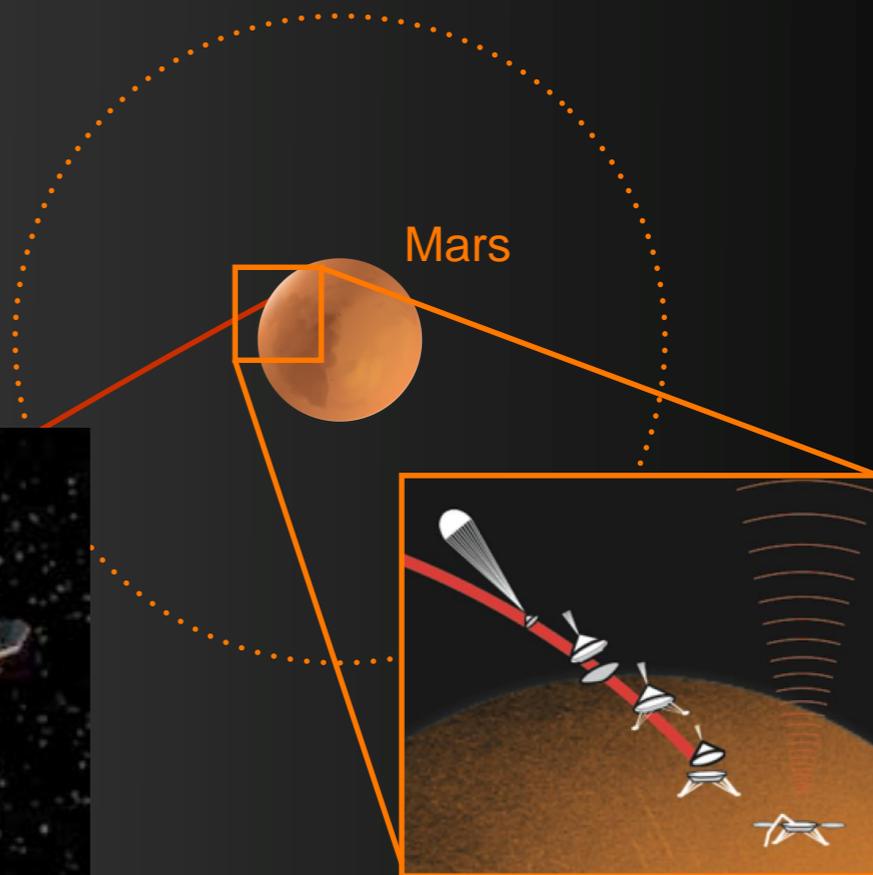
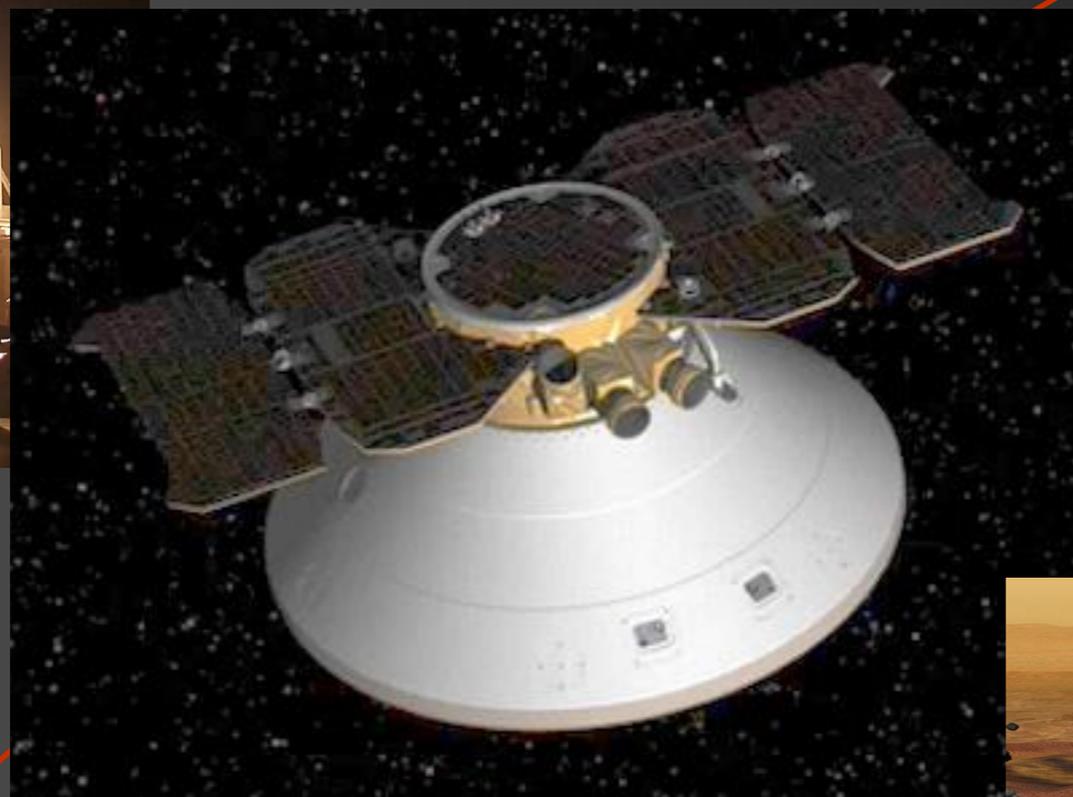


