

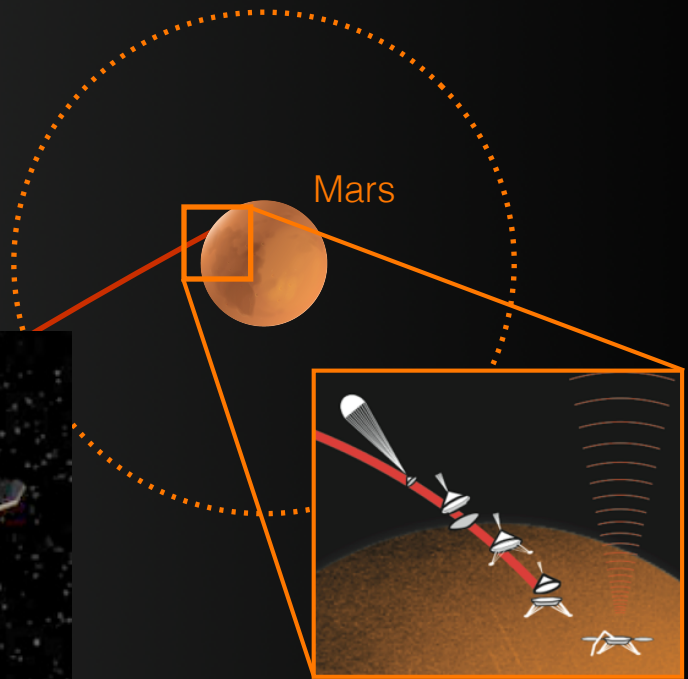
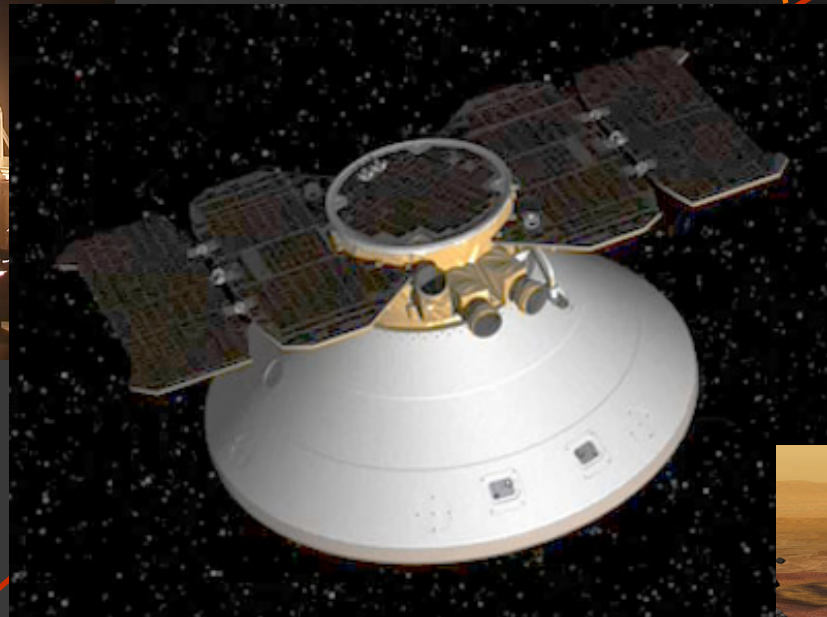
MarCO

