

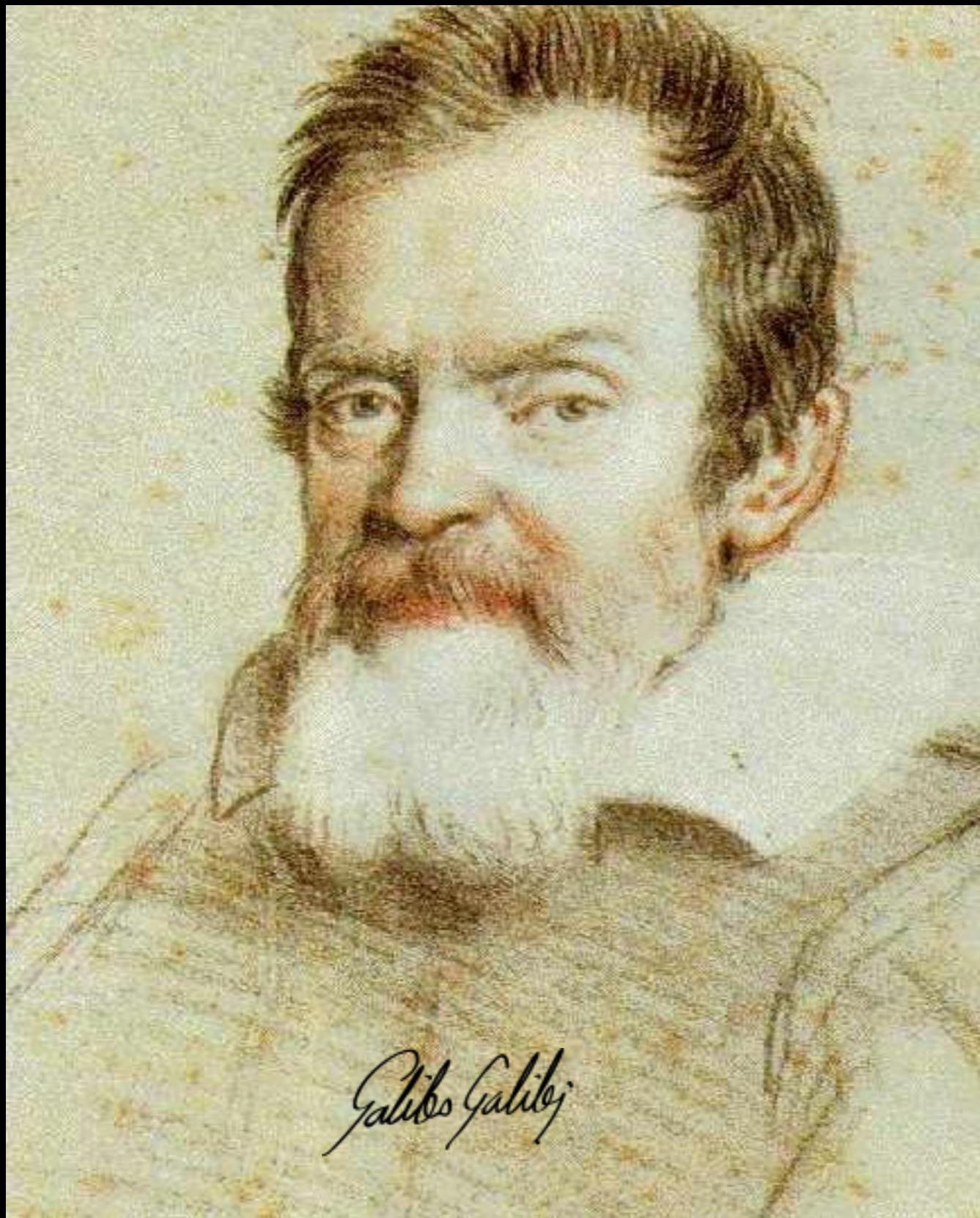
Dálkový průzkum planet

Jan Kolář

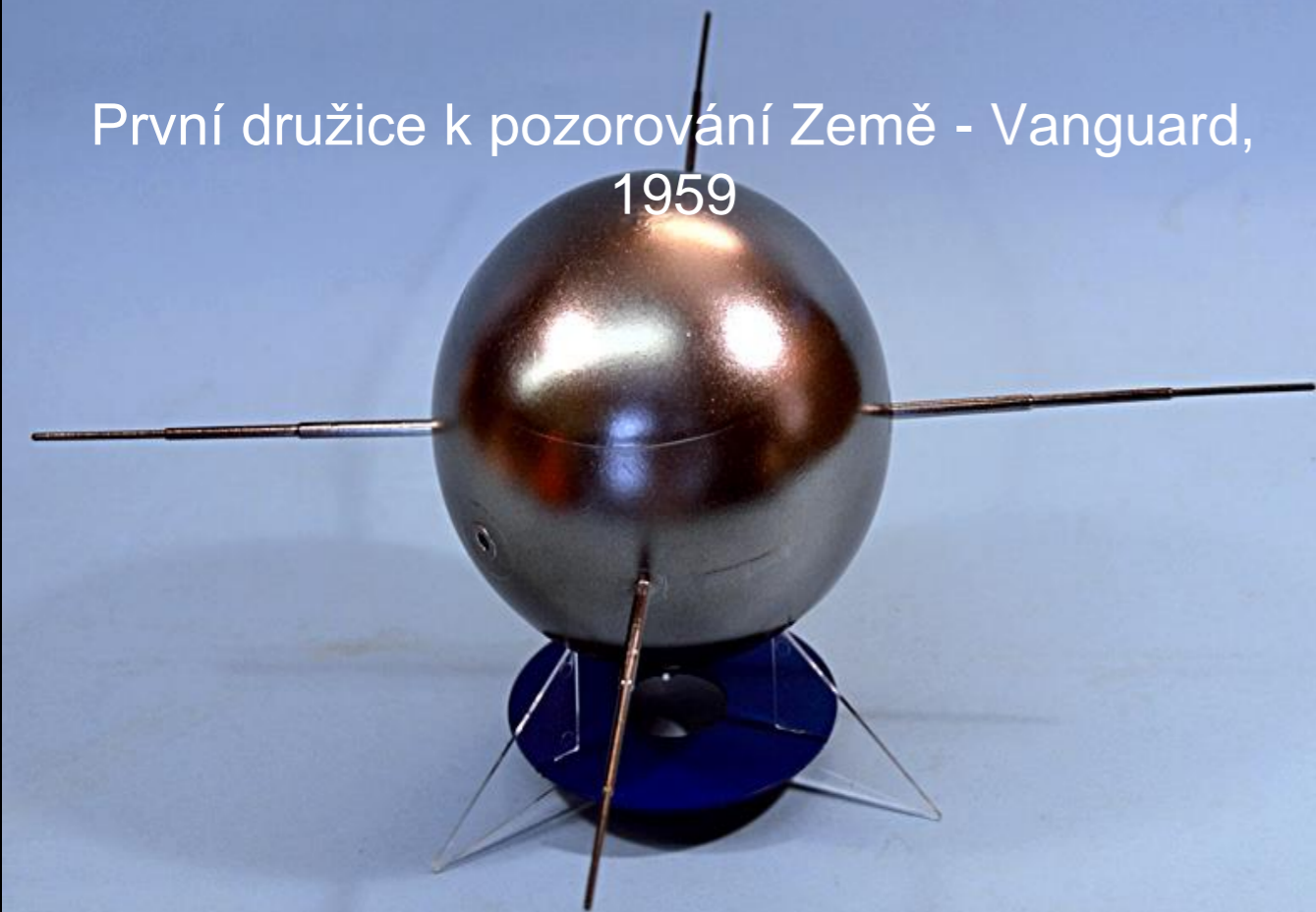


Konference GIS Esri v ČR
4. a 5. listopadu 2015

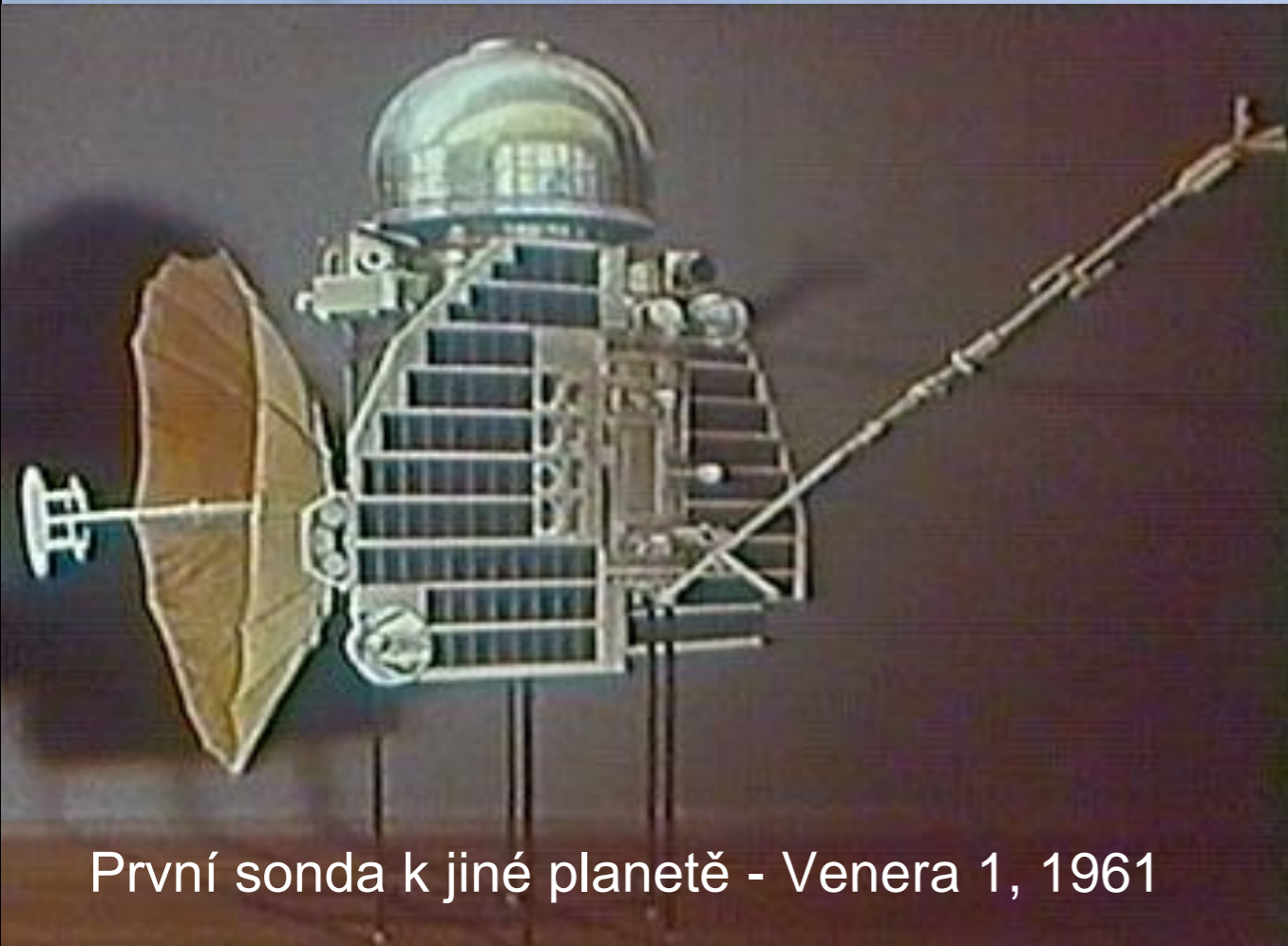
Objevování vyžaduje vylepšení našich smyslů



První družice k pozorování Země - Vanguard,
1959



První sonda na dráze kolem Slunce - Luna 1, 1959
První sonda na jiném tělese - Luna 2, 1959



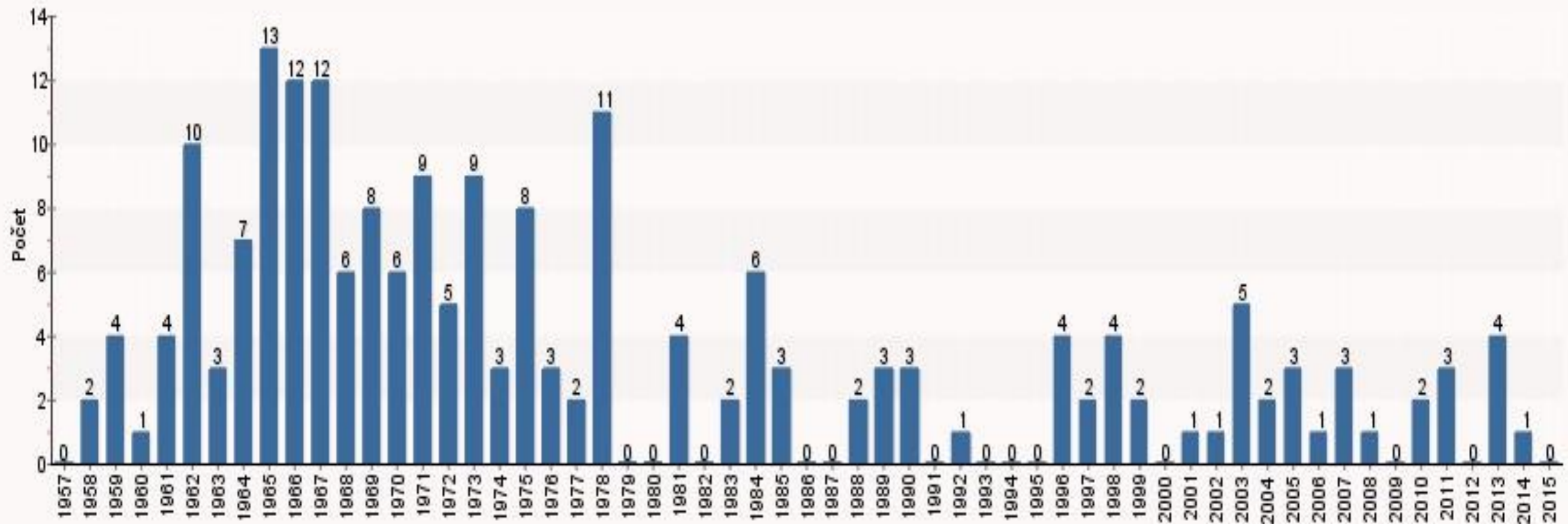
První sonda k jiné planetě - Venera 1, 1961



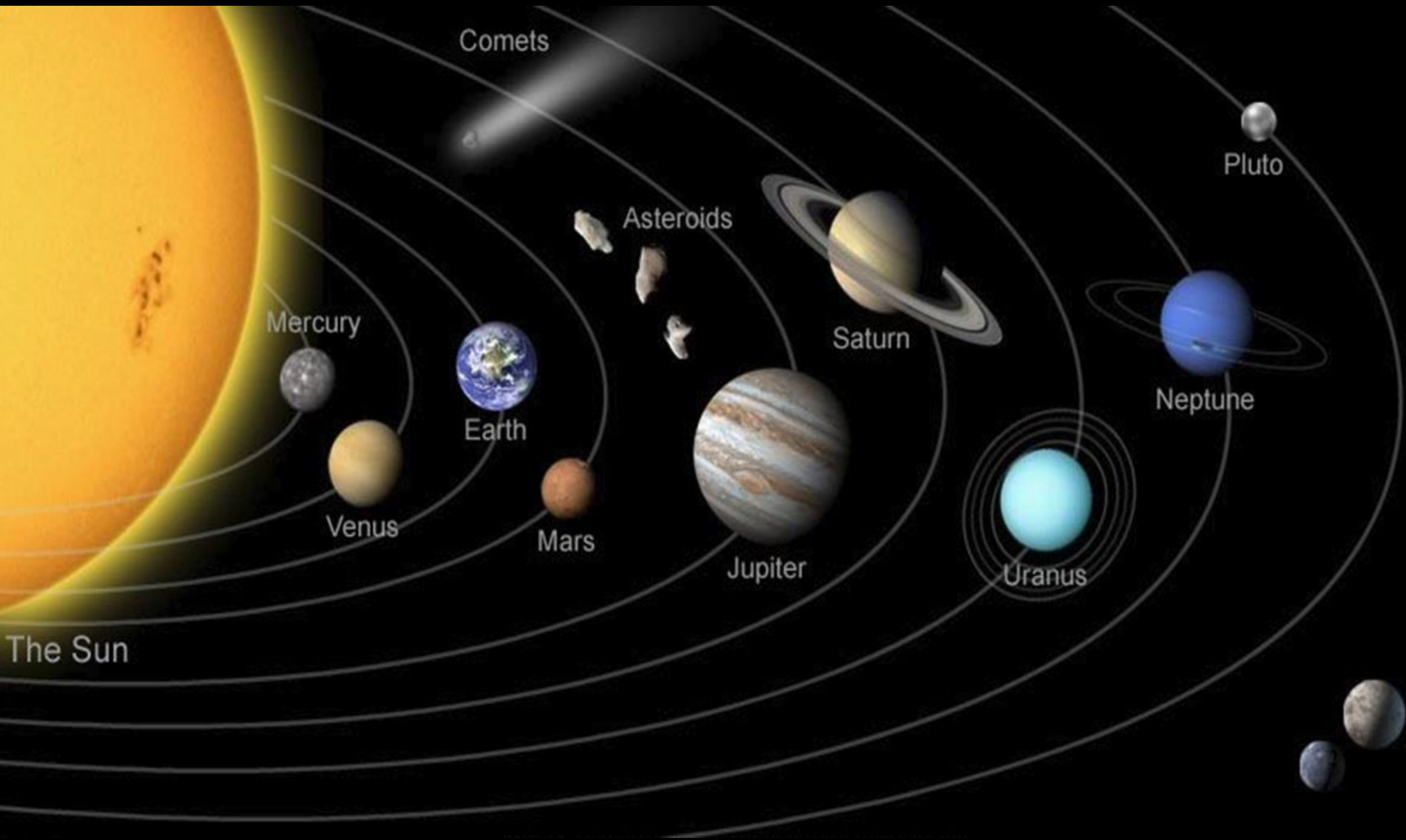
První měření jiné planety - Mariner 2, 1962