# MarCO

CubeSats to Mars in ~~2016~~  
2018



**Jet Propulsion Laboratory**  
California Institute of Technology



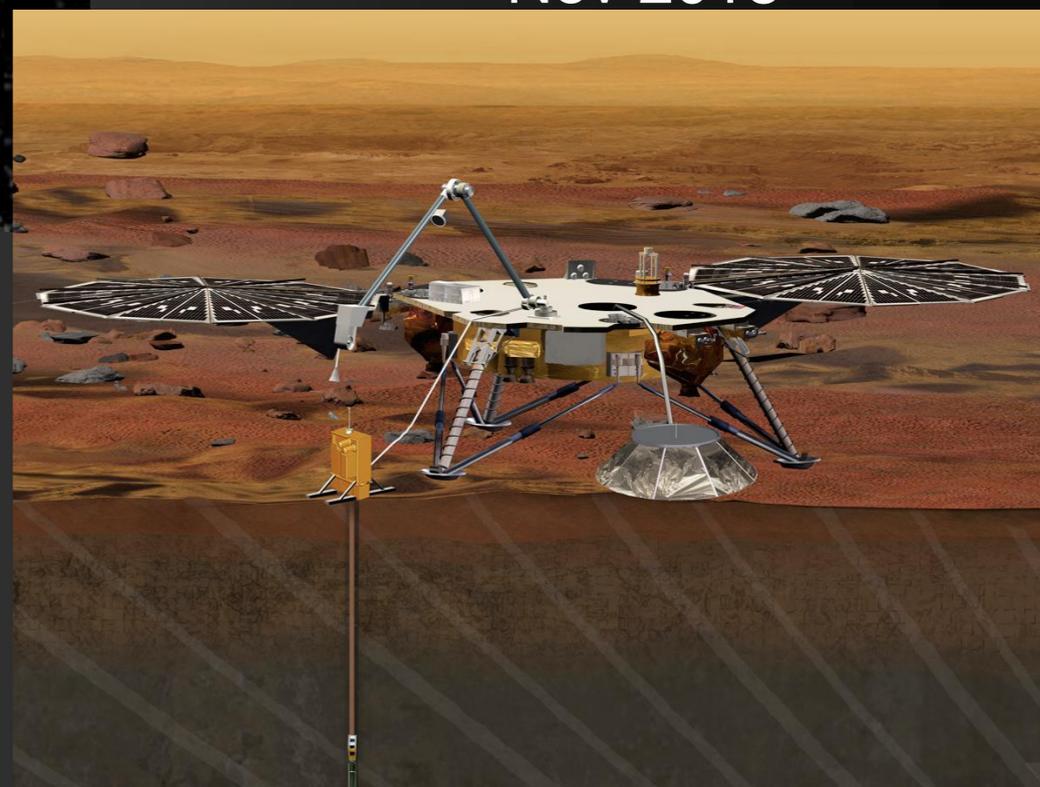
Mars