CubeSats to Mars in ~~2016~~

2018



Jet Propulsion Laboratory
California Institute of Technology



Entry, Descent, and Landing
Nov 2018

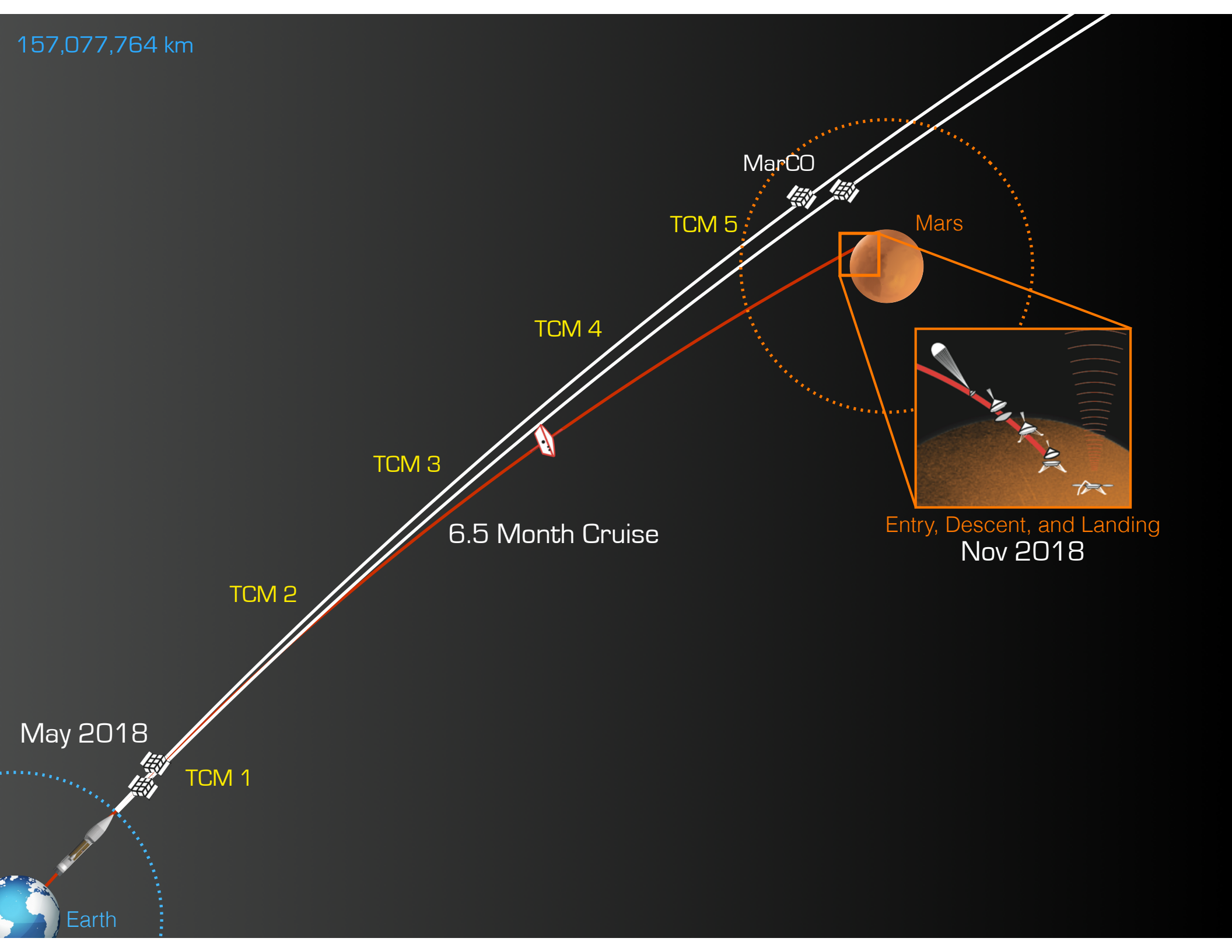


May 2018



Earth

157,077,764 km



May 2018

TCM 1

TCM 2

TCM 3

TCM 4

TCM 5

MarCO

Mars

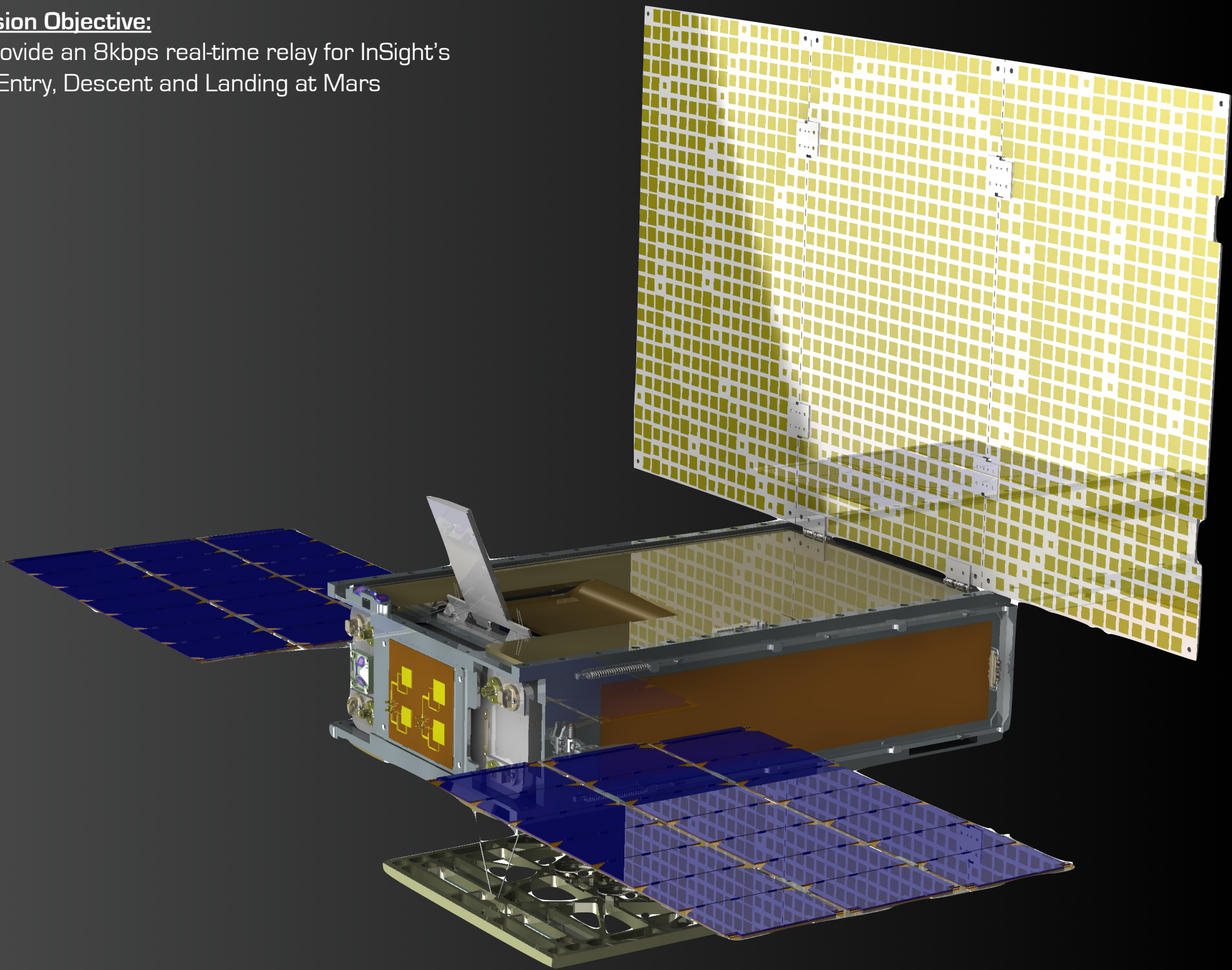