Četnost startů kosmických sond

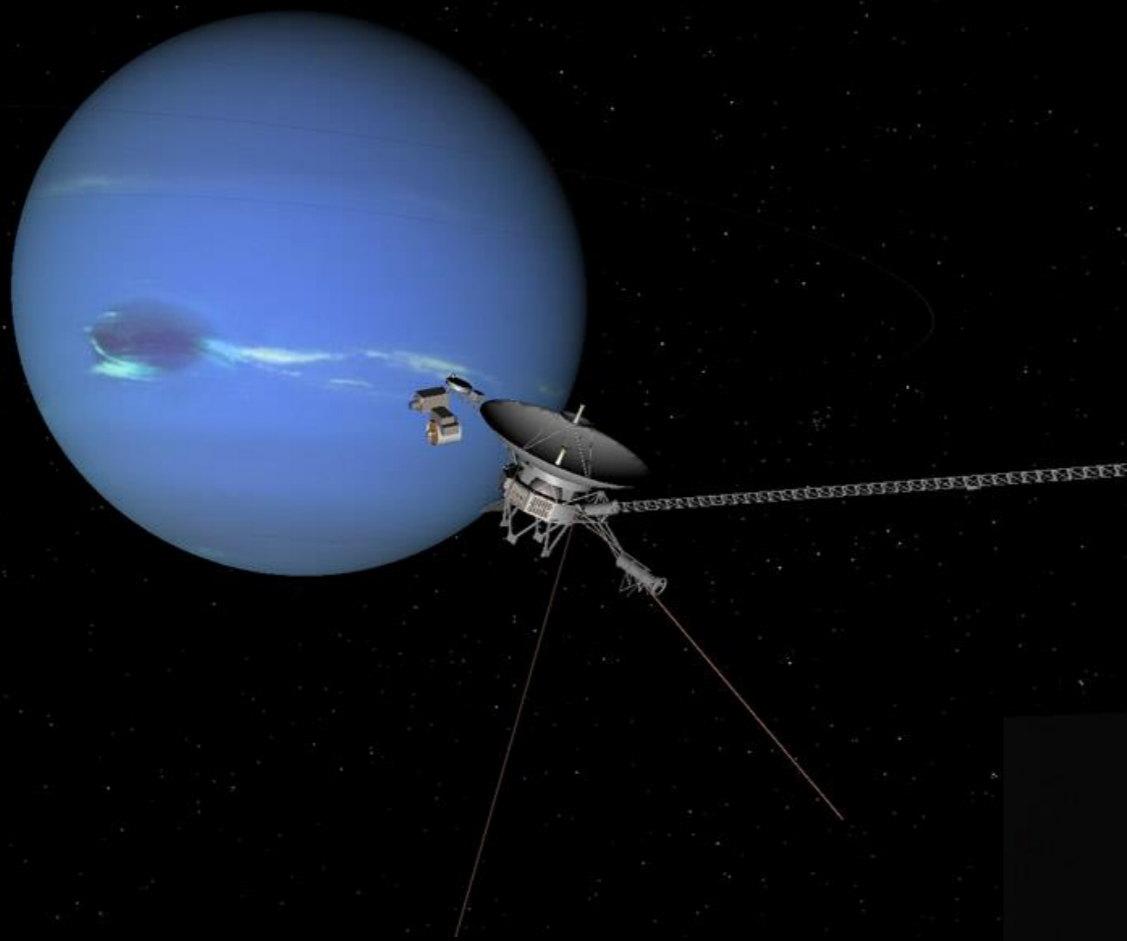
Sondy - celkem 201 (stav k 26.10.2015)



Roboti vyrobené člověkem zkoumaly všechny druhy těles



Průlet:0, obíhání:11, přistání:3, na cestě:5, L1:4



Špičkové přístroje dálkového průzkumu

spektrometry, kamery, radary

Technické podmínky:

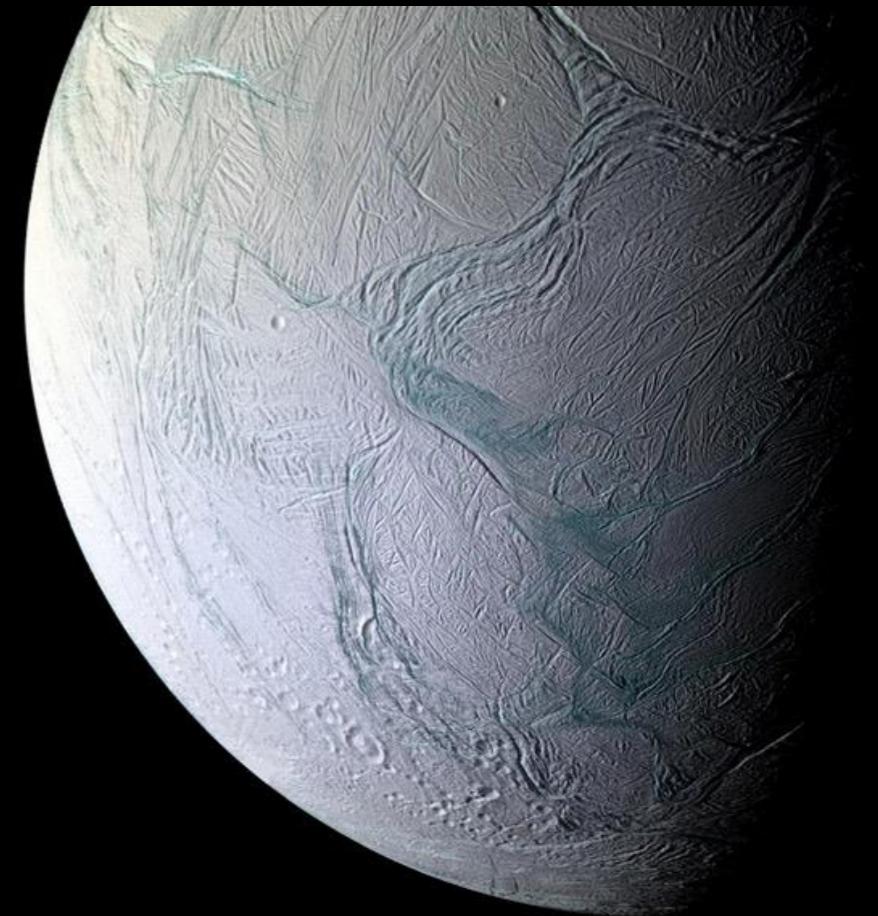
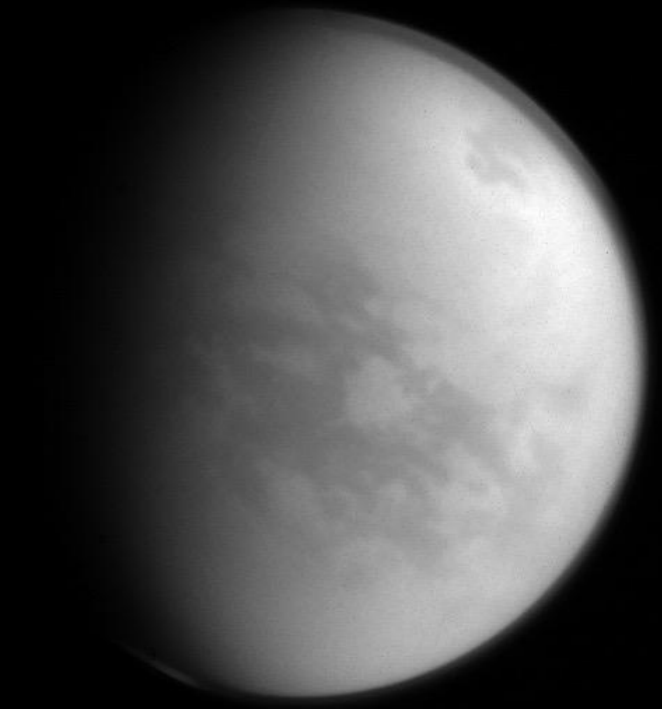
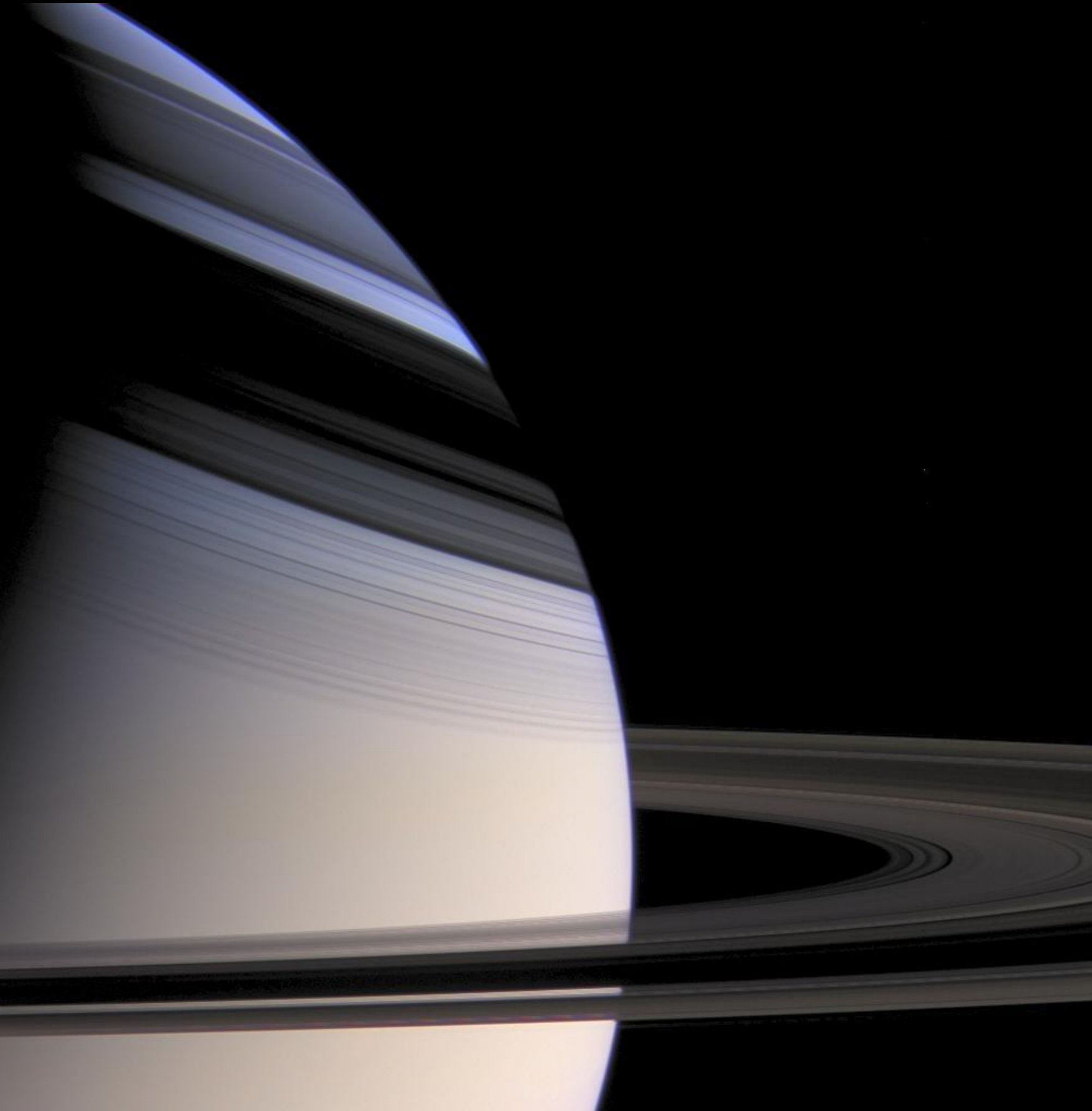
- radiace (sluneční vítr, erupce, galaktické záření)
- telekomunikace ($10 - 10^4$ bps)
- energie (sluneční panely, termoelektrický generátor)
- trvanlivost (~ 10 let)

Metody zpracování dat:

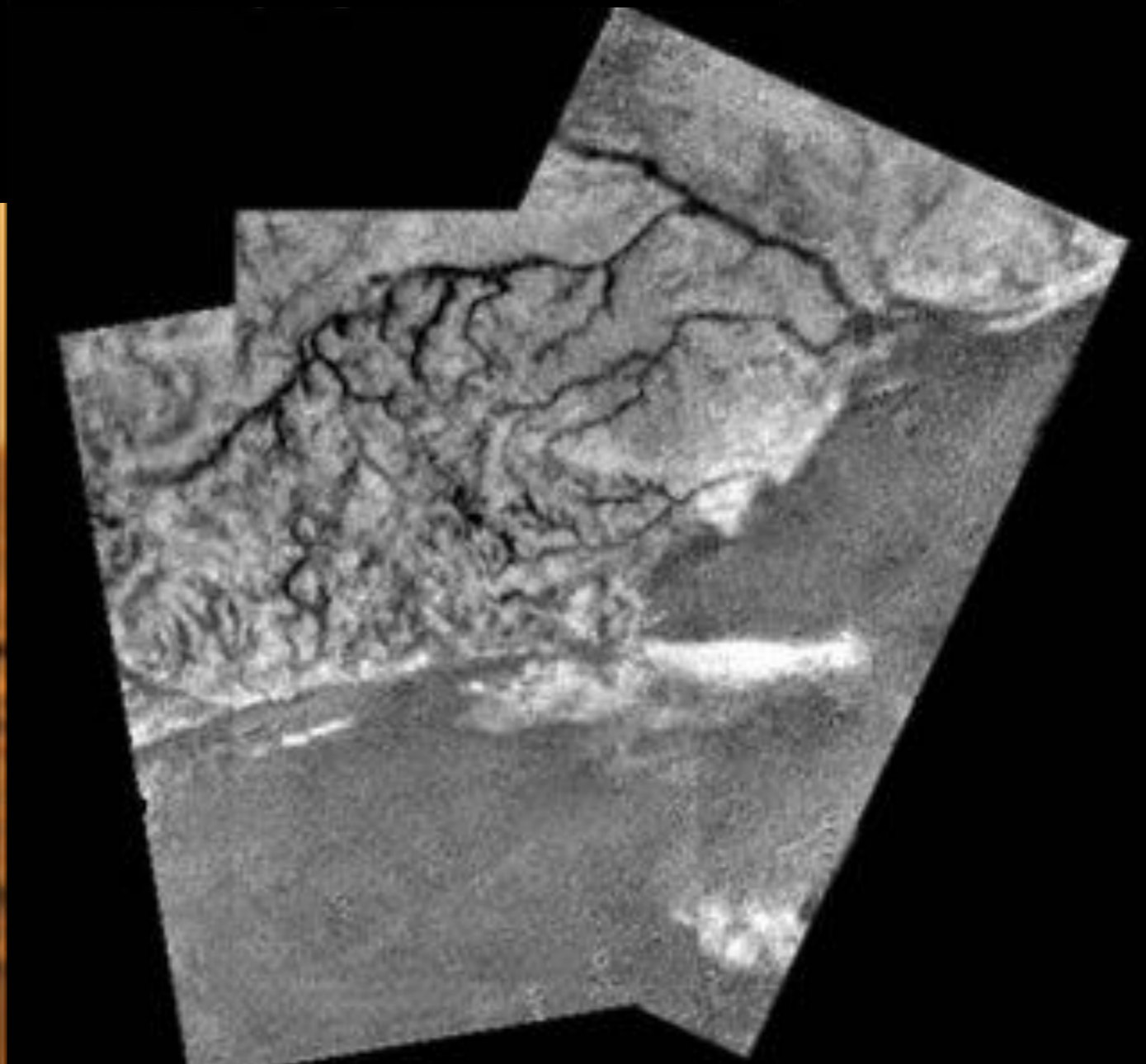
- spektrální analýzy
- vizuální interpretace
- klasifikace multispektrálních obrazových dat