Entry, Descent, and Landing  
Nov 2018

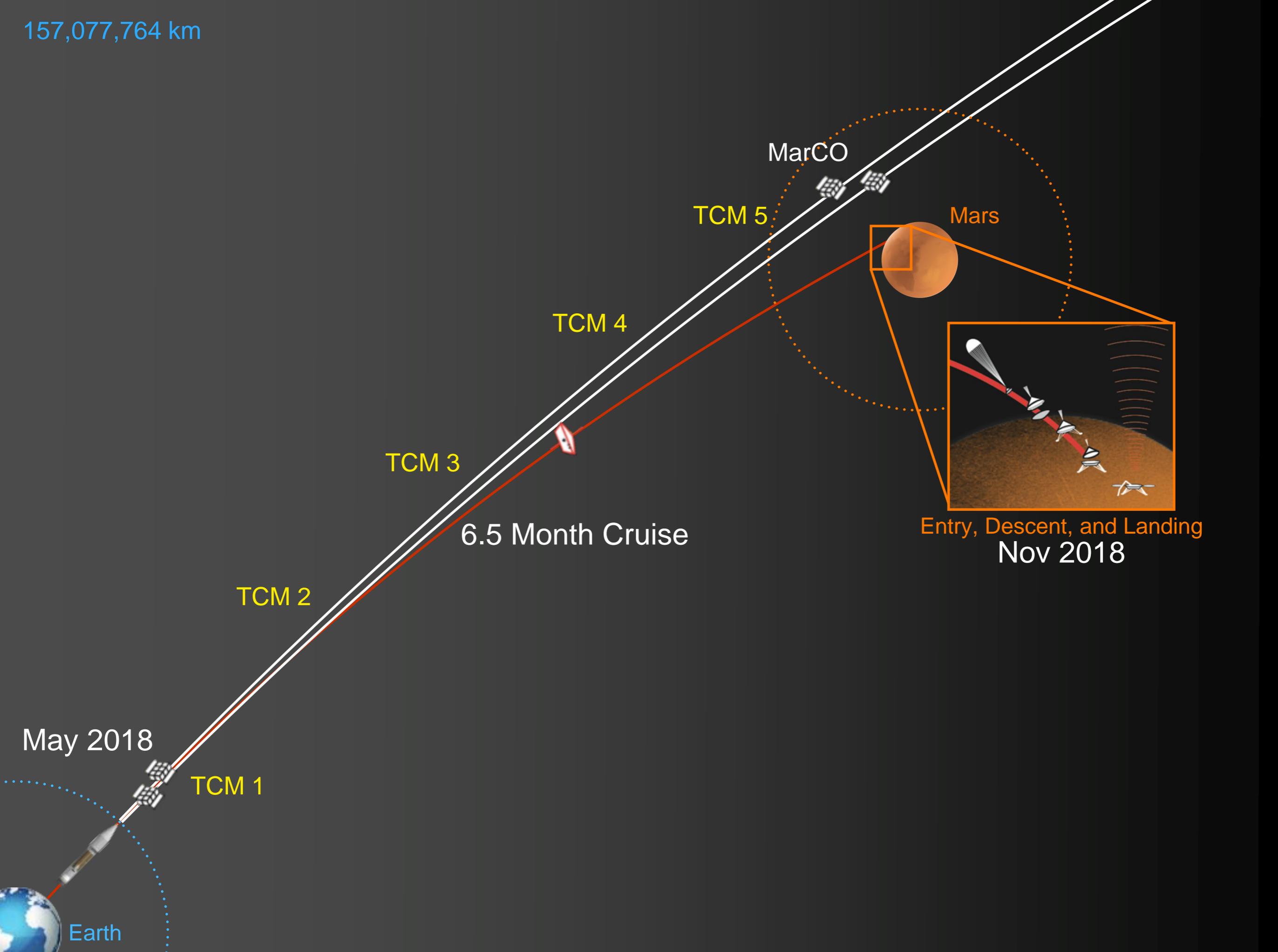
May 2018



Earth



157,077,764 km



May 2018

TCM 1

TCM 2

TCM 3

TCM 4

TCM 5

MarCO

Mars

