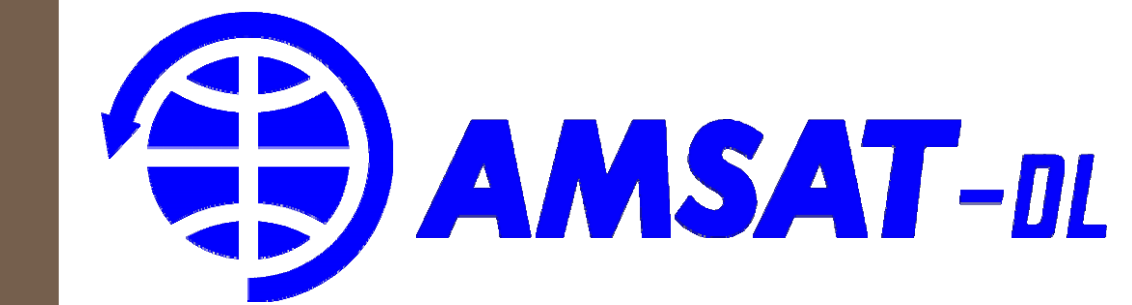
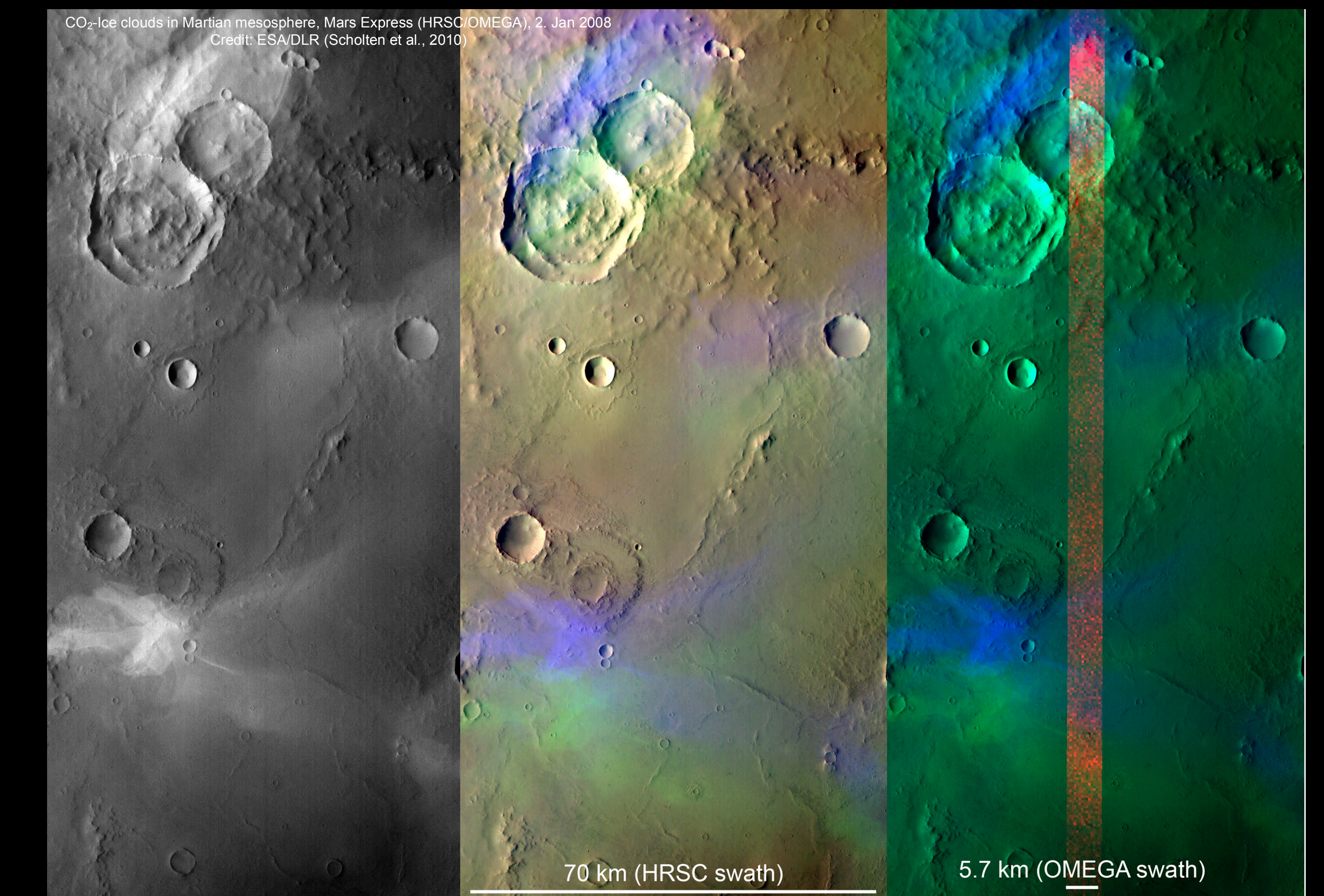