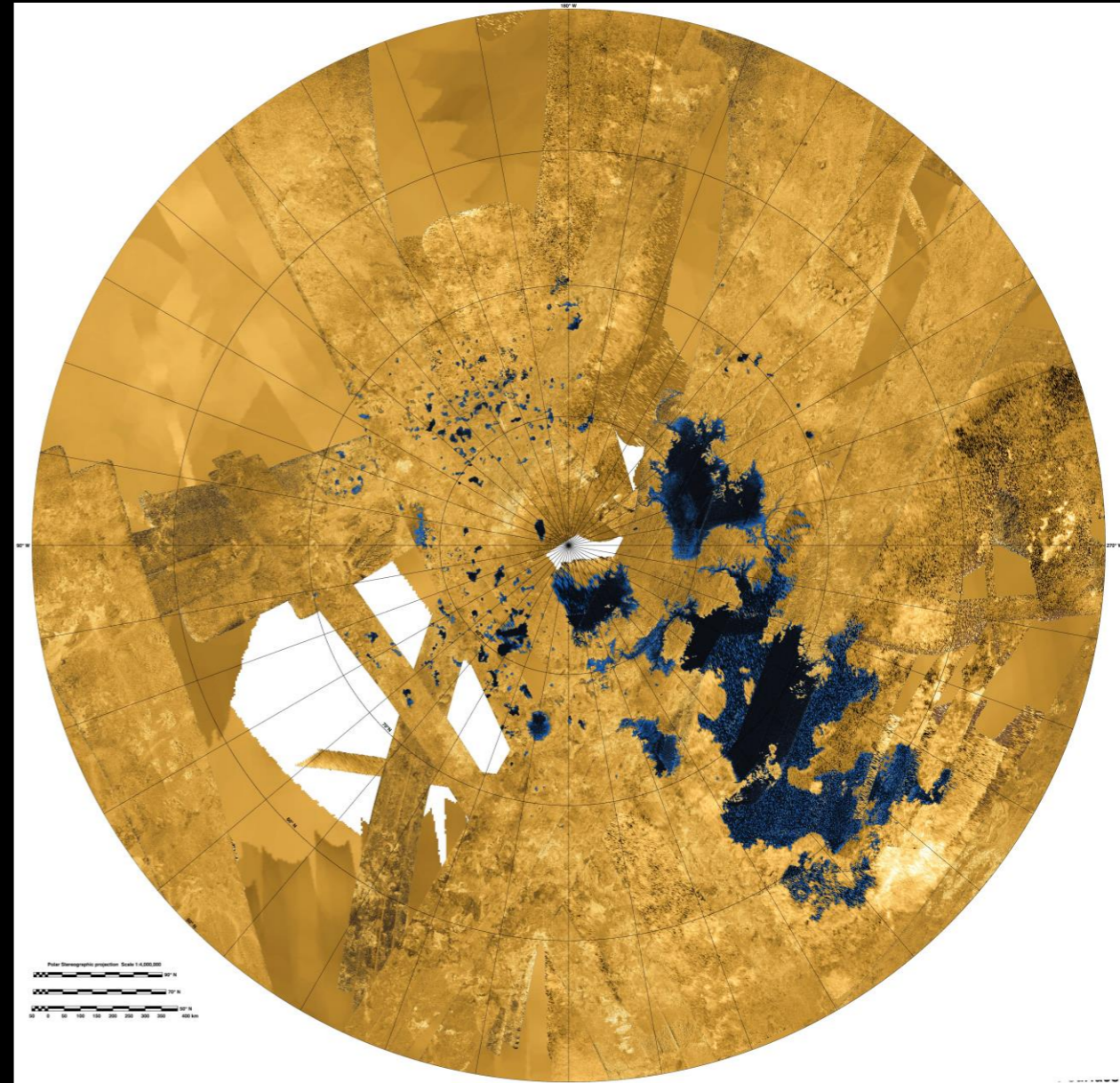
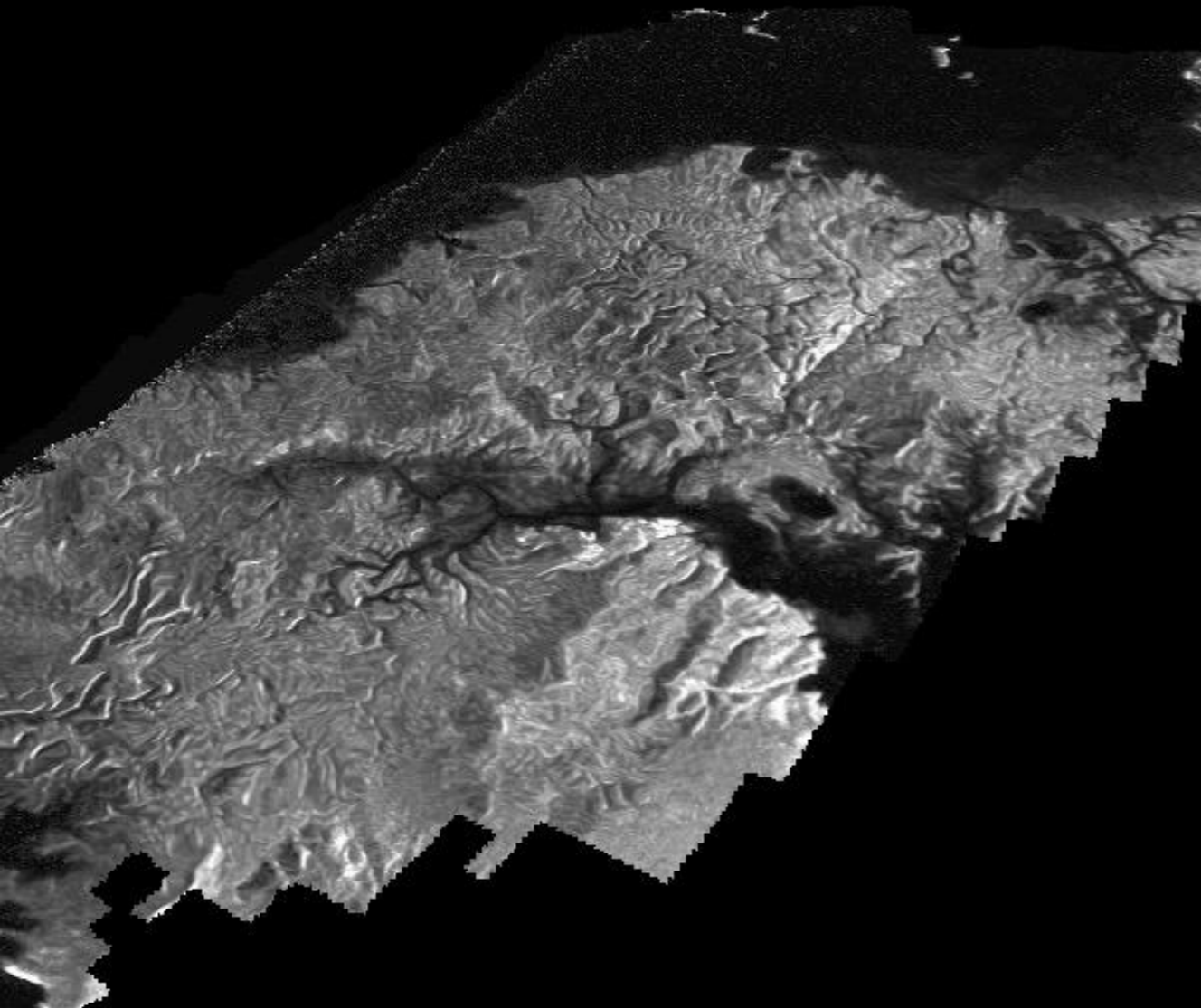
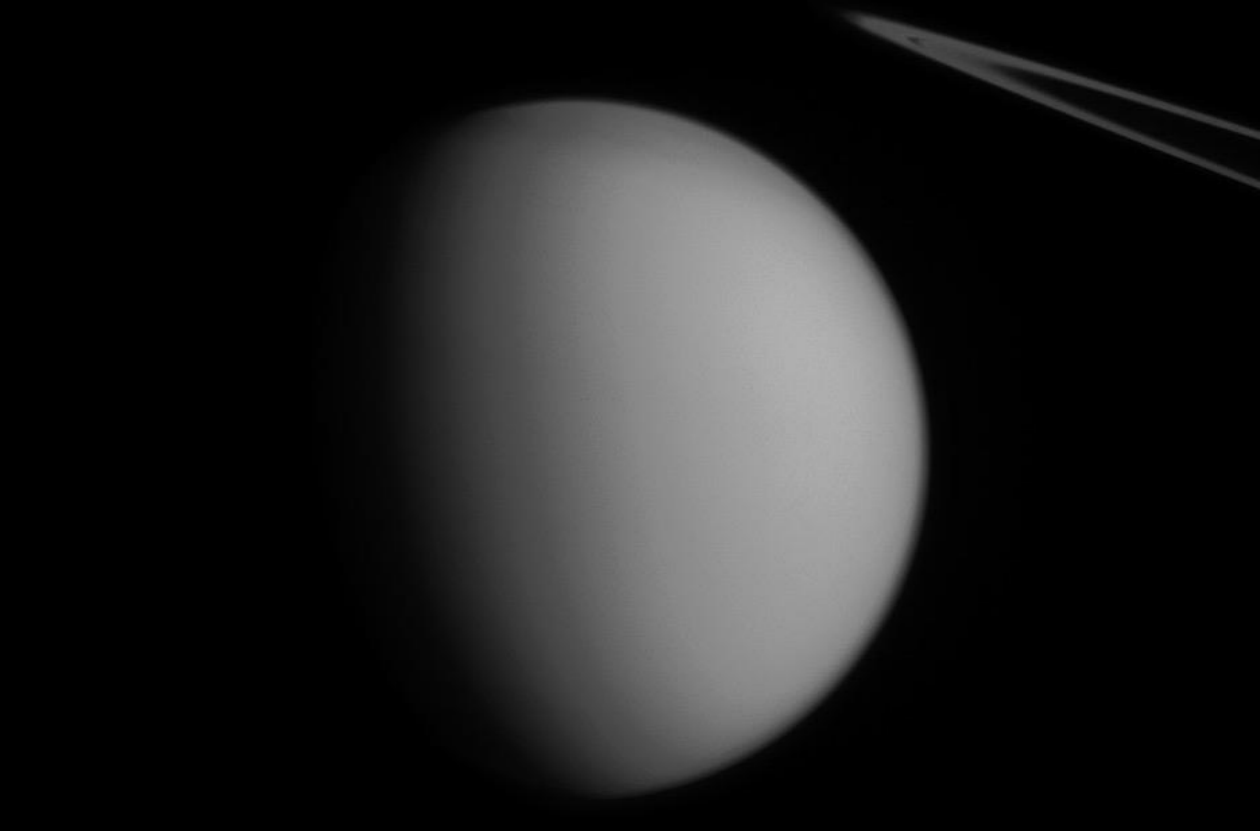
Cassini/Huygens: Saturn - Titan