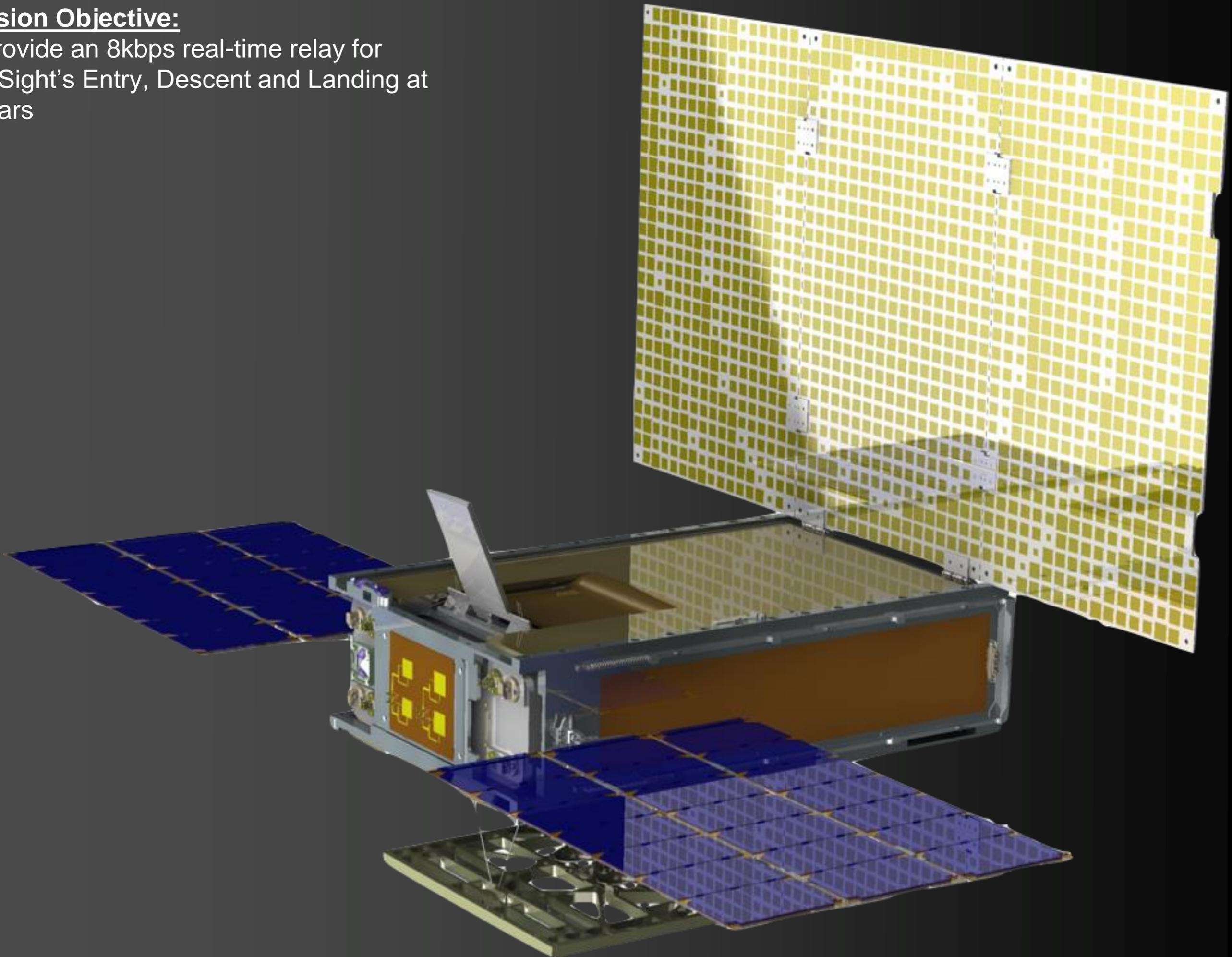
6.5 Month Cruise

Entry, Descent, and Landing  
Nov 2018

Earth

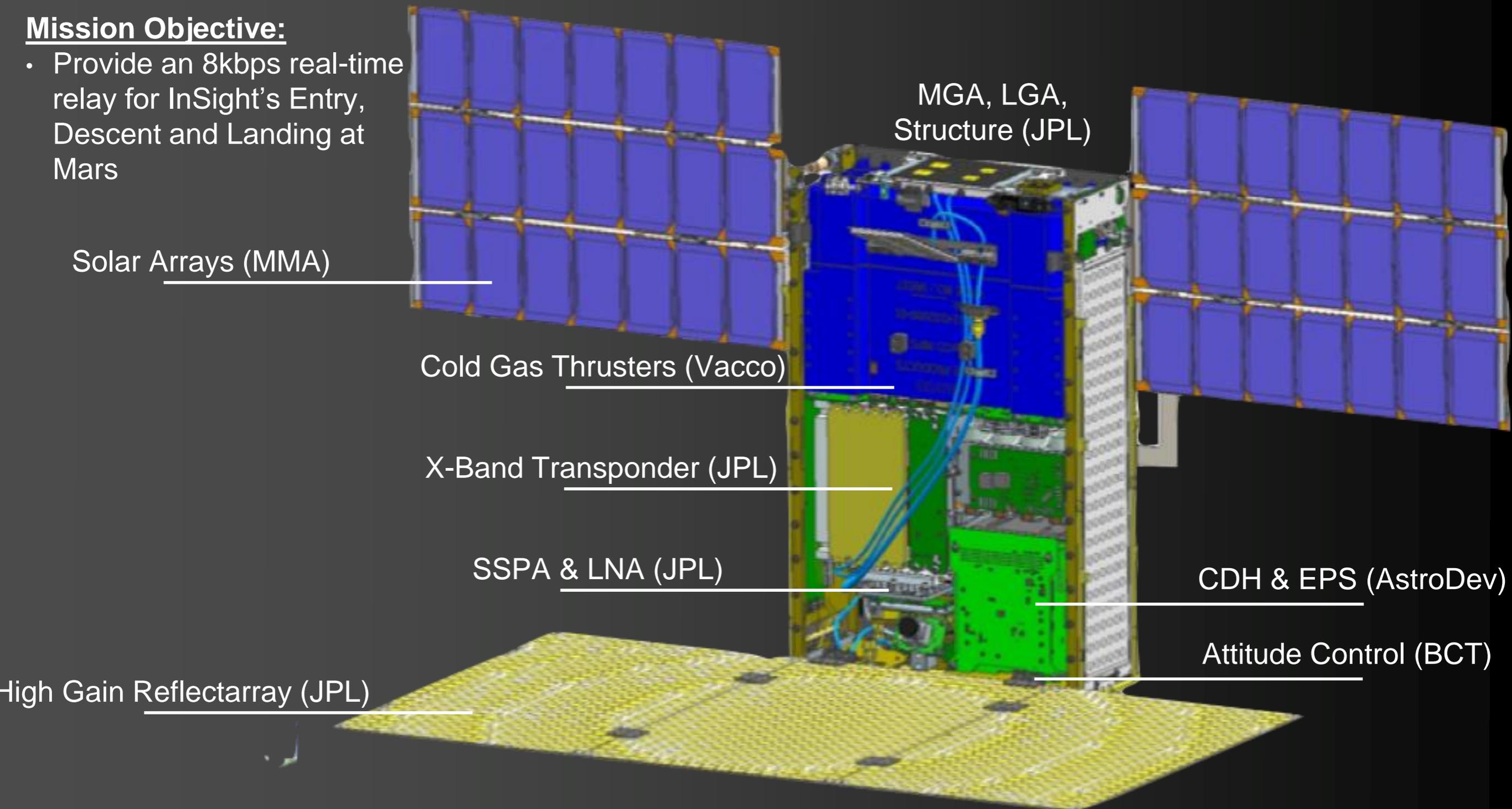
**Mission Objective:**

- 