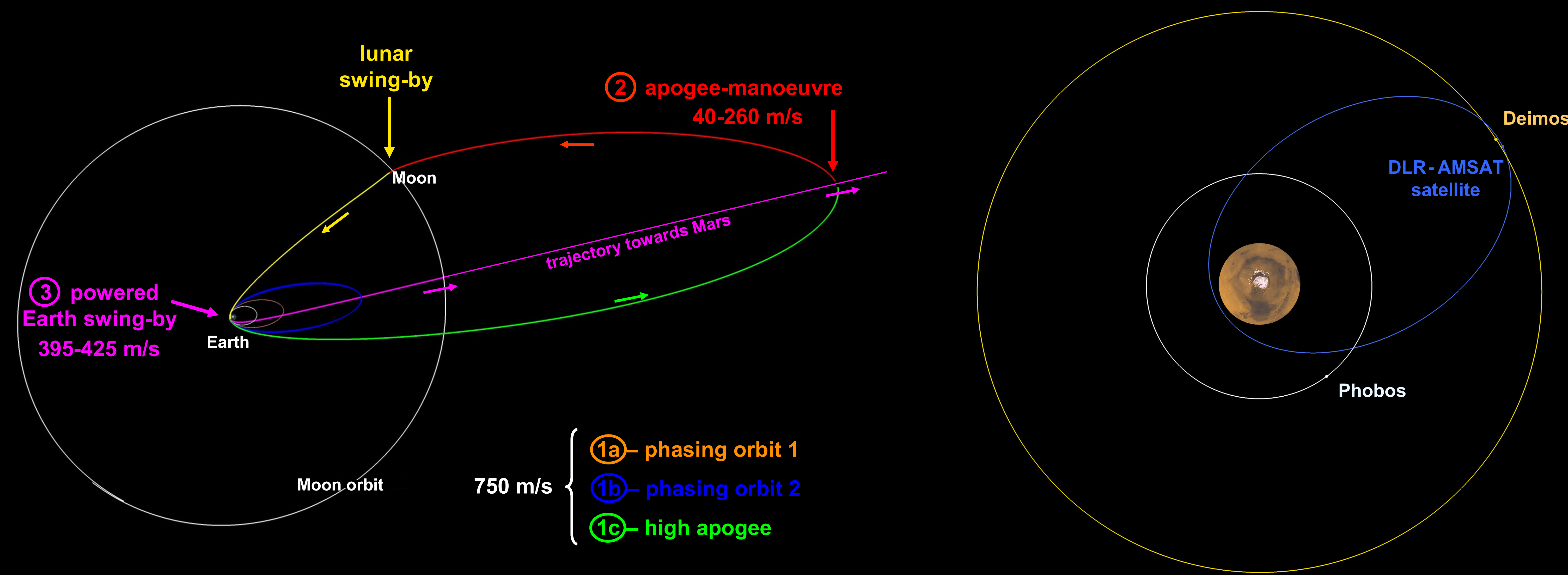
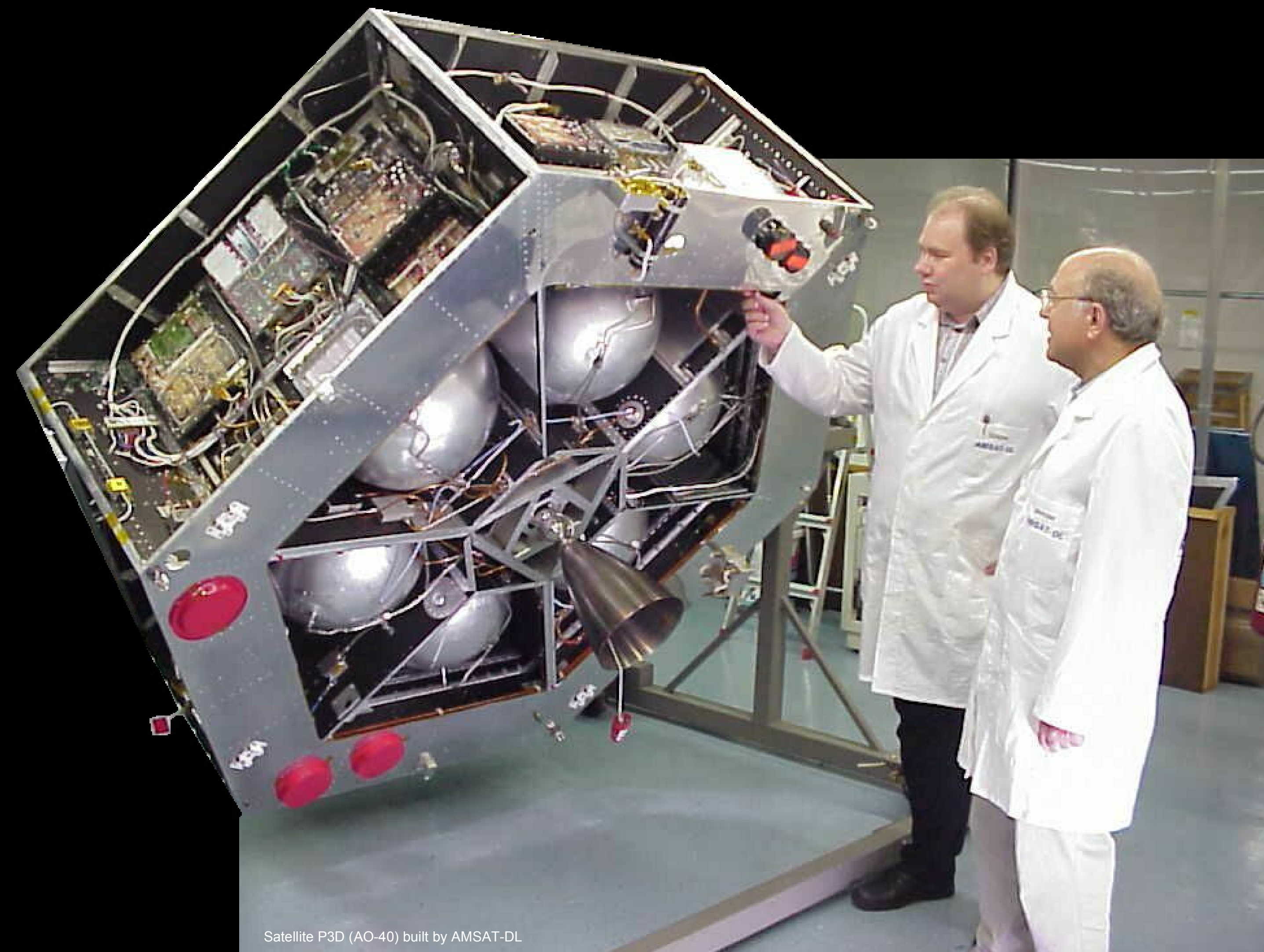