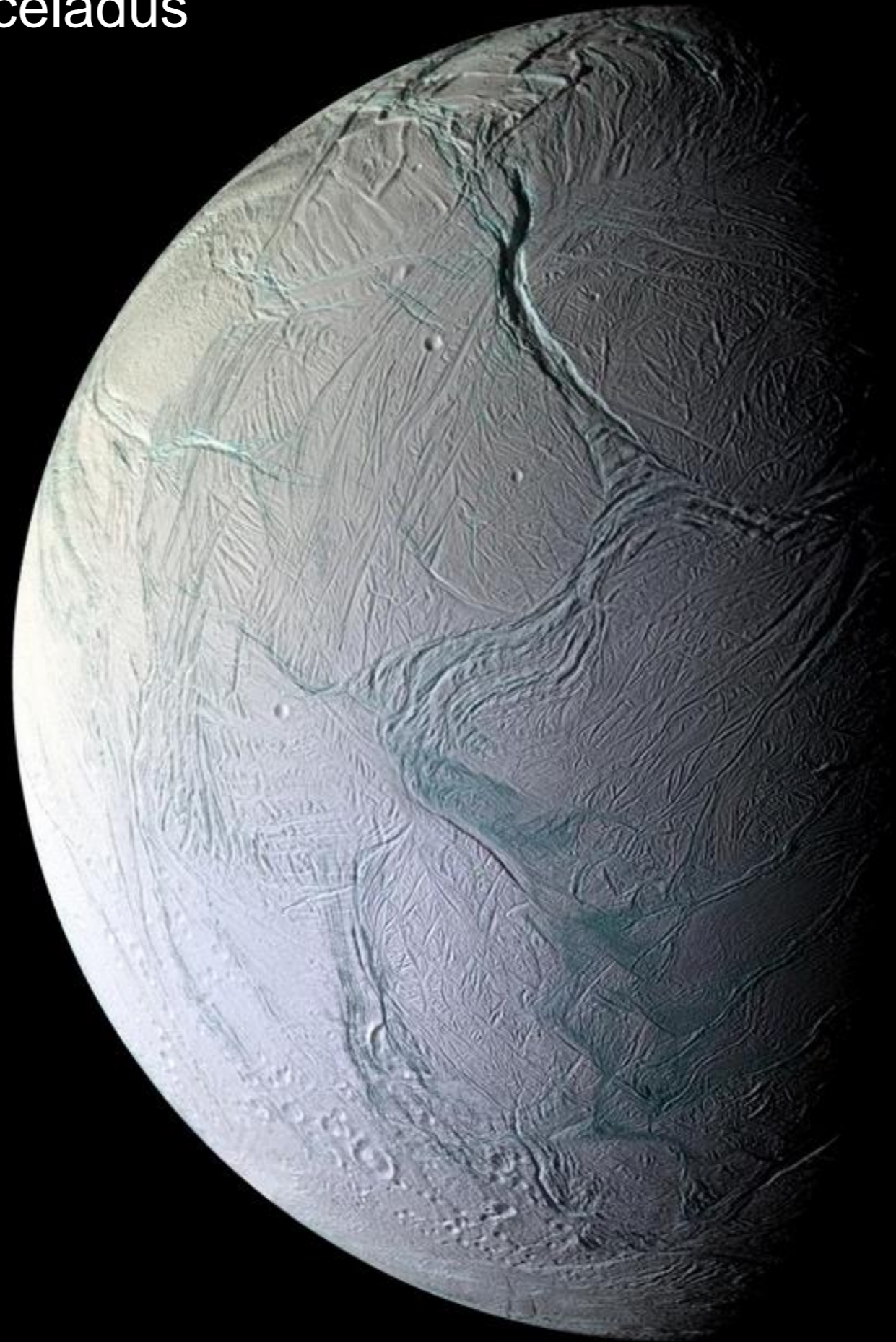
Huygens: Titan



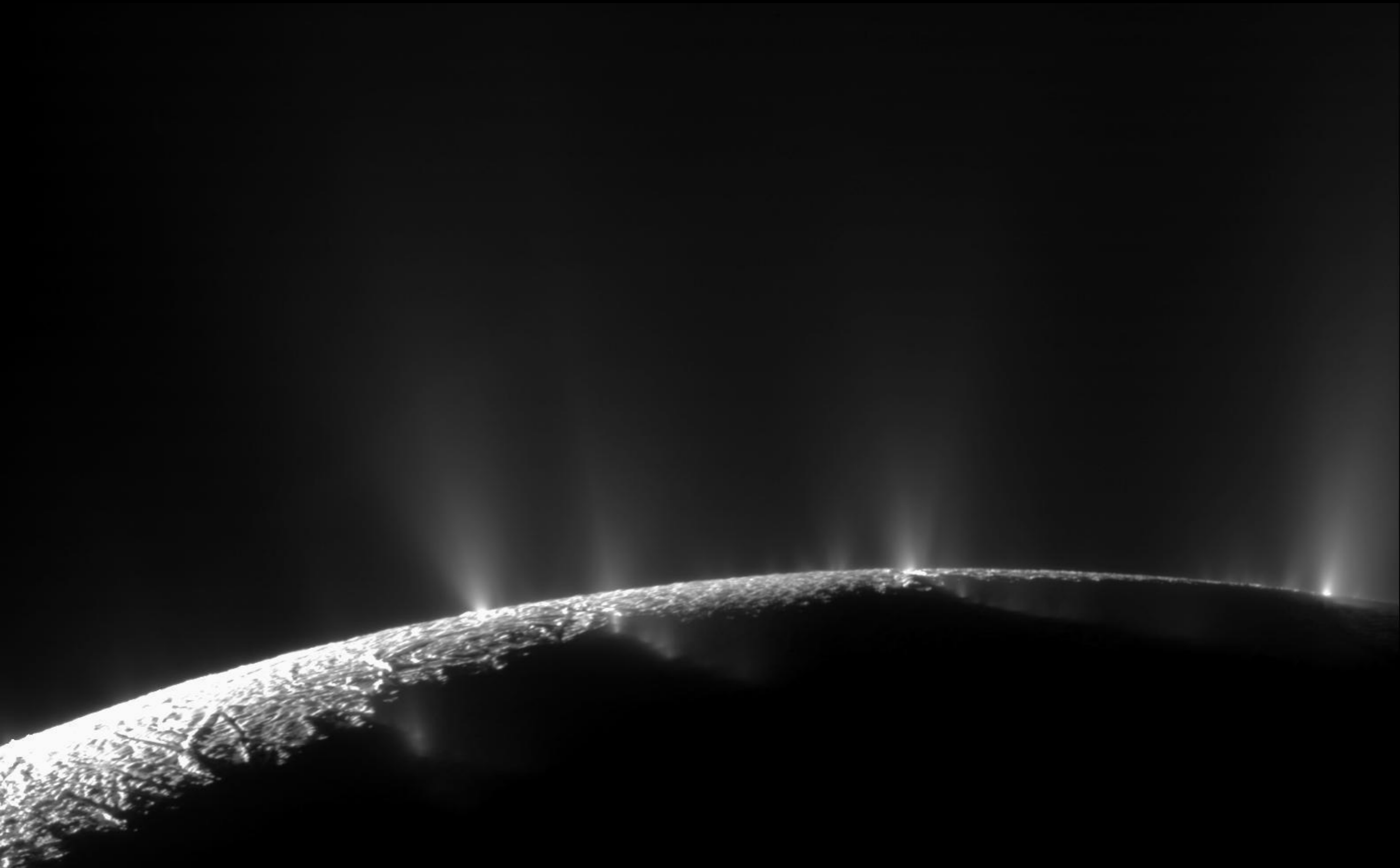
Cassini: Titan



Cassini: Enceladus



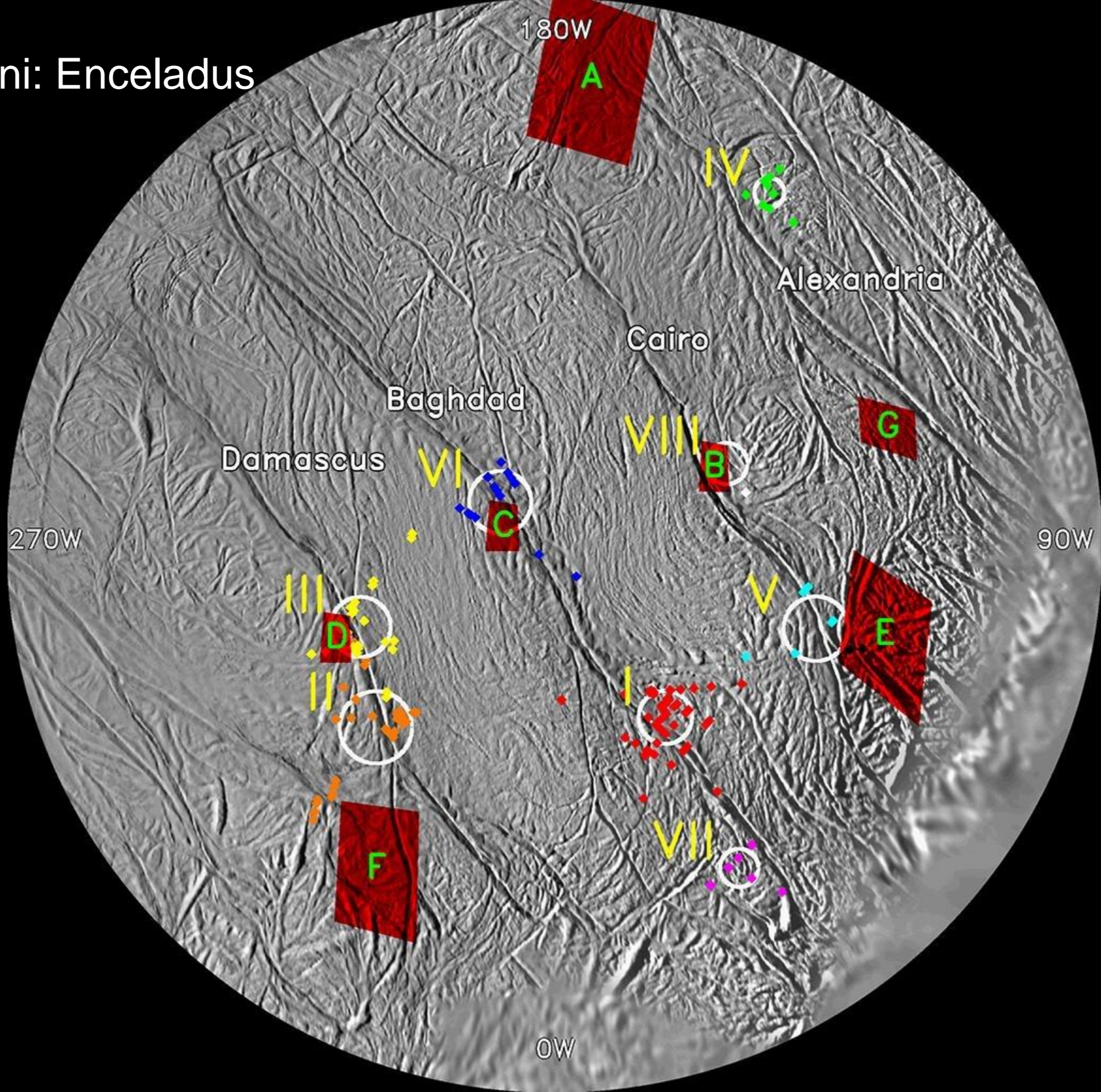
Cassini: Enceladus



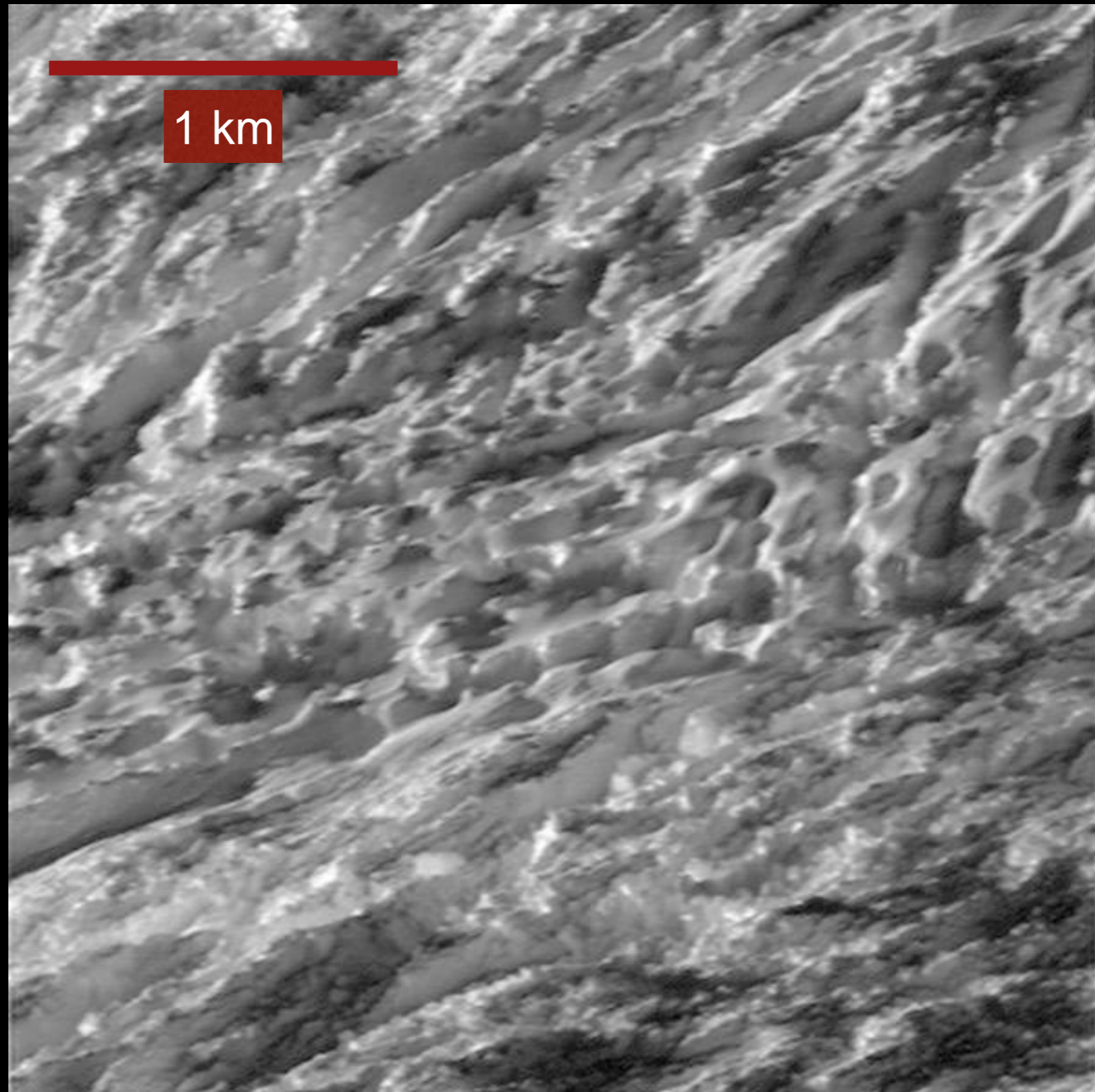
Cassini: Enceladus



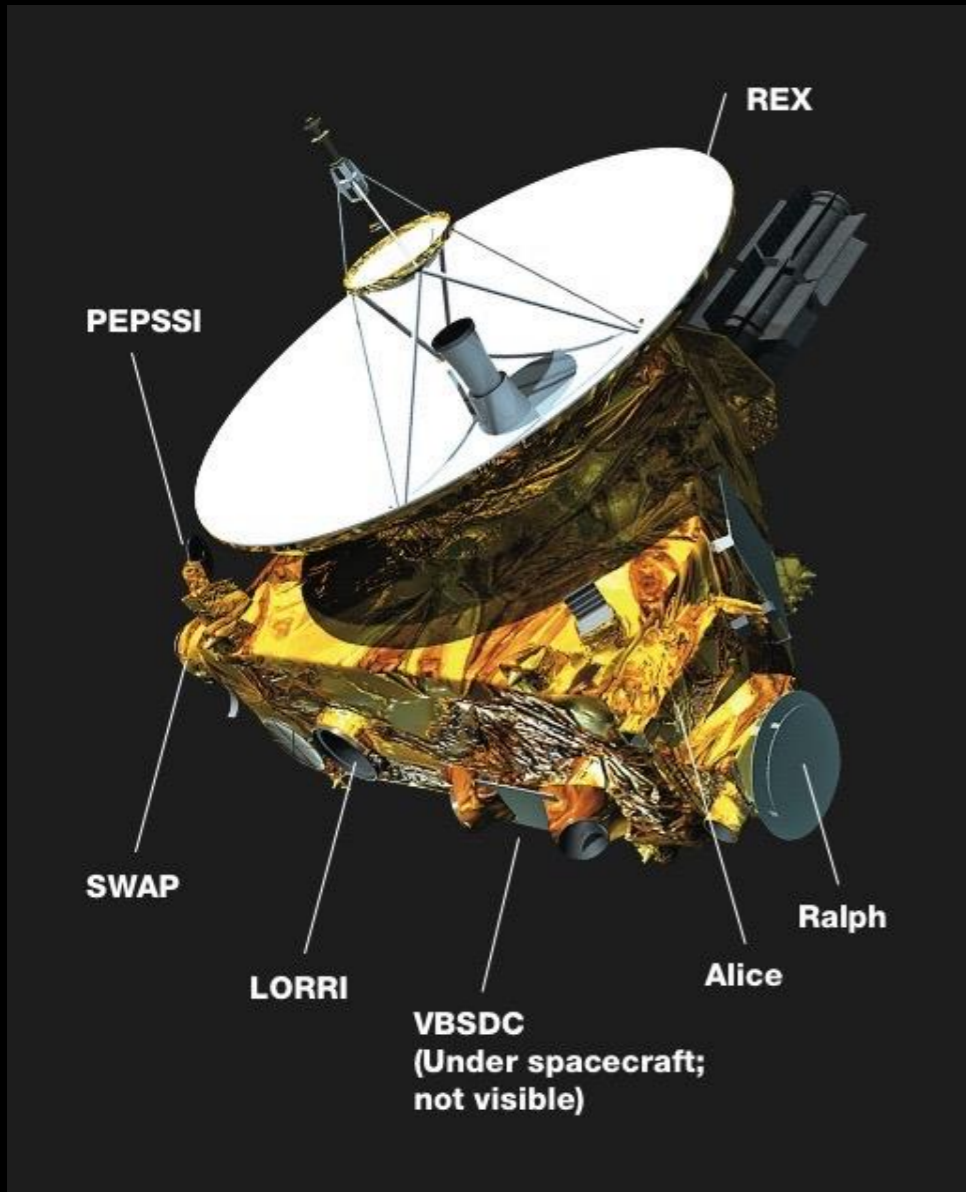
Cassini: Enceladus

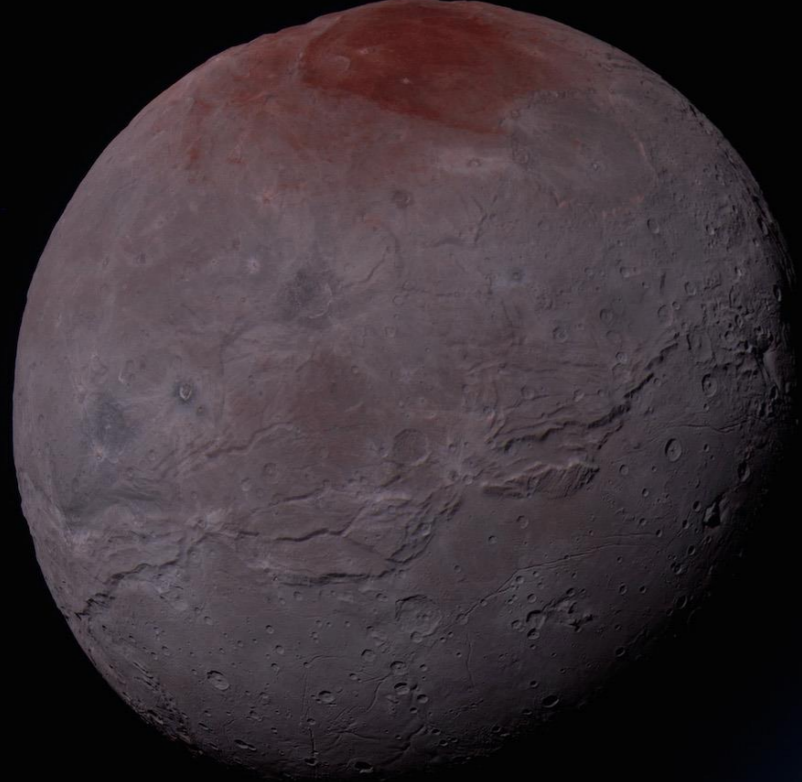


Cassini: Enceladus

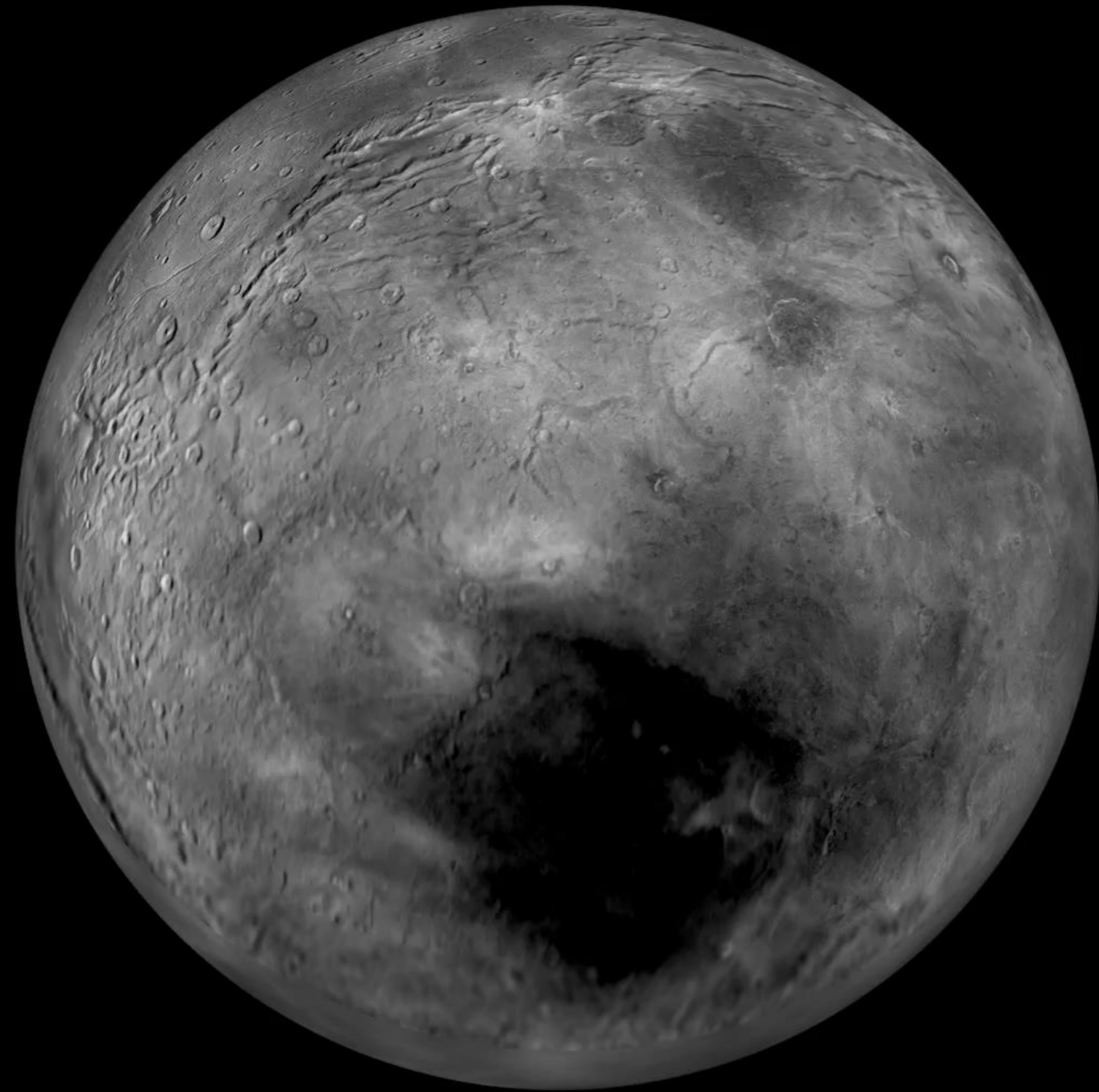


New Horizons: Pluto