6.5 Month Cruise

Entry, Descent, and Landing
Nov 2018

Earth

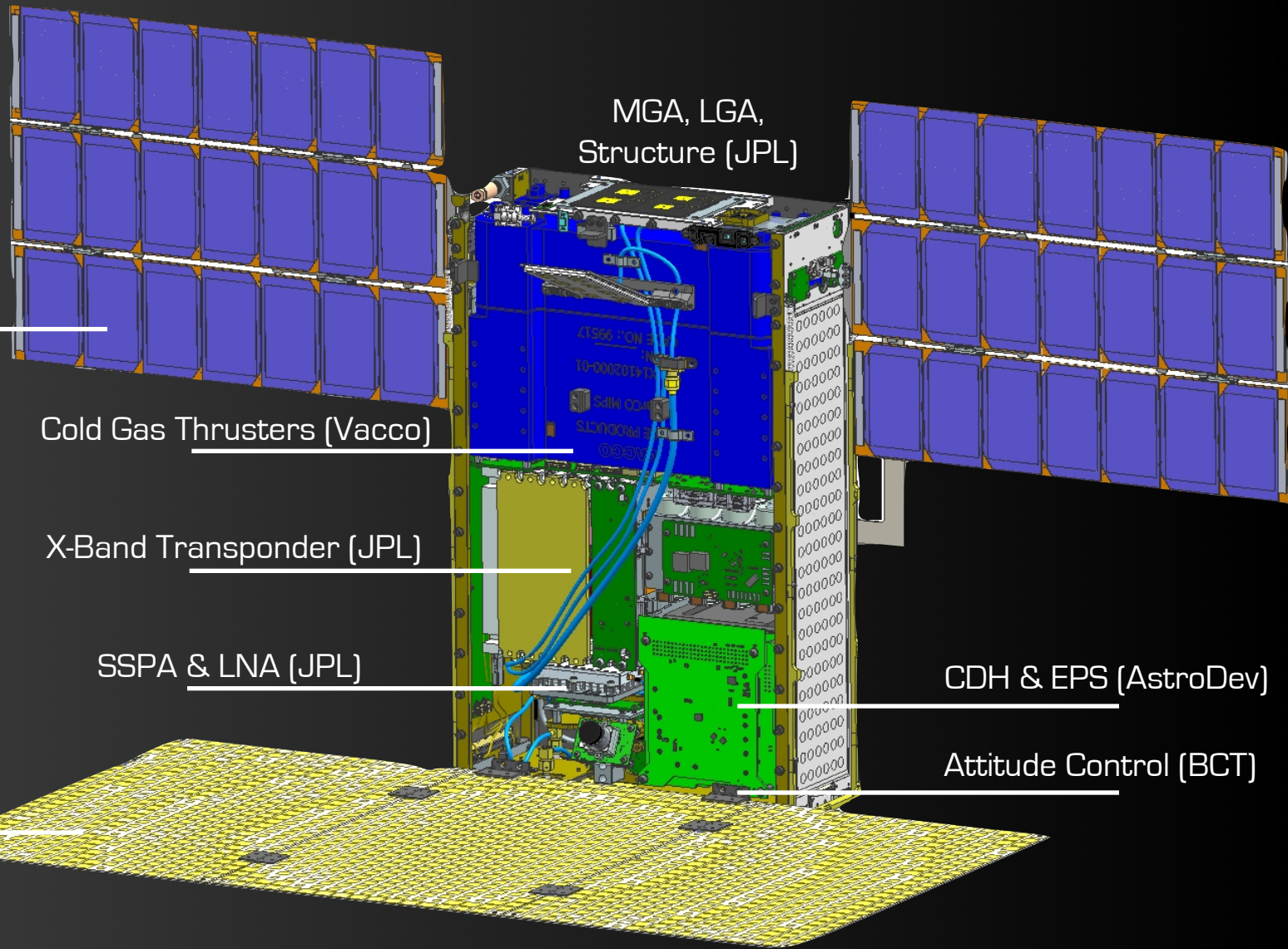
Mission Objective:

- Provide an 8kbps real-time relay for InSight's Entry, Descent and Landing at Mars



Mission Objective:

- Provide an 8kbps real-time relay for InSight's Entry, Descent and Landing at Mars



MarCO Overview:

Volume: 2 x 6U (12x24x36cm)

Mass: 14.0 kg

Power Generation:

Earth: 35 W

Data Rates: 62-8,000 bps

Delta-V: >40 m/s

Software:

FSW: protos (JPL)

GSW: AMPCS (NASA/JPL)

I&T:

In-house S/C I&T, testing,

Tyvak NLAS/Launch Integration

Operations:

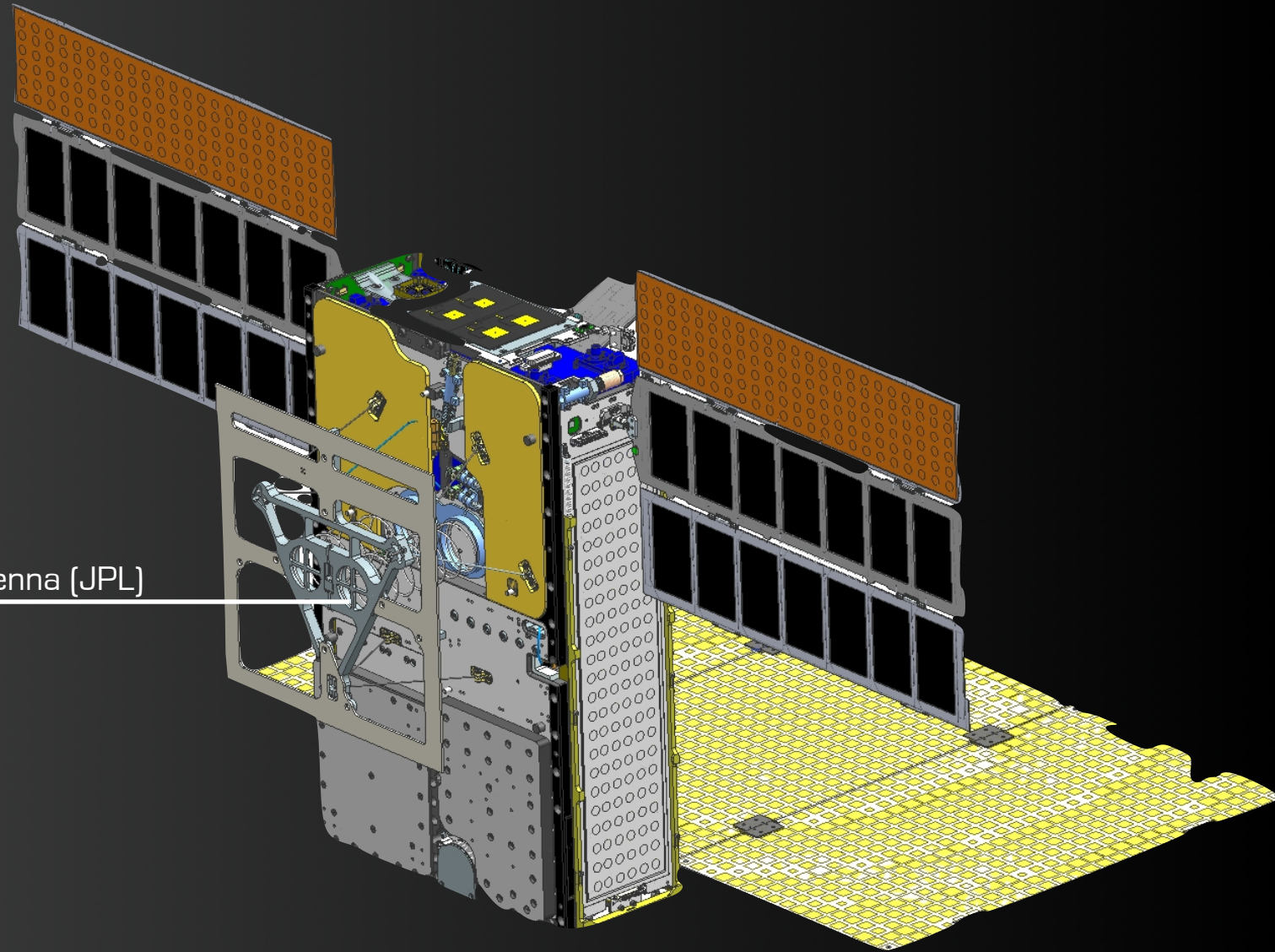
Primary: DSN 34m

EDL: Madrid 70m

Mission Objective:

- Provide an 8kbps real-time relay for InSight's Entry, Descent and Landing at Mars

UHF Antenna (JPL)



MarCO Overview:

Volume: 2 x 6U (10x10x30cm)

Mass: 14.0 kg

Power Generation:

Earth: 35 W

Data Rates: 62-8,000 bps

Delta-V: >40 m/s

Software:

FSW: protos (JPL)

GSW: AMPCS (NASA/JPL)

I&T:

In-house S/C I&T, testing,

Tyvak NLAS/Launch Integration

Operations:

Primary: DSN 34m

EDL: Madrid 70m

Mechanical Fit Check

- Includes all external flight-like hardware
- Pre-validate NLAS-II Canister fit

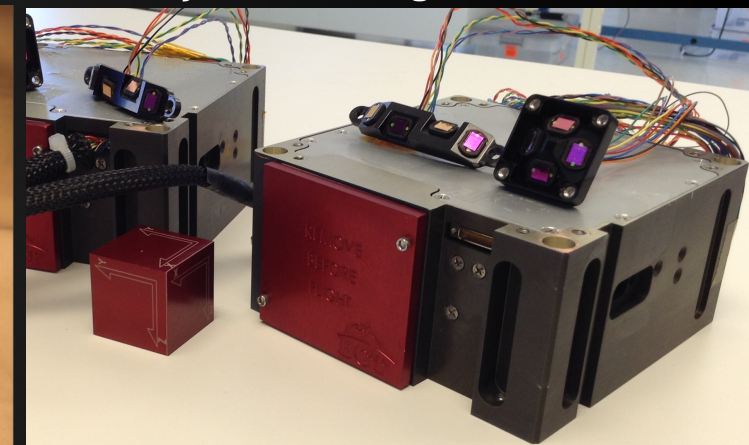
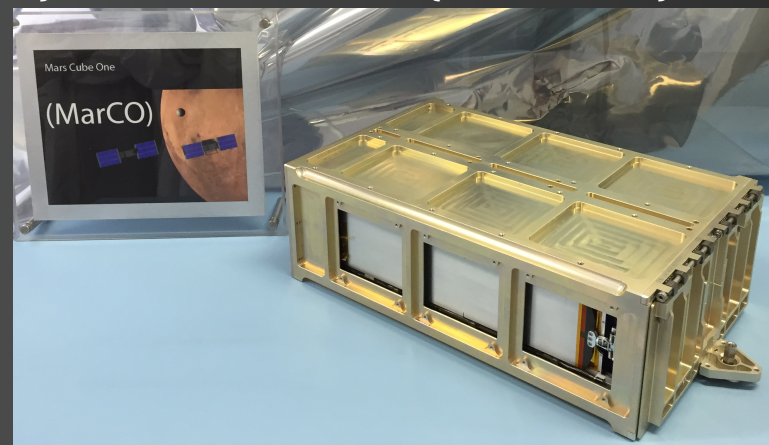
Thermal Blanket