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



High Gain Reflectarray (JPL)

## MarCO Overview:

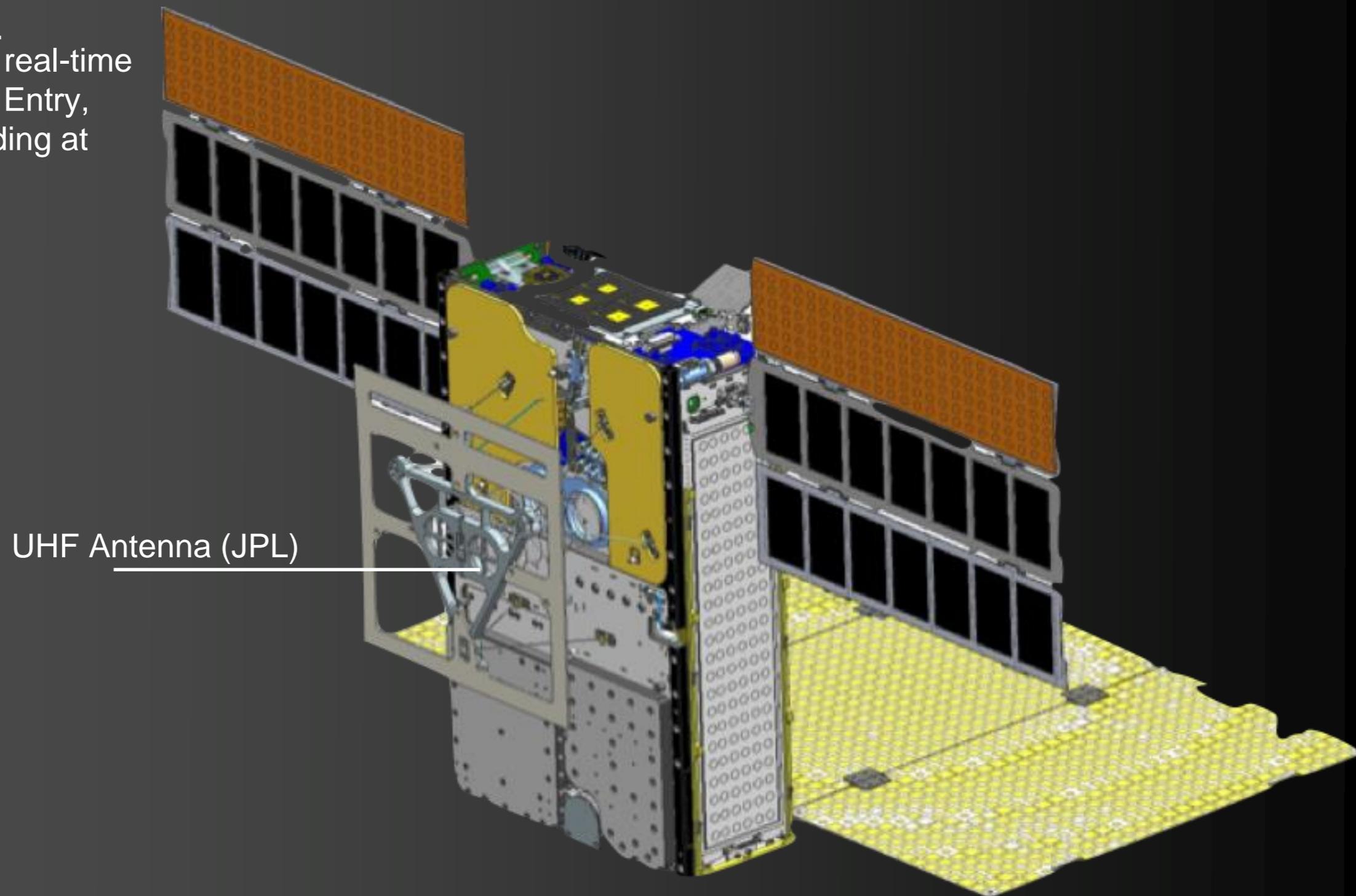
- **Technical Demonstration Mission (Not required for InSight Success)**
- **First interplanetary CubeSats**
- **Smallest spacecraft to ever independently fly by Mars**
- **Low-Cost, commercial-off-the-shelf parts**