Low Cost Mission to Deimos

38th COSPAR B02-0041-10
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Successful cooperation between a private association (AMSAT-DL) and DLR



Cost

- + Non-industrial satellite concept
- + Partnership between AMSAT-DL and DLR
- + Satellite built by AMSAT-DL (analogue P3D (AO-40))
- + Payload, science, launch and early operation phase by DLR

→ effective and attractive exploration venture with costs comparable to an Earth satellite mission

Trajectory

- + Piggy-Back-Launch into GTO
- + Using Moon-Earth-Gravity-Assist to allow minimum delta-v transfer for a 3 month launch window

Mars Orbit

- + Insertion into elliptical orbit around Mars with apoapsis very close to Deimos (20500 x 450 km)
- + Deimos approaches closer than 100 km with different lightning conditions
- + Phobos approaches closer than 1000 km
- + Global view onto Mars
- + Closer view on medium latitudes of Mars

Science

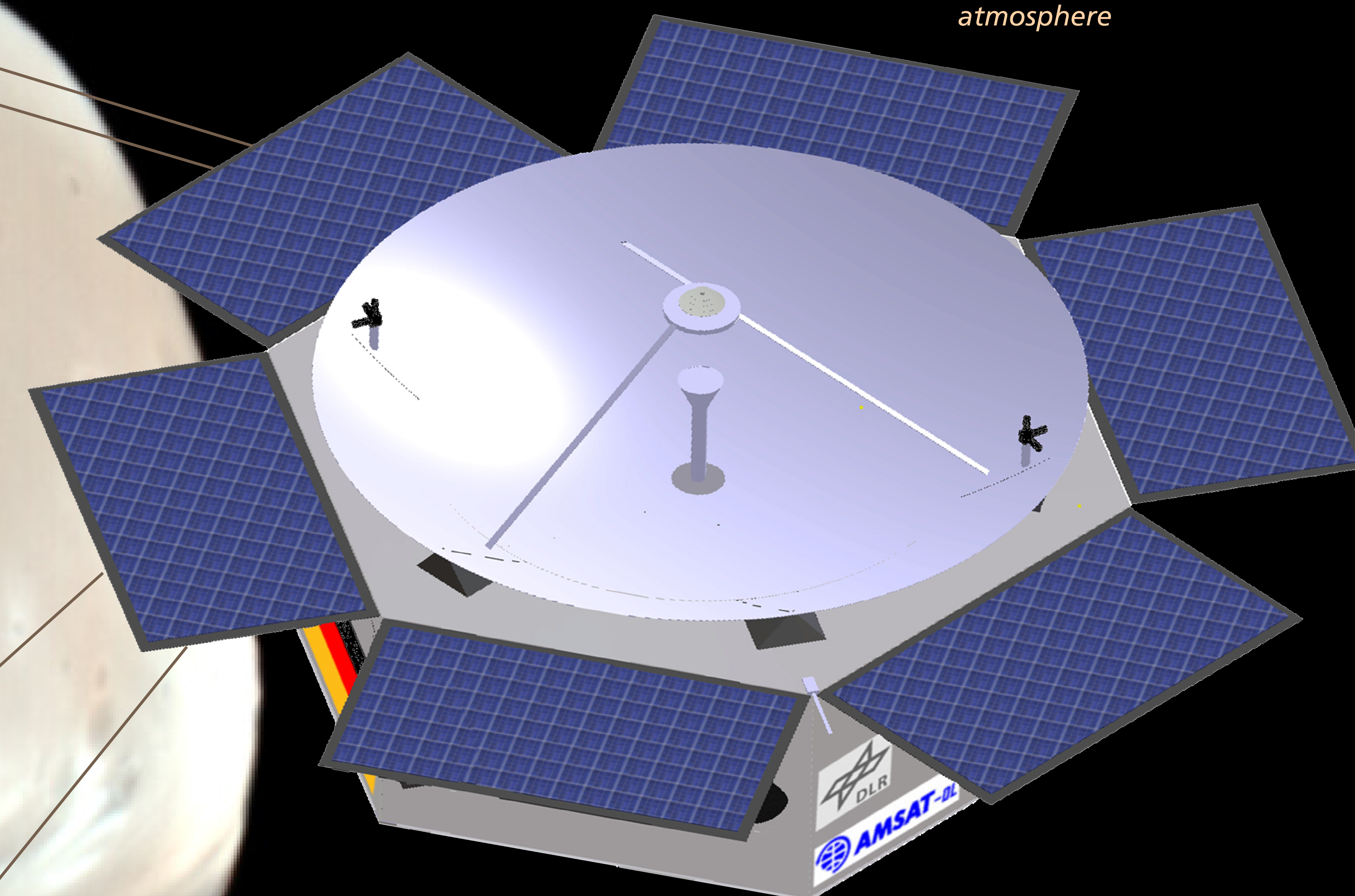
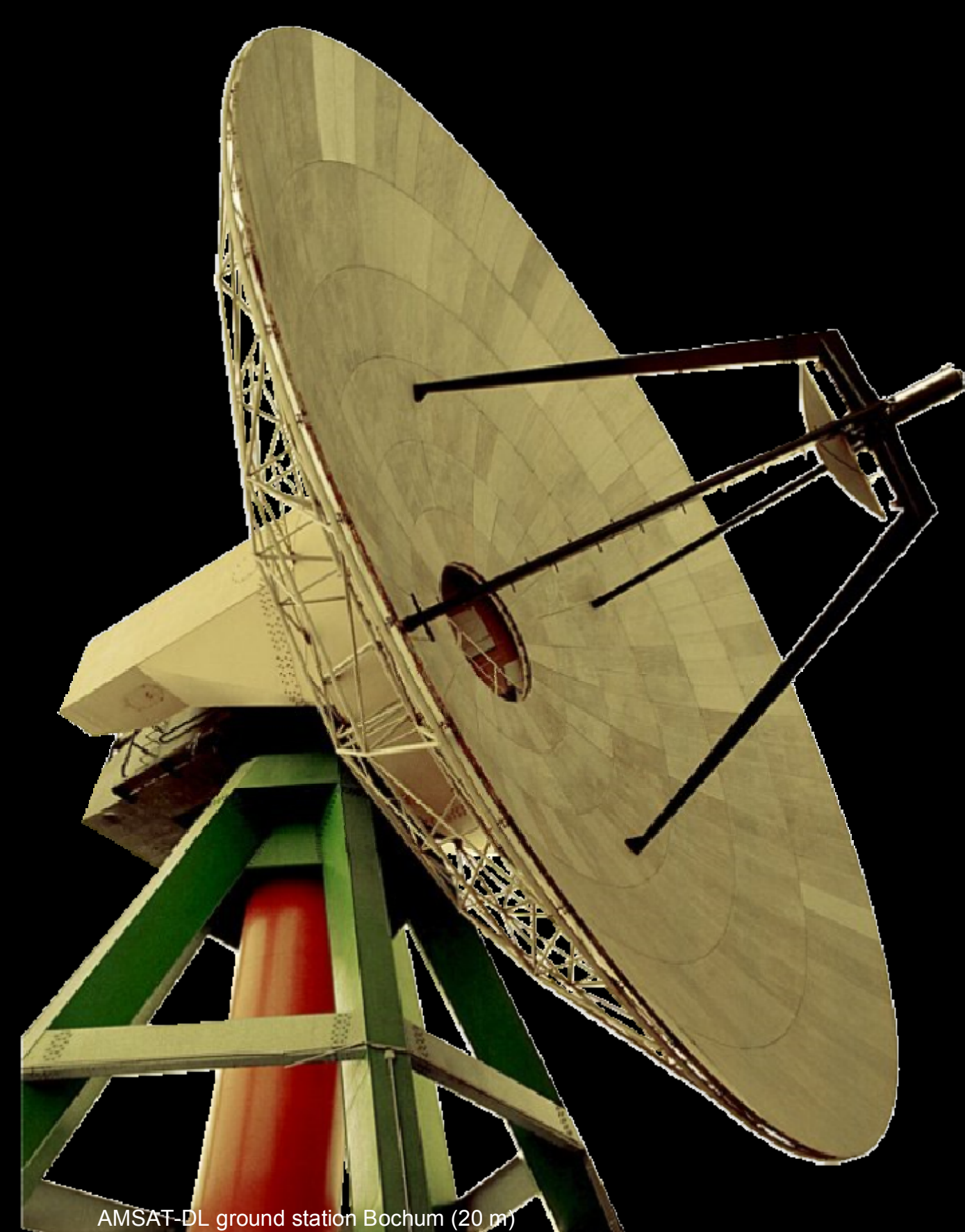
- + Research on Martian moons especially Deimos:
 - + Origin of Deimos (volume, mass, gravity, composition)
 - + Deimos evolution (morphology, topography)
 - + Preparation of future landing missions (orbital model, detailed mapping)
- + Mars clouds and atmospheric dynamics:
 - + Distribution (time, season, location, altitude and extension) of Martian clouds
 - + Development and reasons for cloud formation
 - + Structure, particle density- and temperature distribution of the Martian atmosphere