Thermal Radiator (JPL)

Tyvak NLAS-II Canister (with MarCO)

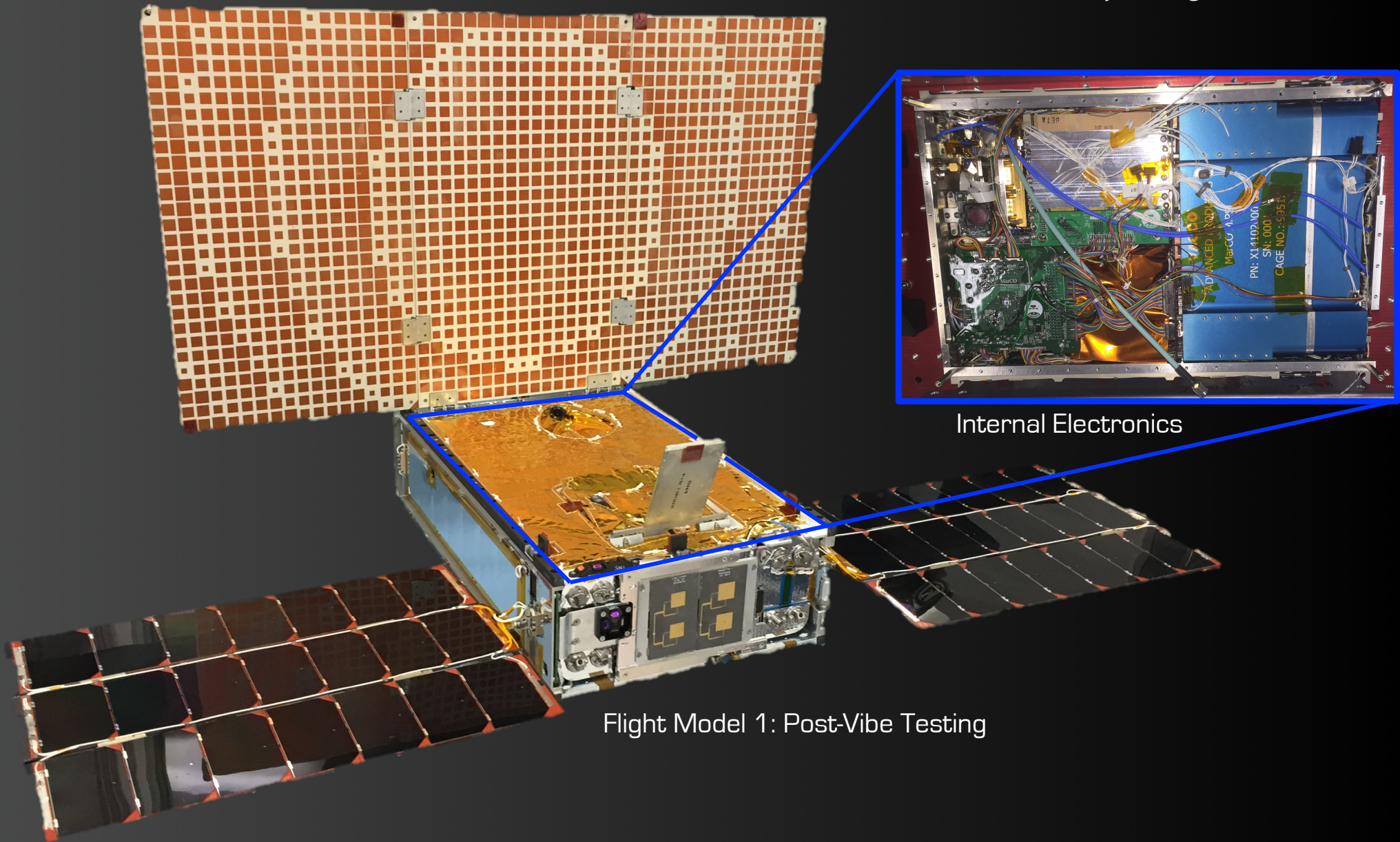
Vacoco Thrusters