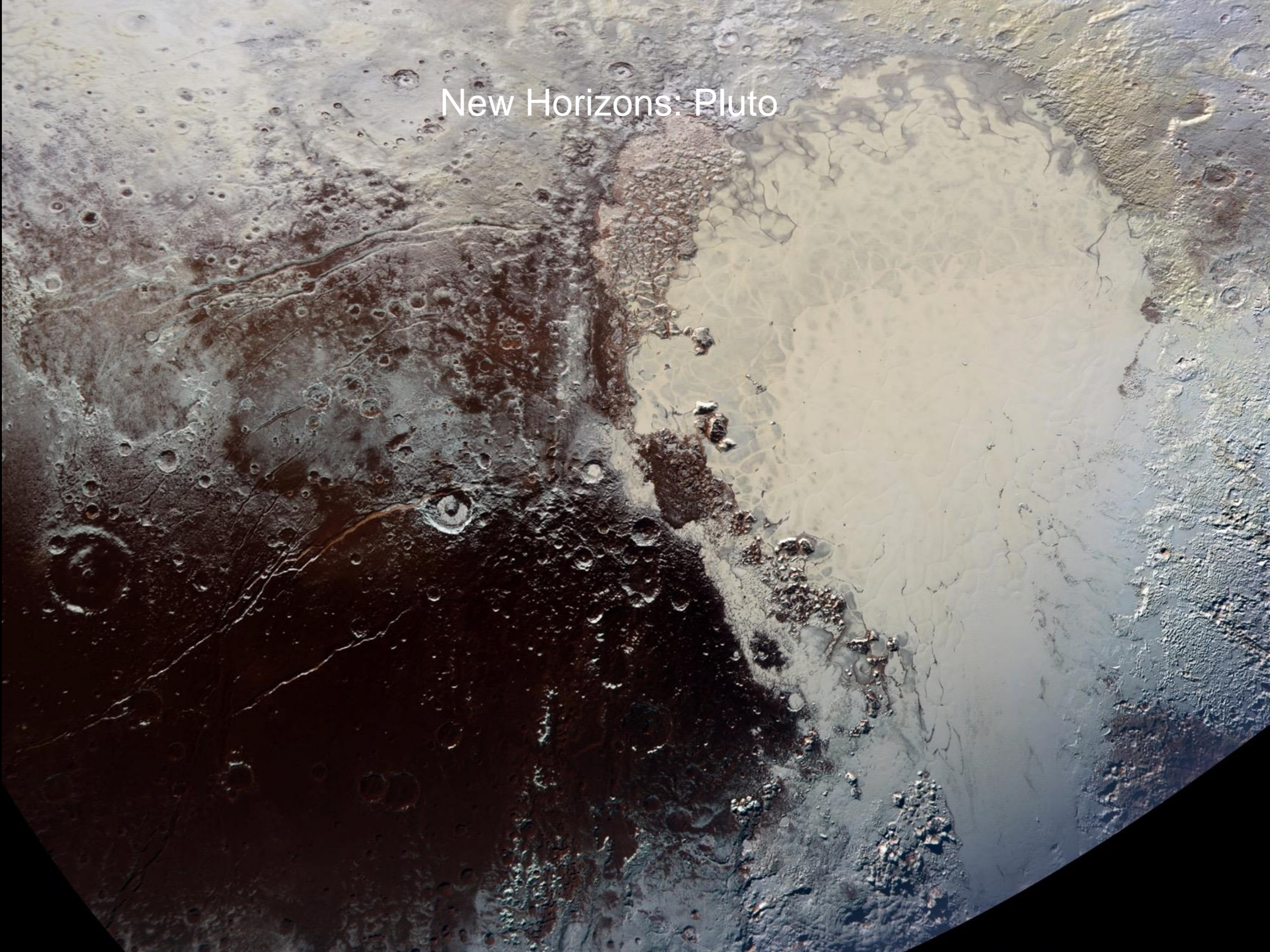




New Horizons: Charon

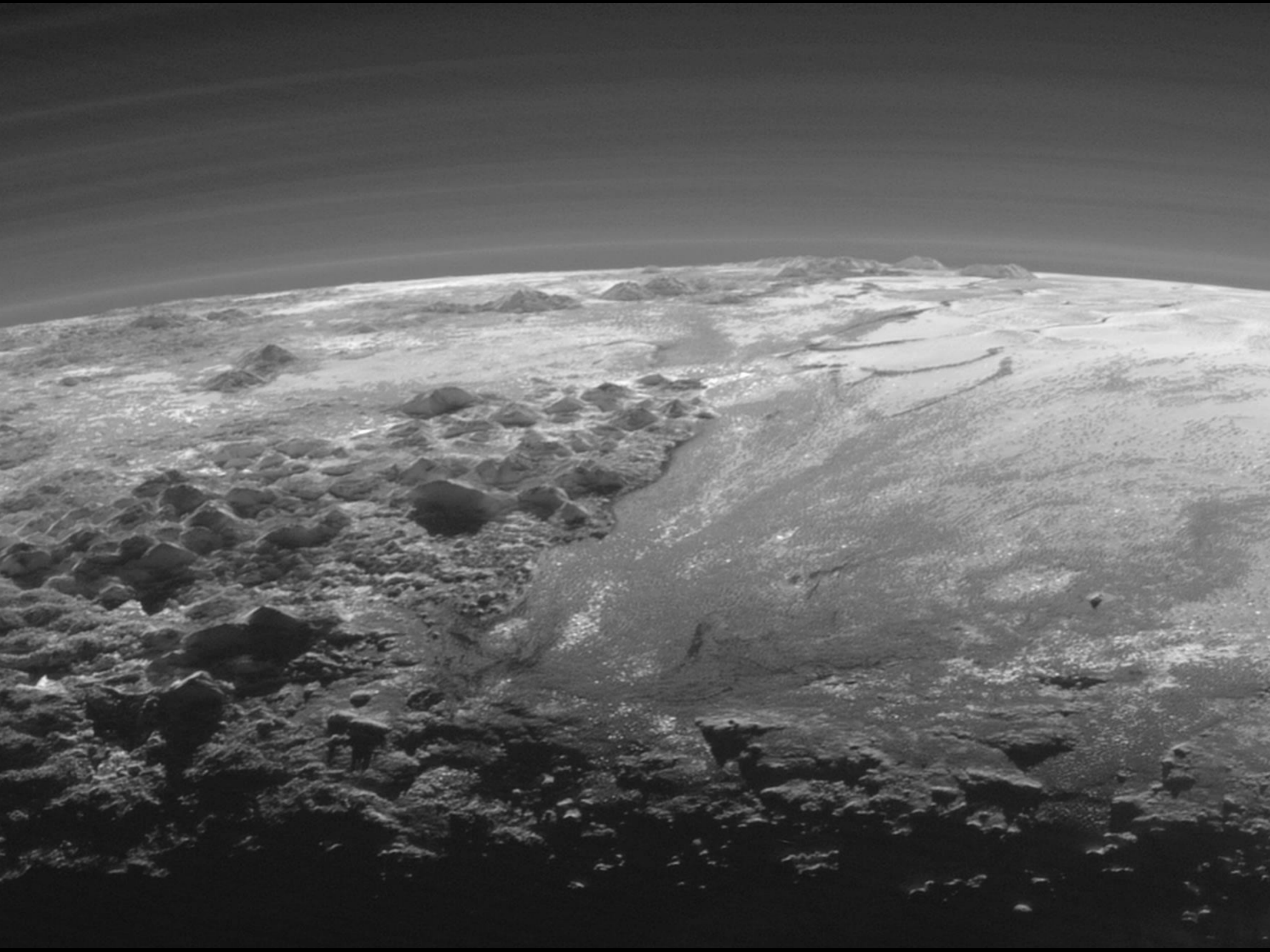


New Horizons: Pluto

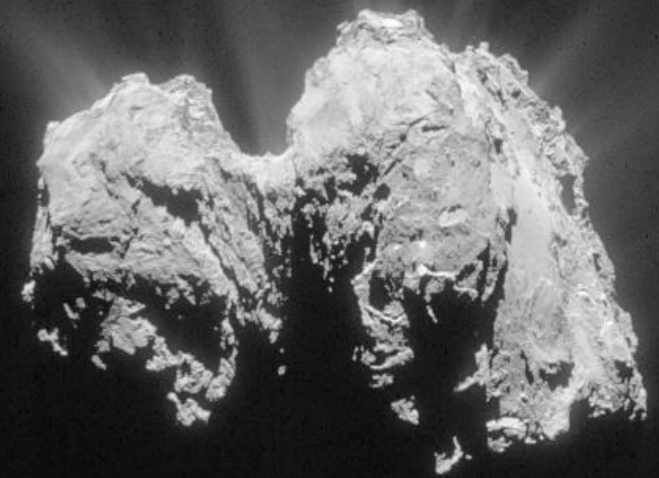


New Horizons: Pluto

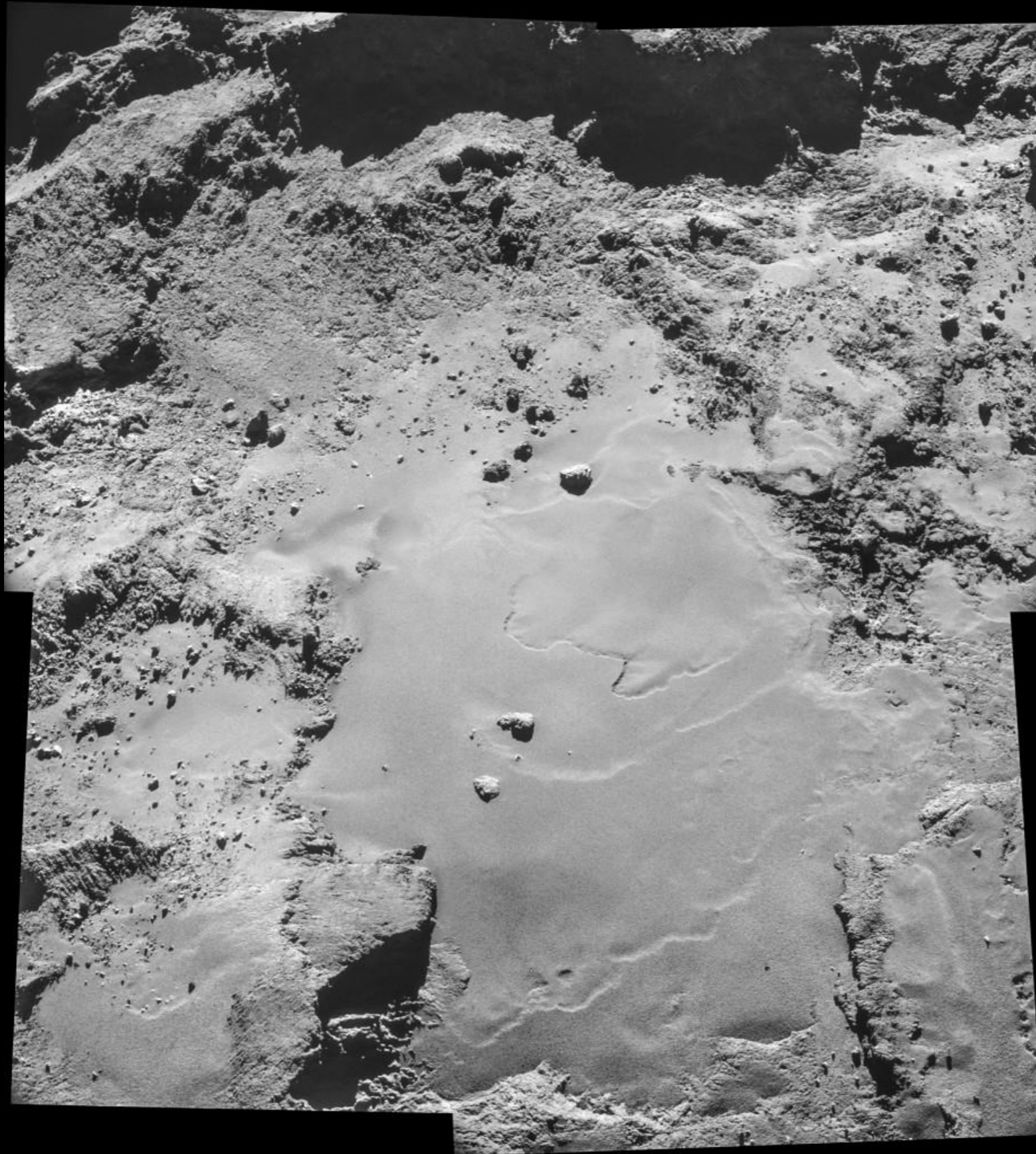




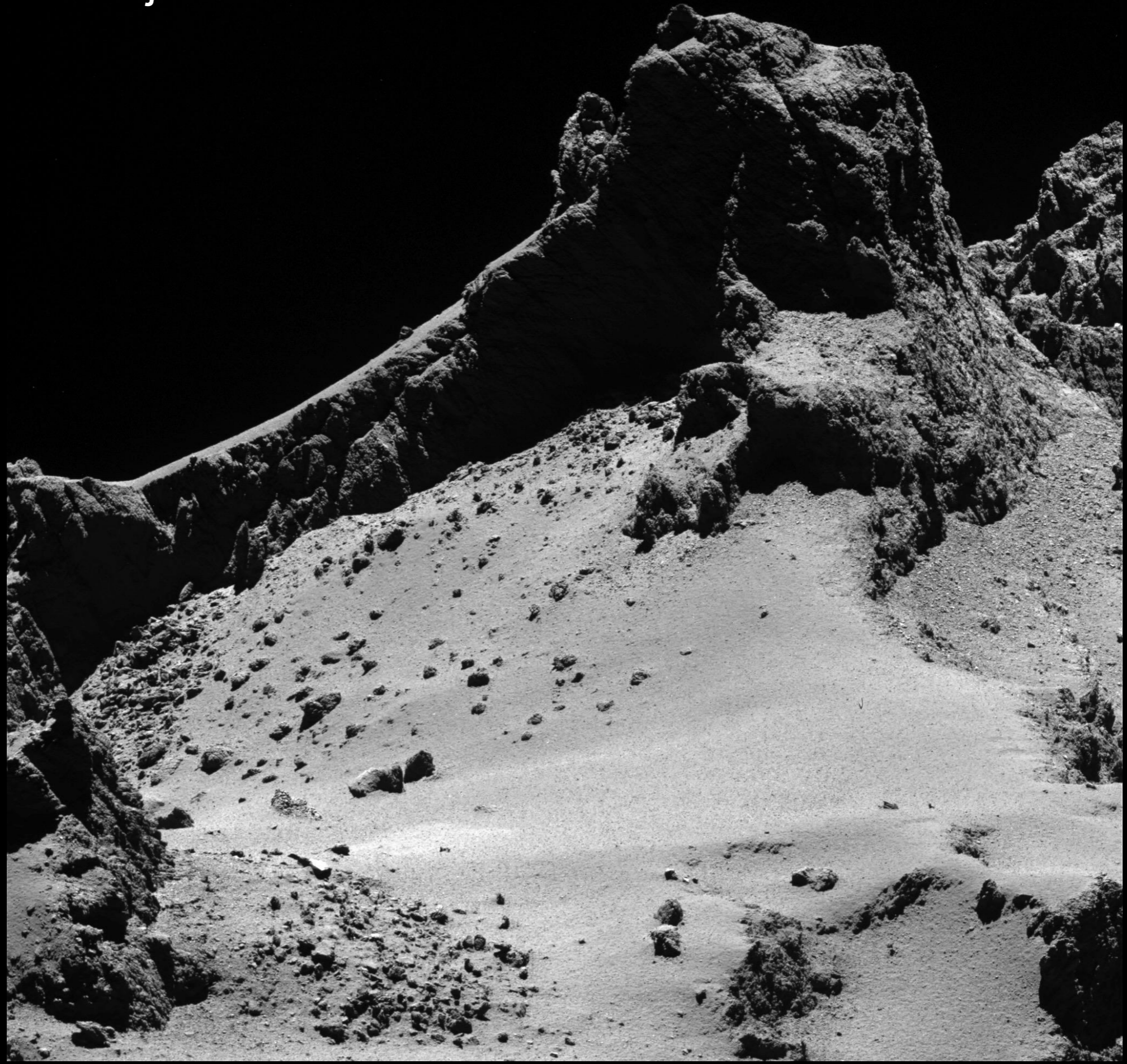
Rosetta: kometa Čurjumov-Gerasimenko



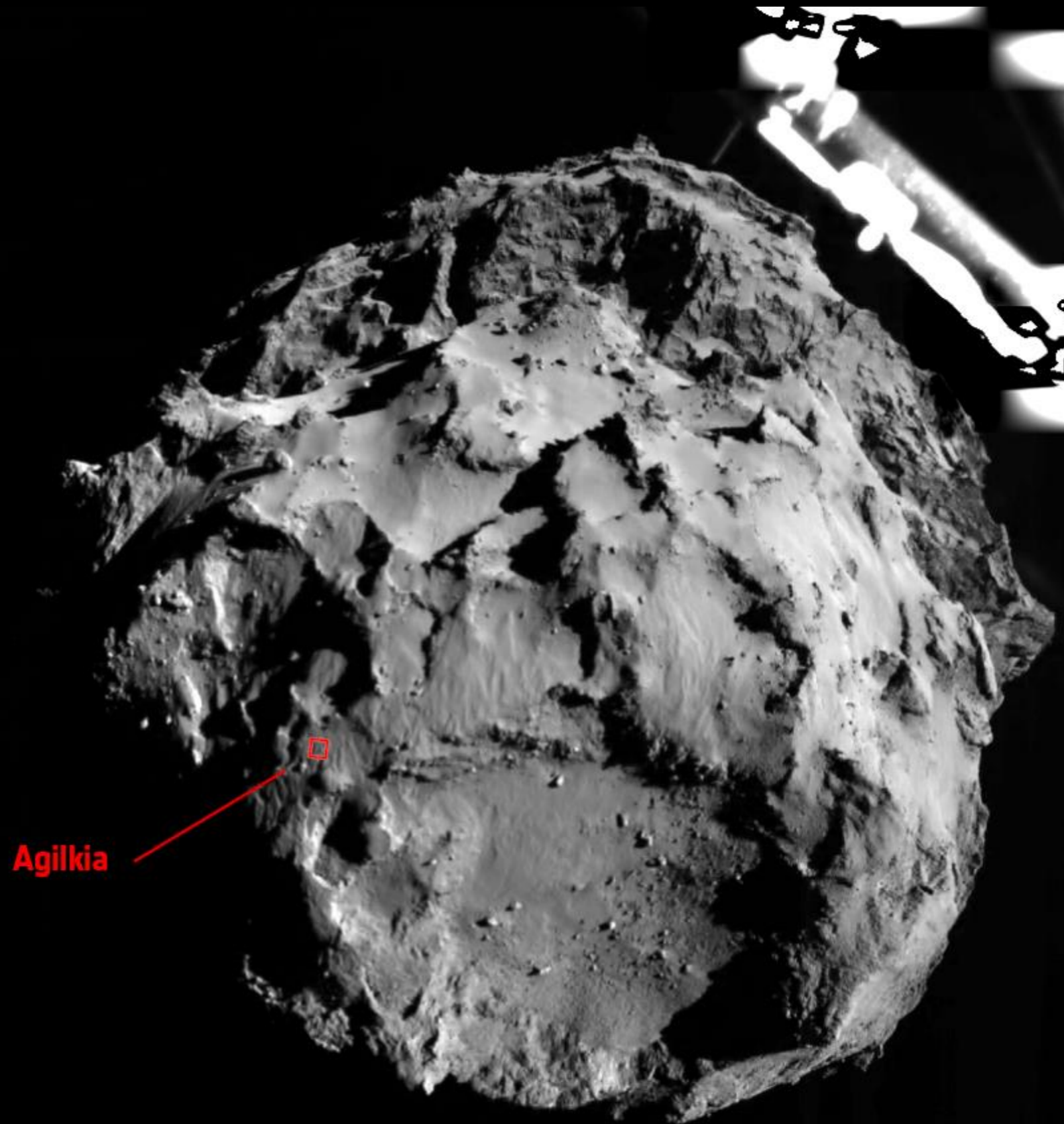
Rosetta: kometa Čurjumov-Gerasimenko



Rosetta: kometa Čurjumov-Gerasimenko



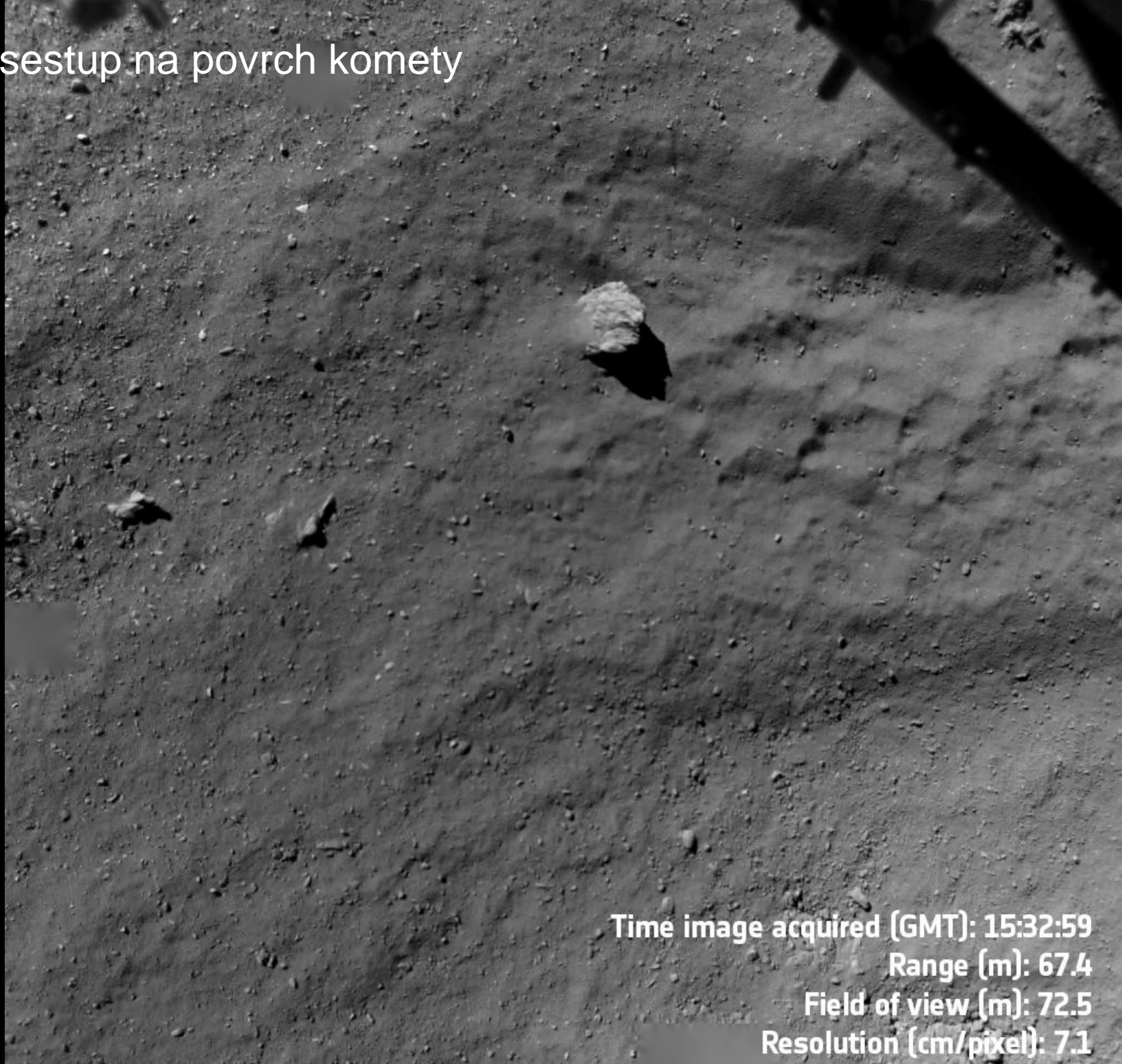
