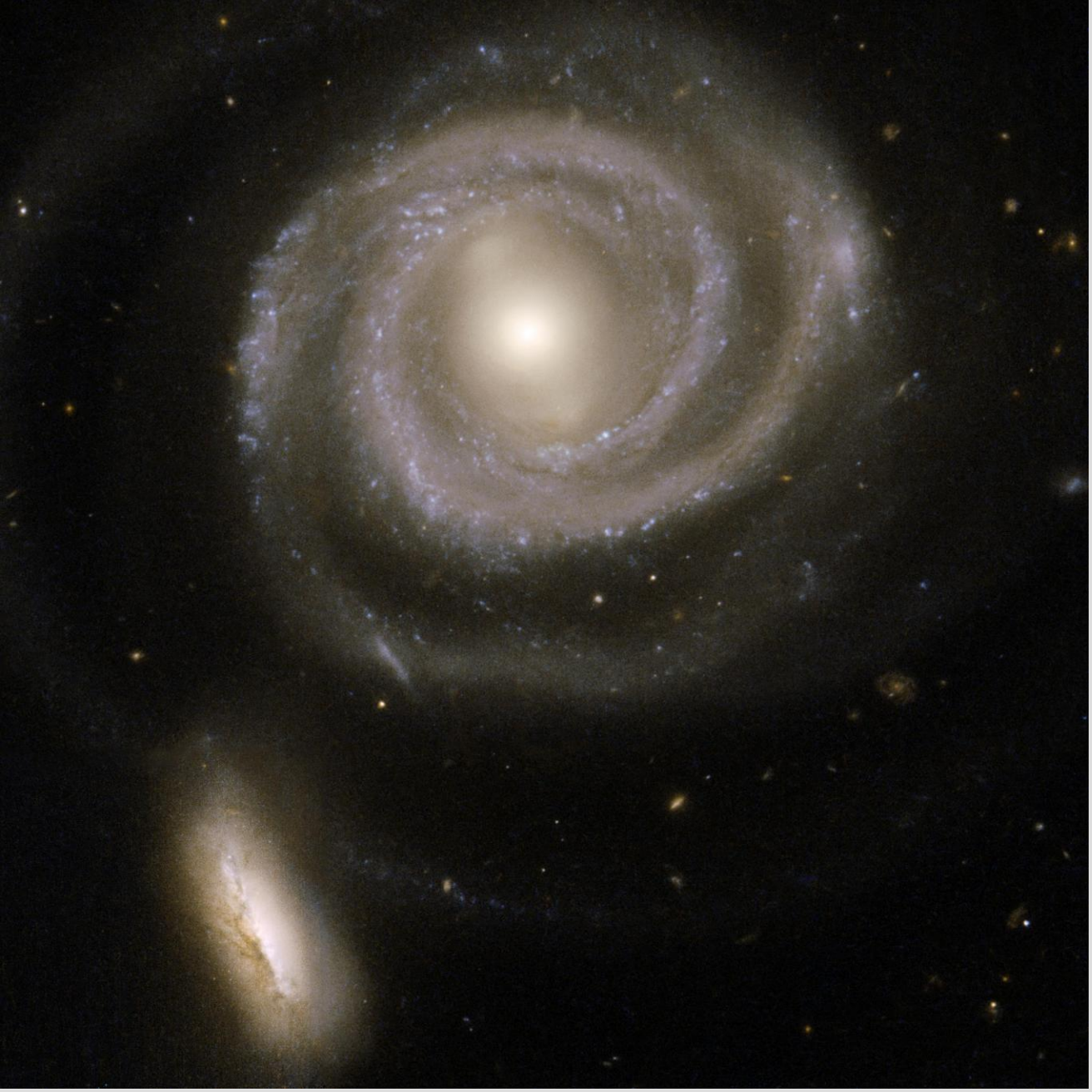




Kolise dvou galaxií

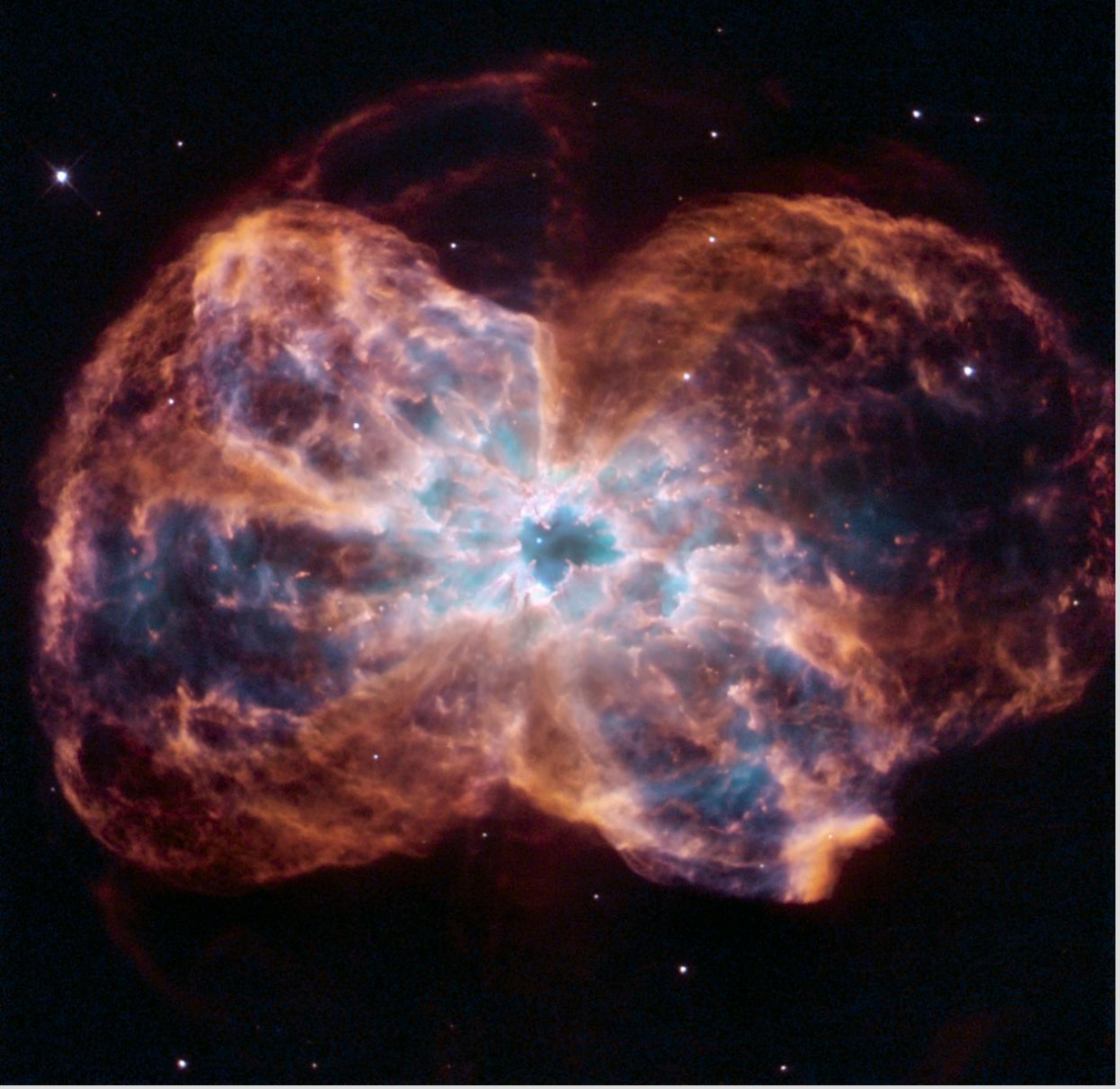


Dvě silně interagující galaxie NGC 6621/2