Blue Canyon Technologies ADCS



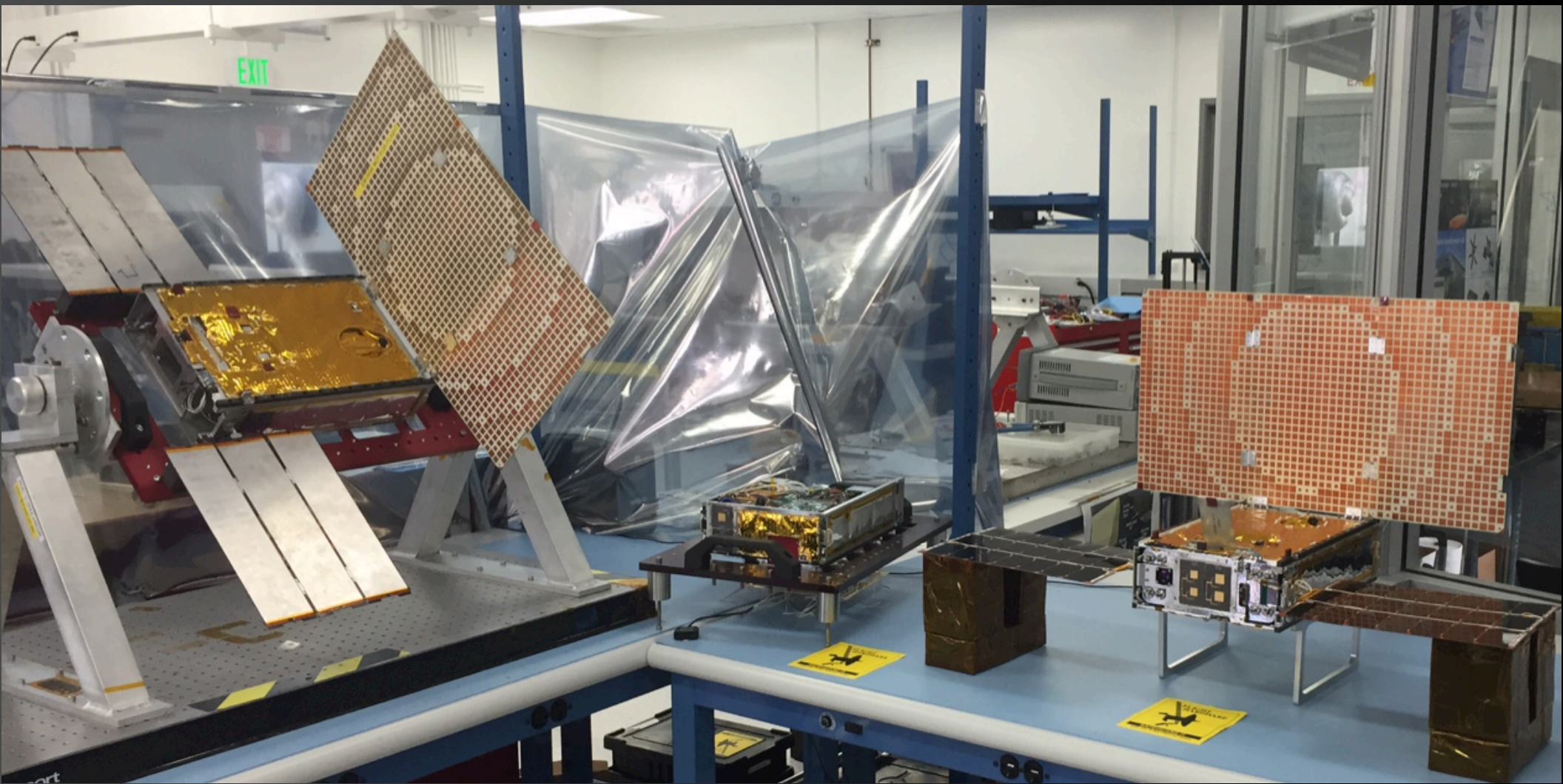
Flight Deployment Check

- Post Environmental Testing
- Ready for Flight!