Philae - sestup na povrch komety



Agilkia

Time image acquired (GMT): 14:38:53
Range (km): 3.1

Philae - sestup na povrch komety



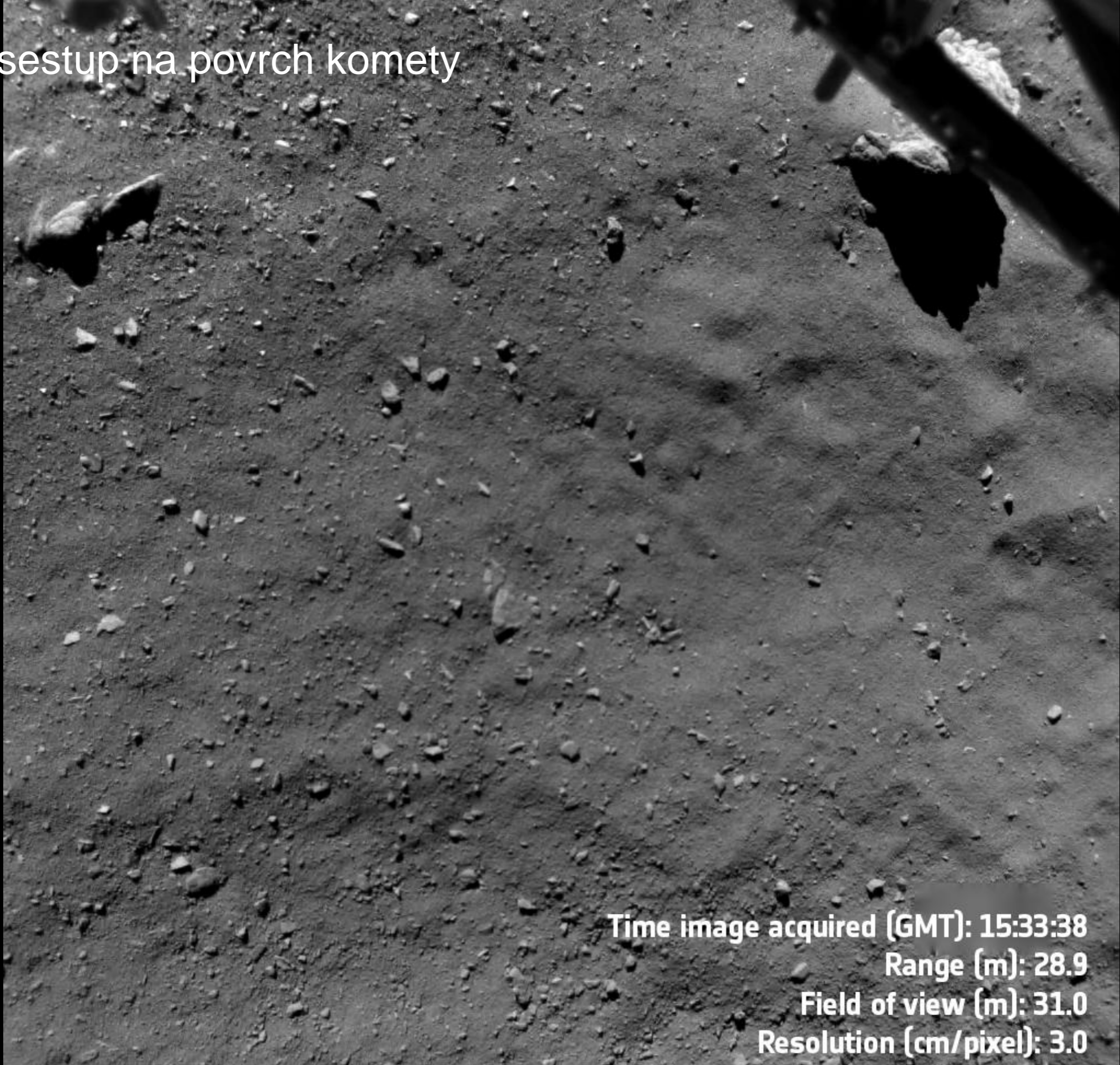
Time image acquired (GMT): 15:32:59

Range (m): 67.4

Field of view (m): 72.5

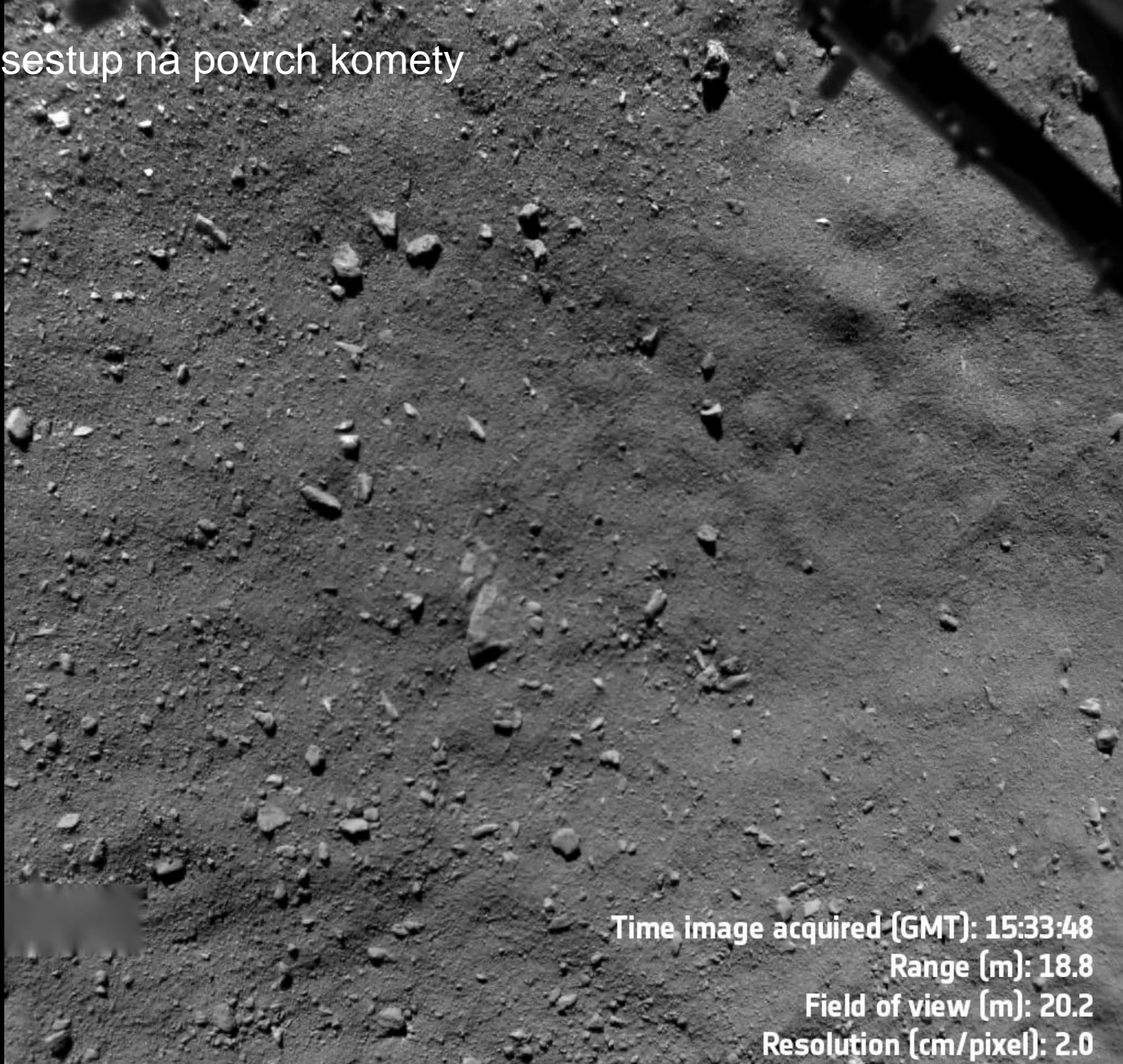
Resolution (cm/pixel): 7.1

Philae - sestup na povrch komety



Time image acquired (GMT): 15:33:38
Range (m): 28.9
Field of view (m): 31.0
Resolution (cm/pixel): 3.0