NGC 5754

NGC 5752

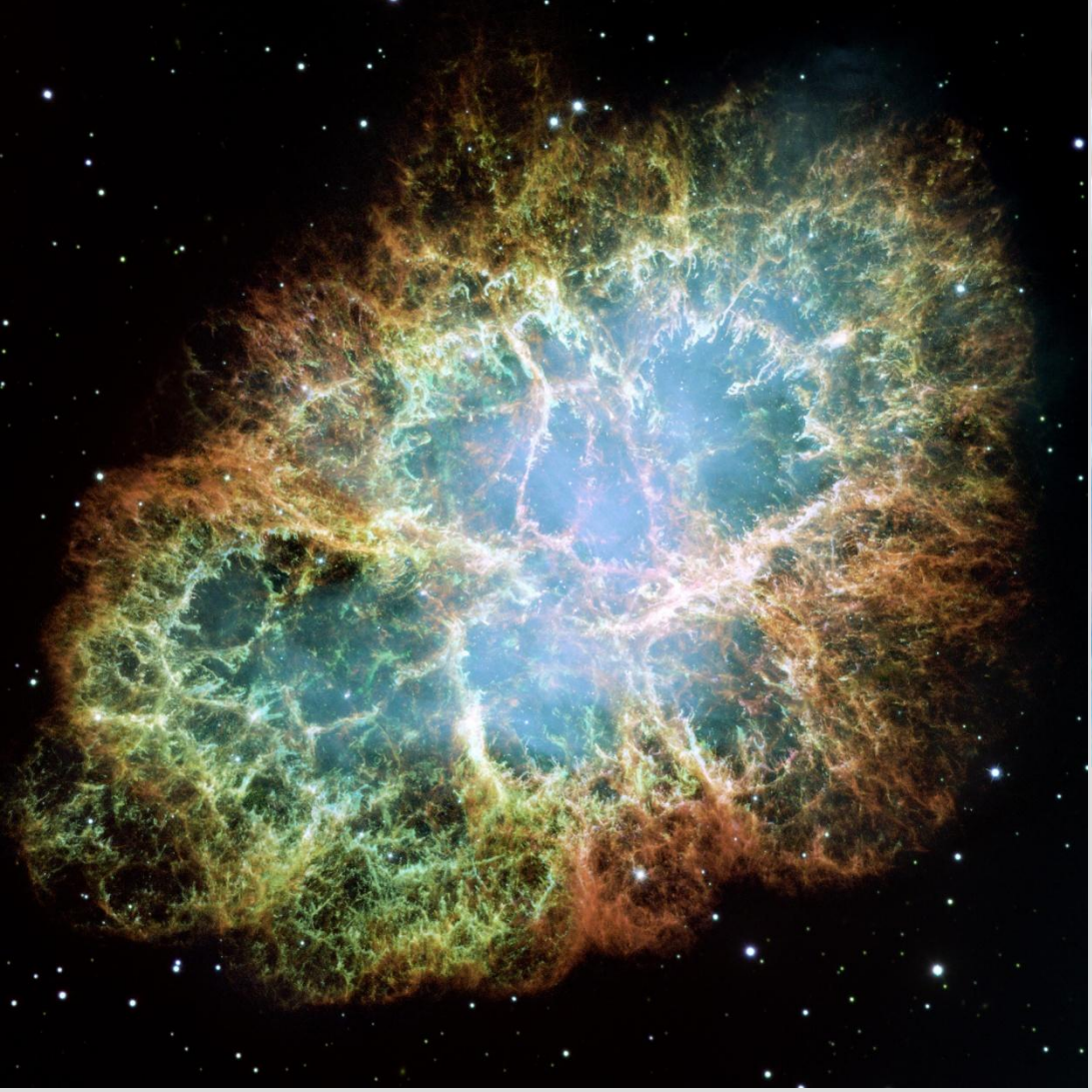


Zánik hvězdy podobné našemu Slunci

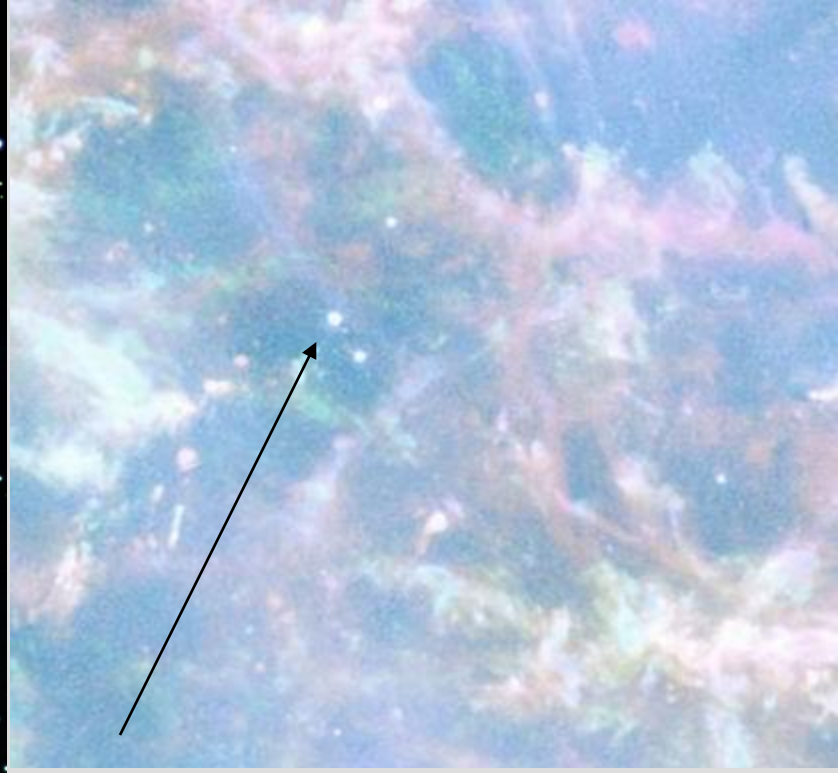
vzniká bílý trpaslík



Supernova 1987A



Krabí mlhovina – exploze v r. 1054



Pulzar – neutronová hvězda
průměr 30 km,
hmotnost 1000000 Zemí
otáčí se 30x za sekundu