Instruments

- + OPTA: multispectral line scanner for Martian cloud investigations and Deimos (and Phobos) stereo pictures during close fly-bys
- + DFC: Deimos Framing Camera for high resolution pictures of Deimos (and Phobos) including video mode
- + MARTIS: imaging infrared spectrometer for mineralogy of Martian (also Deimian and Phobian) silicates and surface temperature measurements
- + Radio science for research of Deimos (and Phobos) gravity, profiling of Mars ionosphere, occurrence of third meteoric ionosphere layer; sounding of neutral atmosphere; solar corona activity

Groundsegment

- + Usage of AMSAT-DL and DLR infrastructure and know-how
- + Critical mission phases (LEOP, commissioning, manoeuvres) by GSOC using Weilheim ground station
- + Routine operations by AMSAT-DL using Bochum ground station
- + Worldwide network of small ground stations by AMSAT
- + Payload operations planning by DLR MUSC



Satellite

- + Launch mass: ~ 937 kg into GTO
- + Propulsion: 400 N, 2660 m/s delta-v
- + Diameter: 2.3 m
- + Height: 1.7 m
- + Power: ~ 230 W (45° solar angle)
- + Data Rate: up to 2 Mbit/s from Mars
- + Comm.: X-, S-Band and UHF
- + Designed at Concurrent Engineering Facility (CEF) - DLR Bremen