Philae - sestup na povrch komety



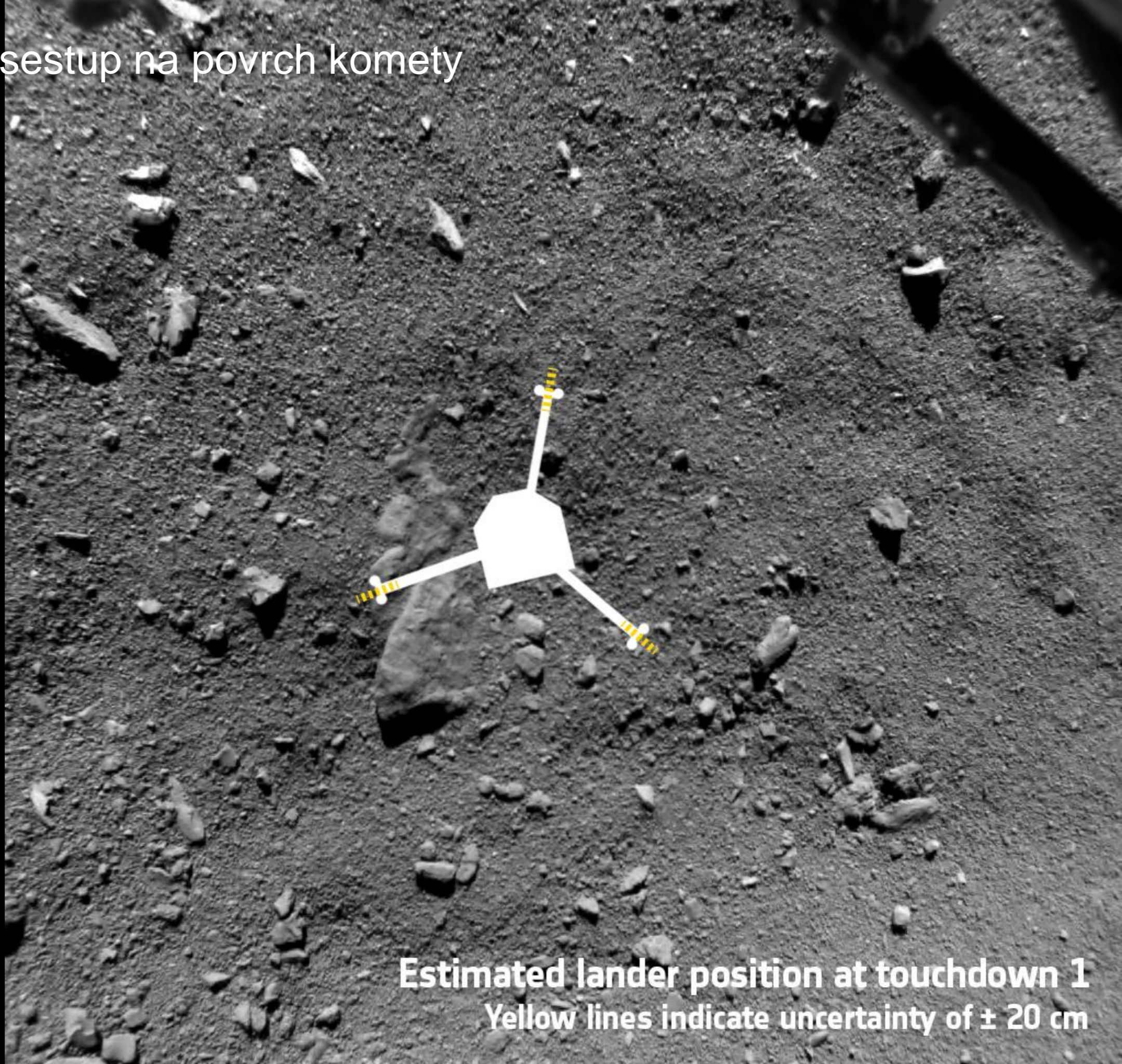
Time image acquired (GMT): 15:33:48

Range (m): 18.8

Field of view (m): 20.2

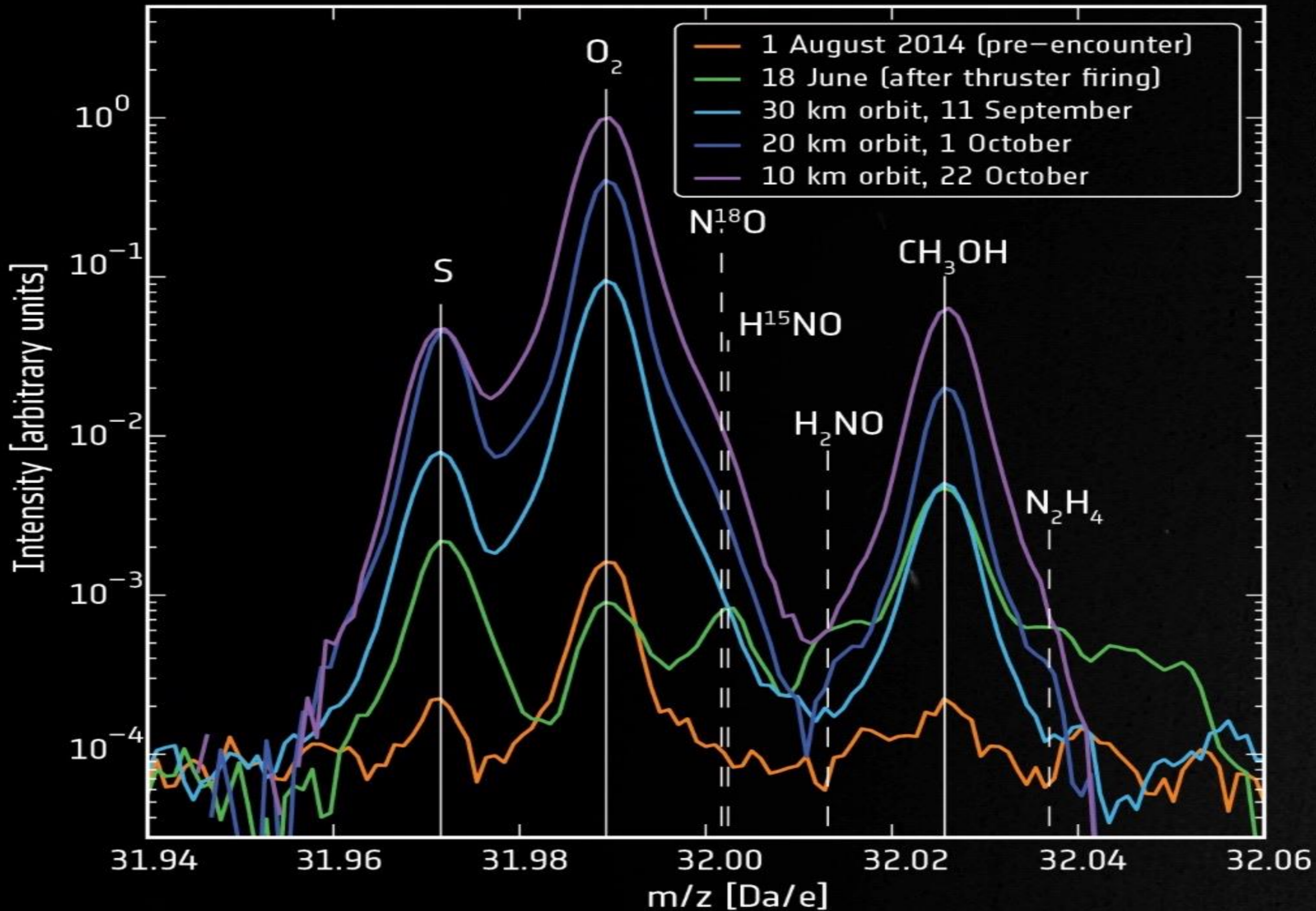
Resolution (cm/pixel): 2.0

Philae - sestup na povrch komety

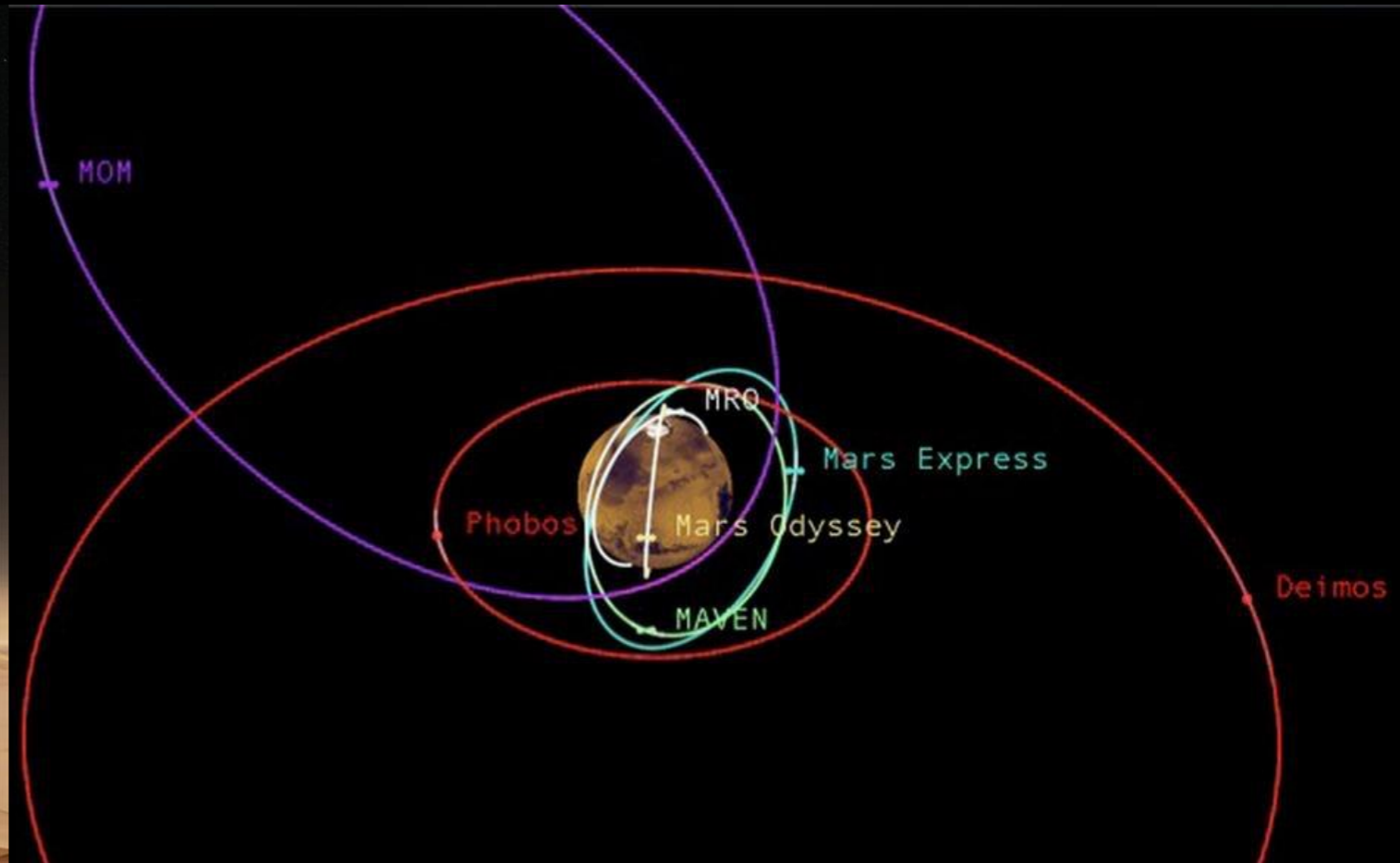


Estimated lander position at touchdown 1
Yellow lines indicate uncertainty of ± 20 cm