Internal Electronics

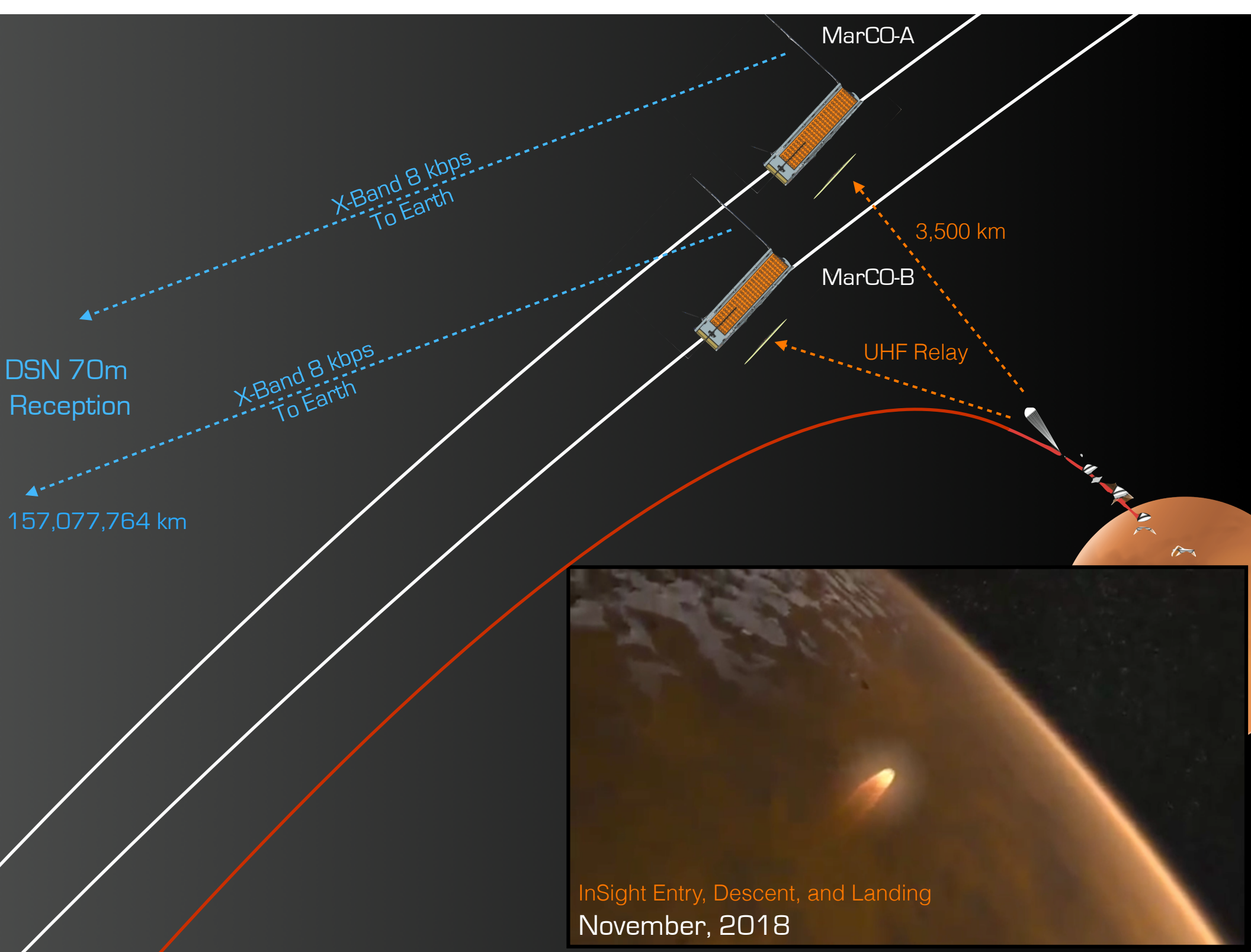
Flight Model 1: Post-Vibe Testing



Mechanical
Model

Flight Model 2
(Access Panels Open)

Flight Model 1
(Deployed)



MarCO-A

MarCO-B

X-Band 8 kbps
To Earth

X-Band 8 kbps
To Earth

3,500 km

UHF Relay

DSN 70m
Reception

157,077,764 km





CubeSats at Mars
(Now) Arriving 2018



Jet Propulsion Laboratory
California Institute of Technology