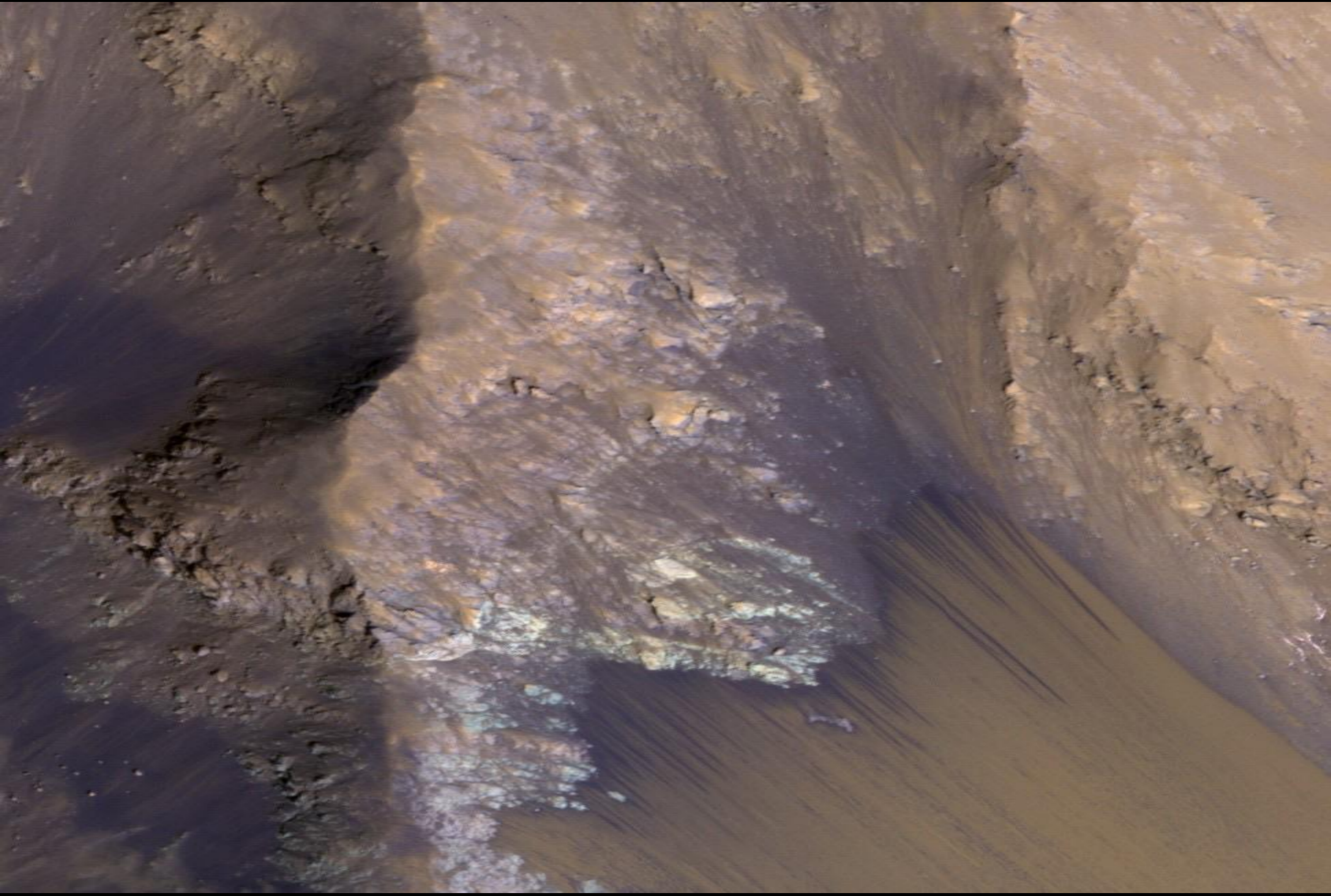
Molekulární kyslík O₂



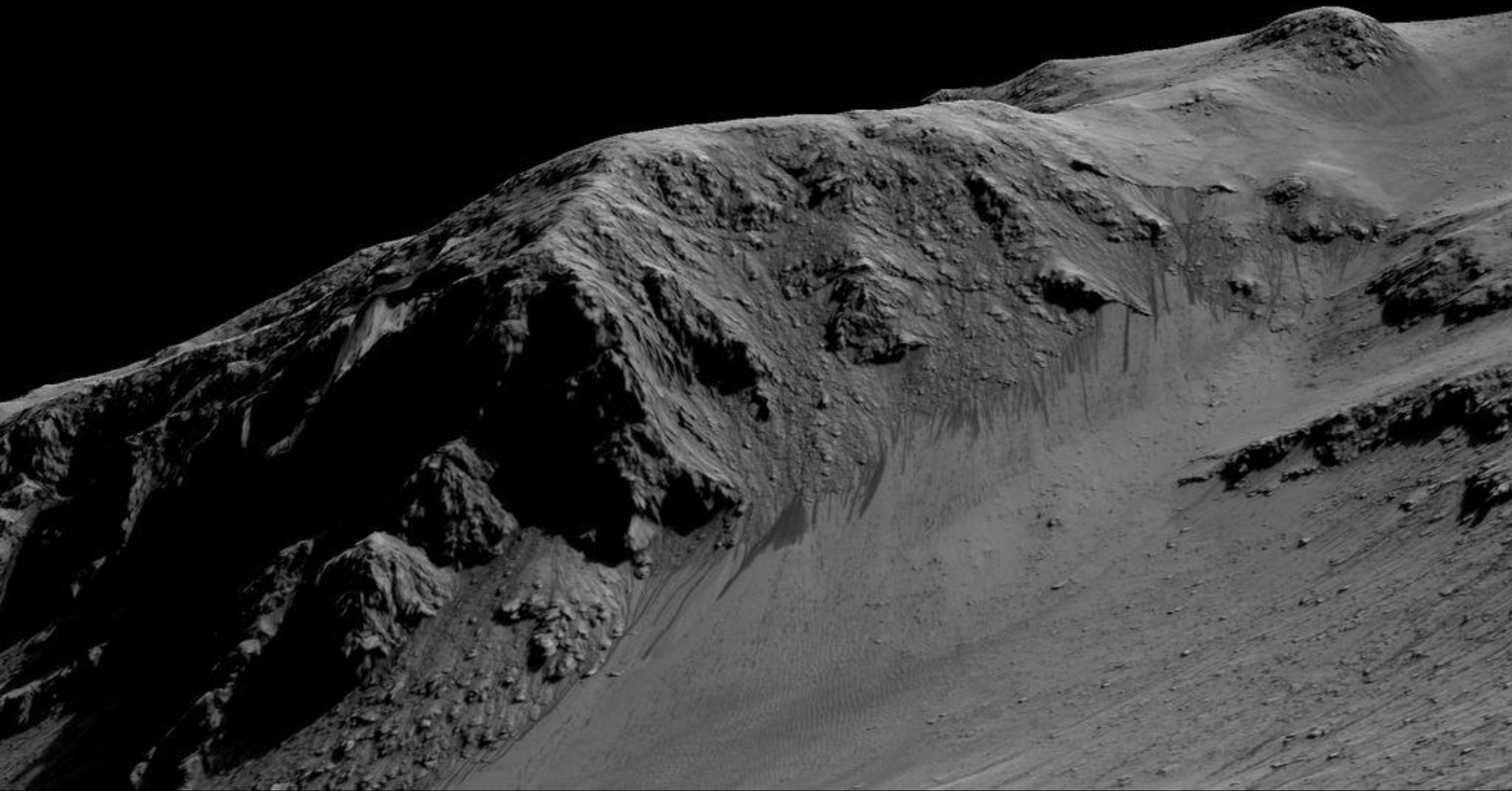
Průzkum Marsu



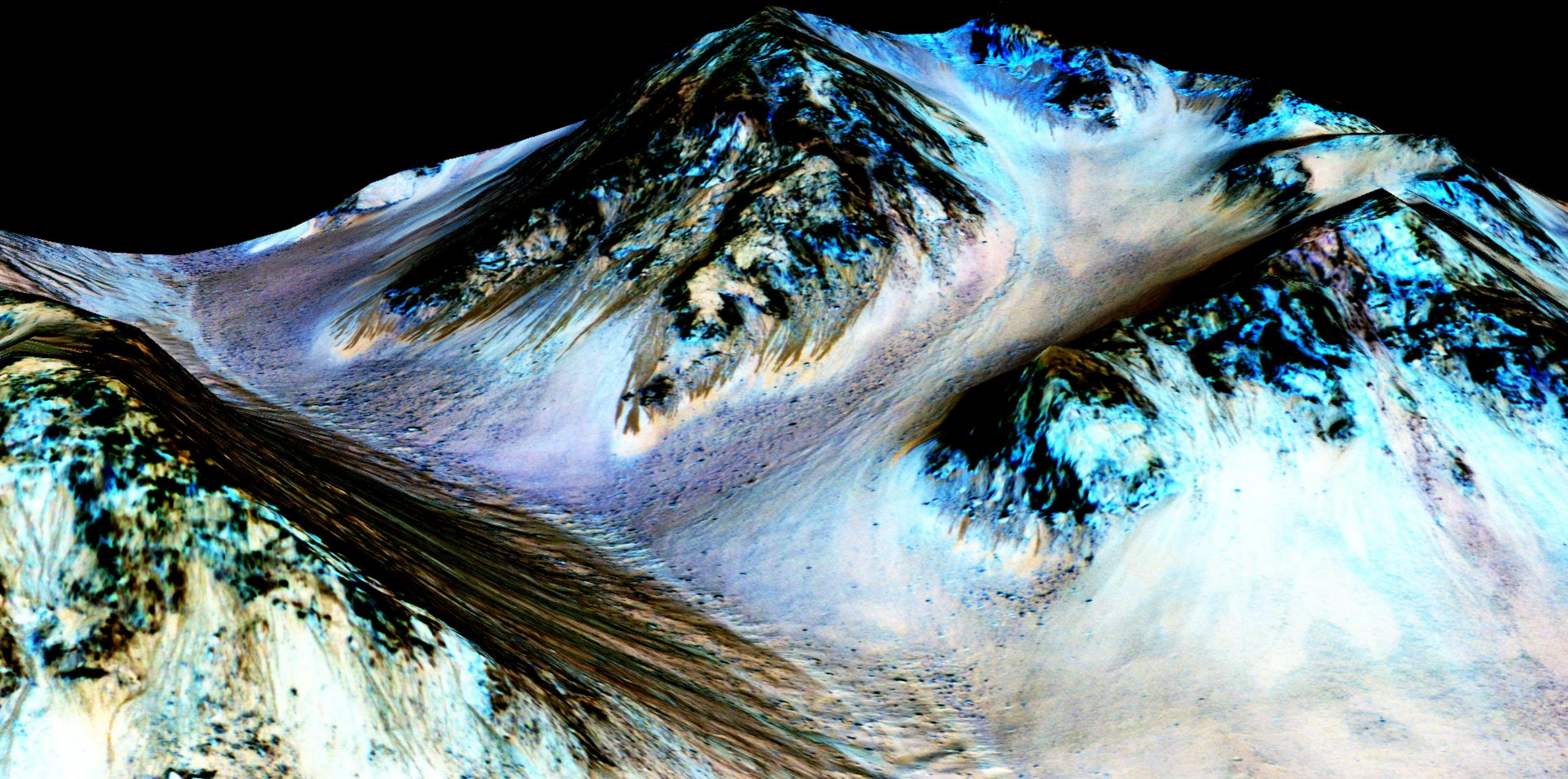
Voda na Marsu



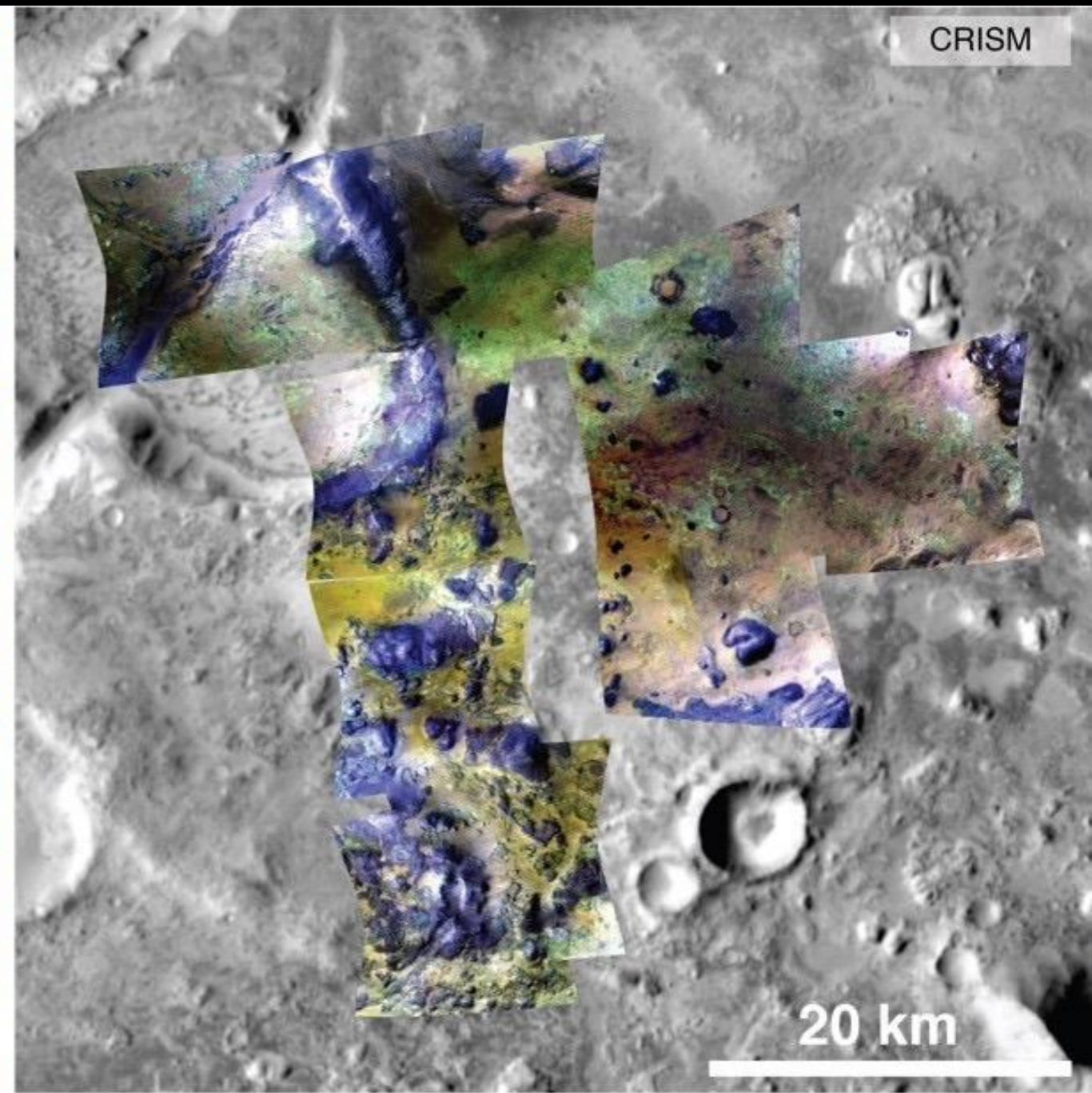
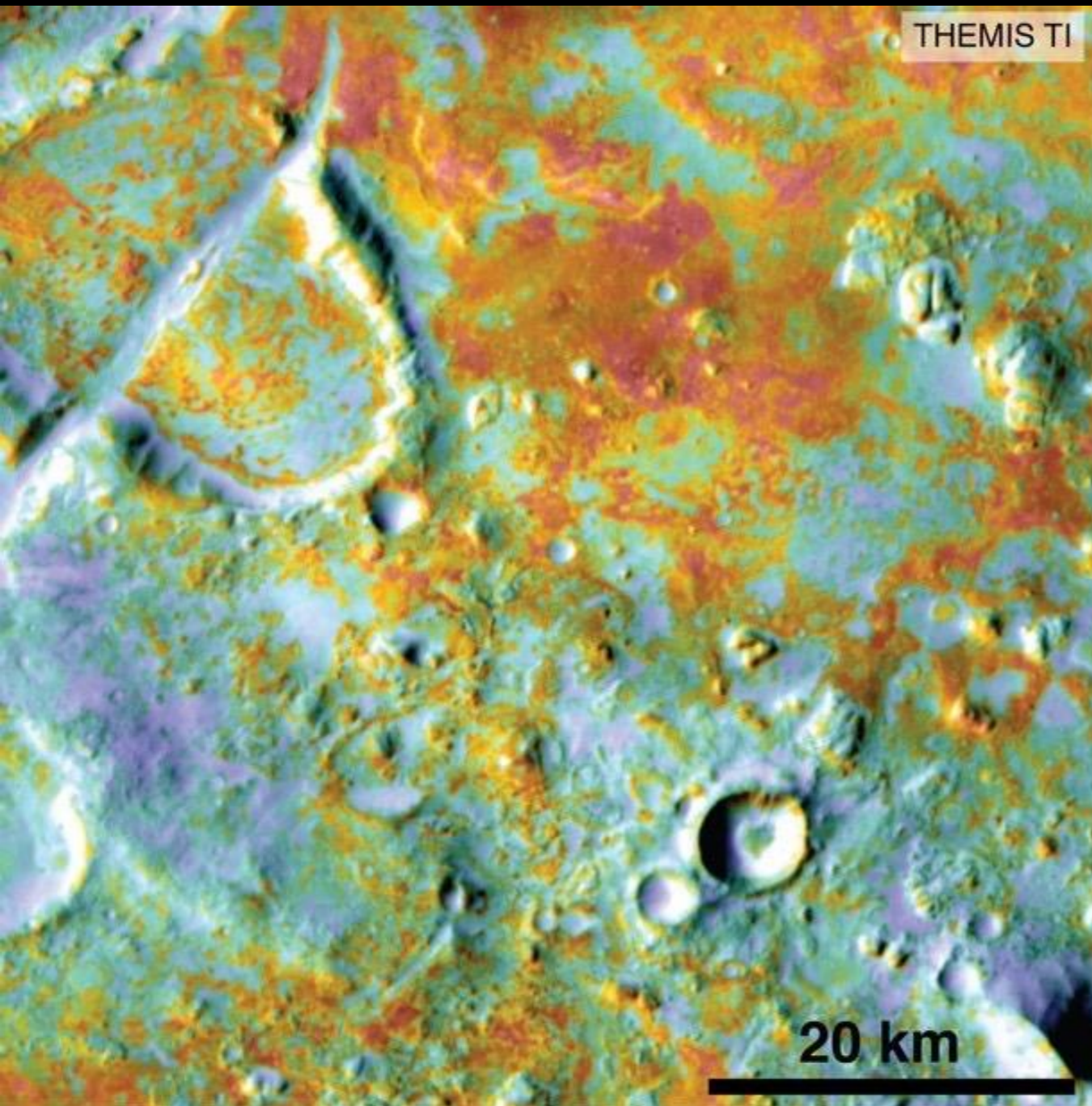
Voda na Marsu



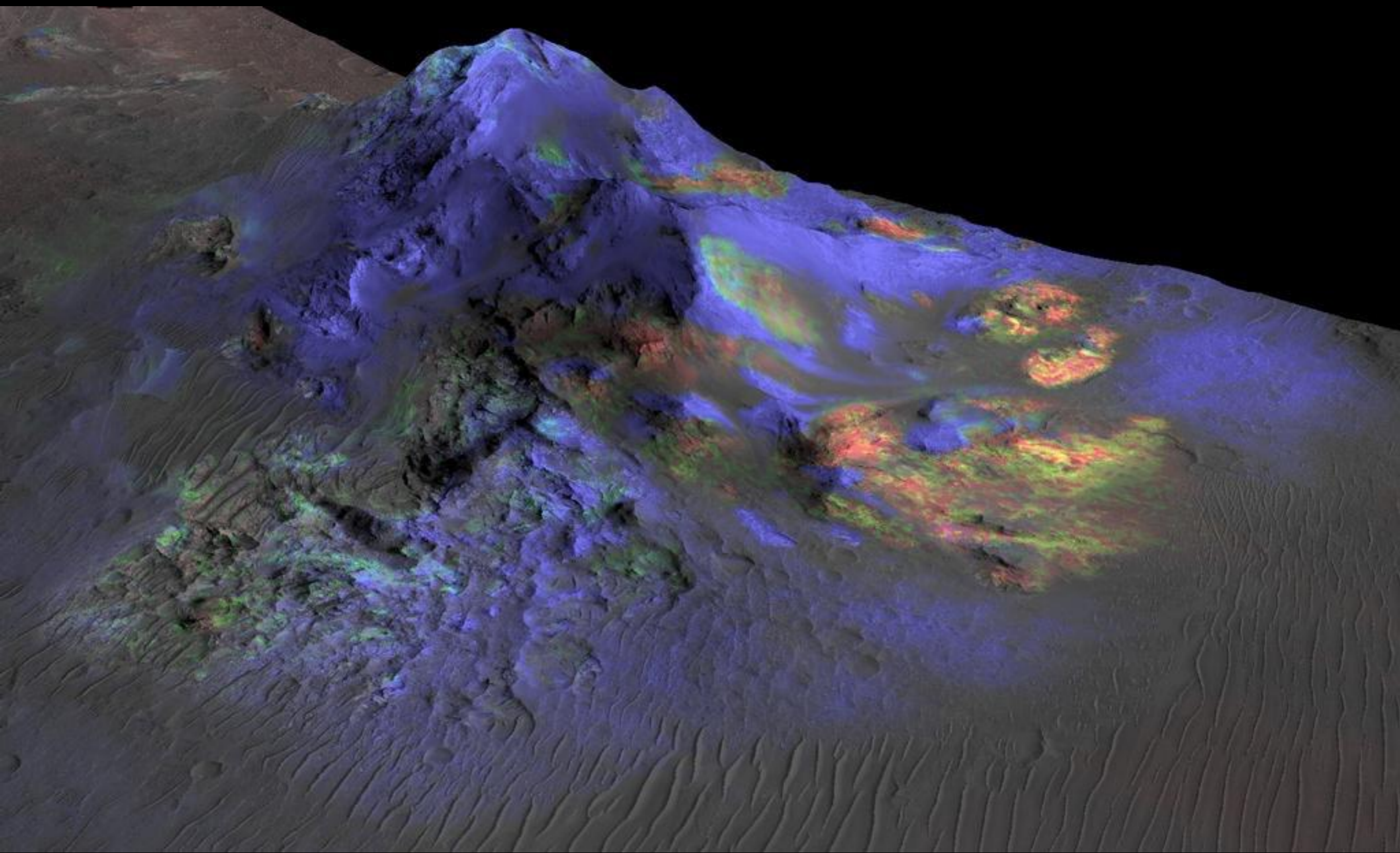
Voda na Marsu



Uhlík na Marsu



Impaktní sklo na Marsu



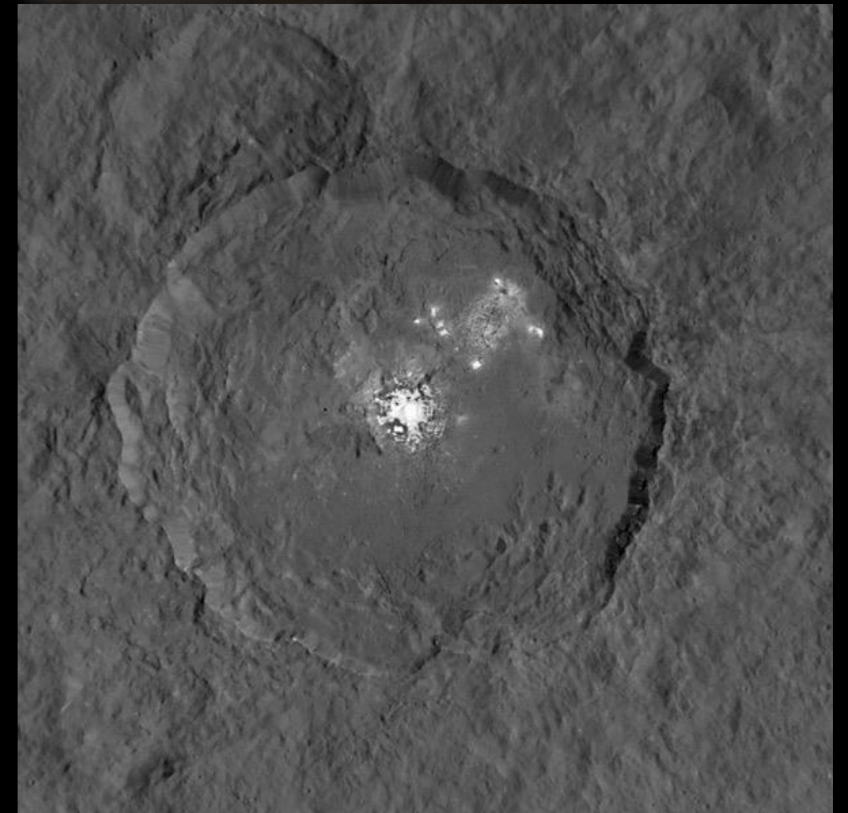
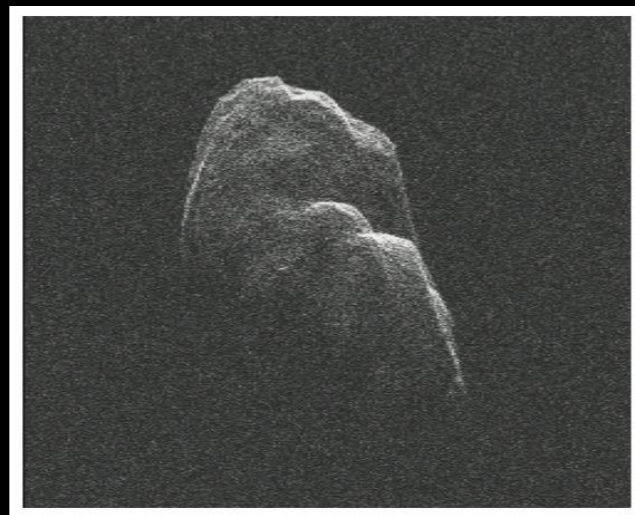
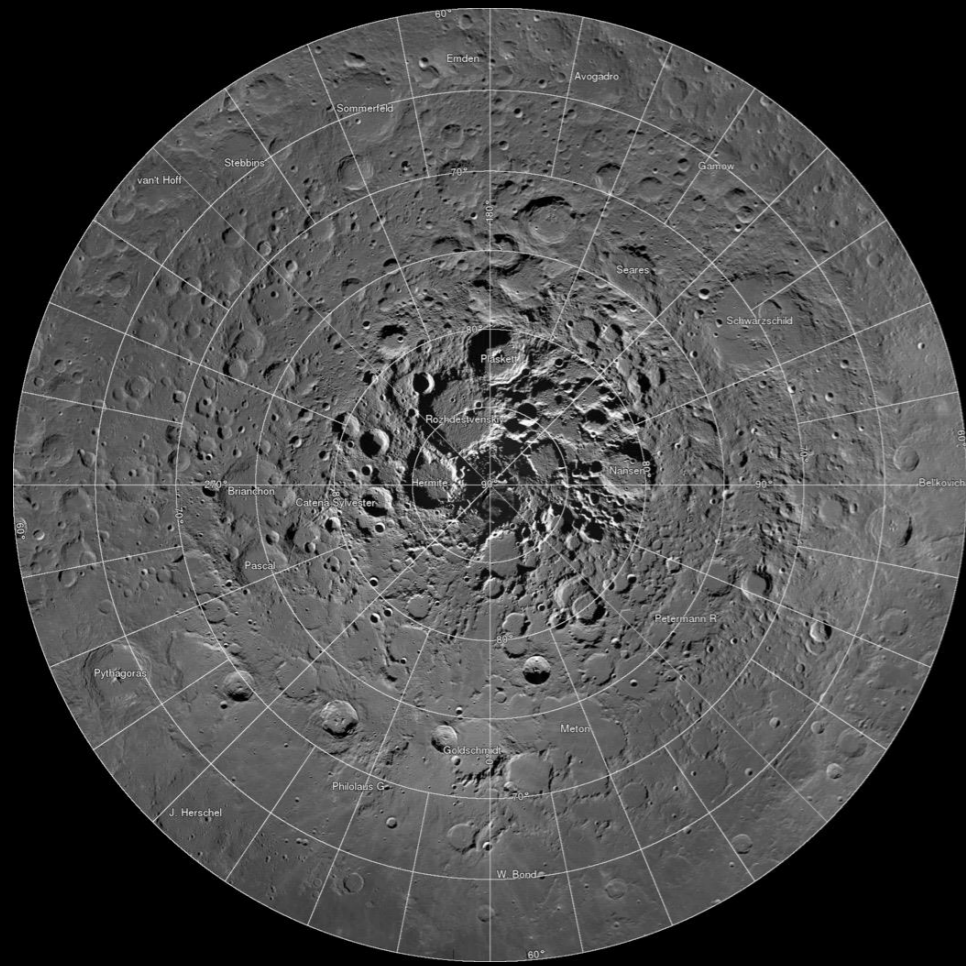
Curiosity: kráter Gale



Curiosity: kráter Gale



Další objekty sluneční soustavy



Sluneční soustava