## Technical Specifications:

- Volume:** 2 x Cereal Boxes
- Mass:** Approximately 30 lbs each
- Journey to Mars:** 6.5 months
- Propulsion:** Cold Gas Fire Extinguishant
- Primary Processor:** Often Used in Toasters

### Mission Objective:

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



UHF Antenna (JPL)

### MarCO Overview:

- **Technical Demonstration Mission (Not required for InSight Success)**
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### Technical Specifications:

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## Mechanical Fit Check

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

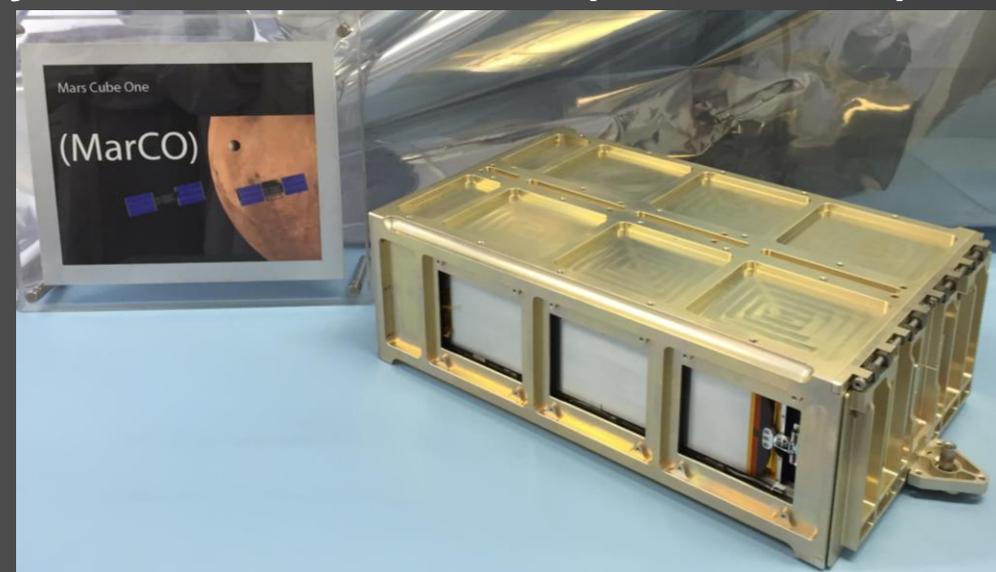
Thermal Blanket

Thermal Radiator (JPL)

Vyvak NLAS-II Canister (with MarCO)

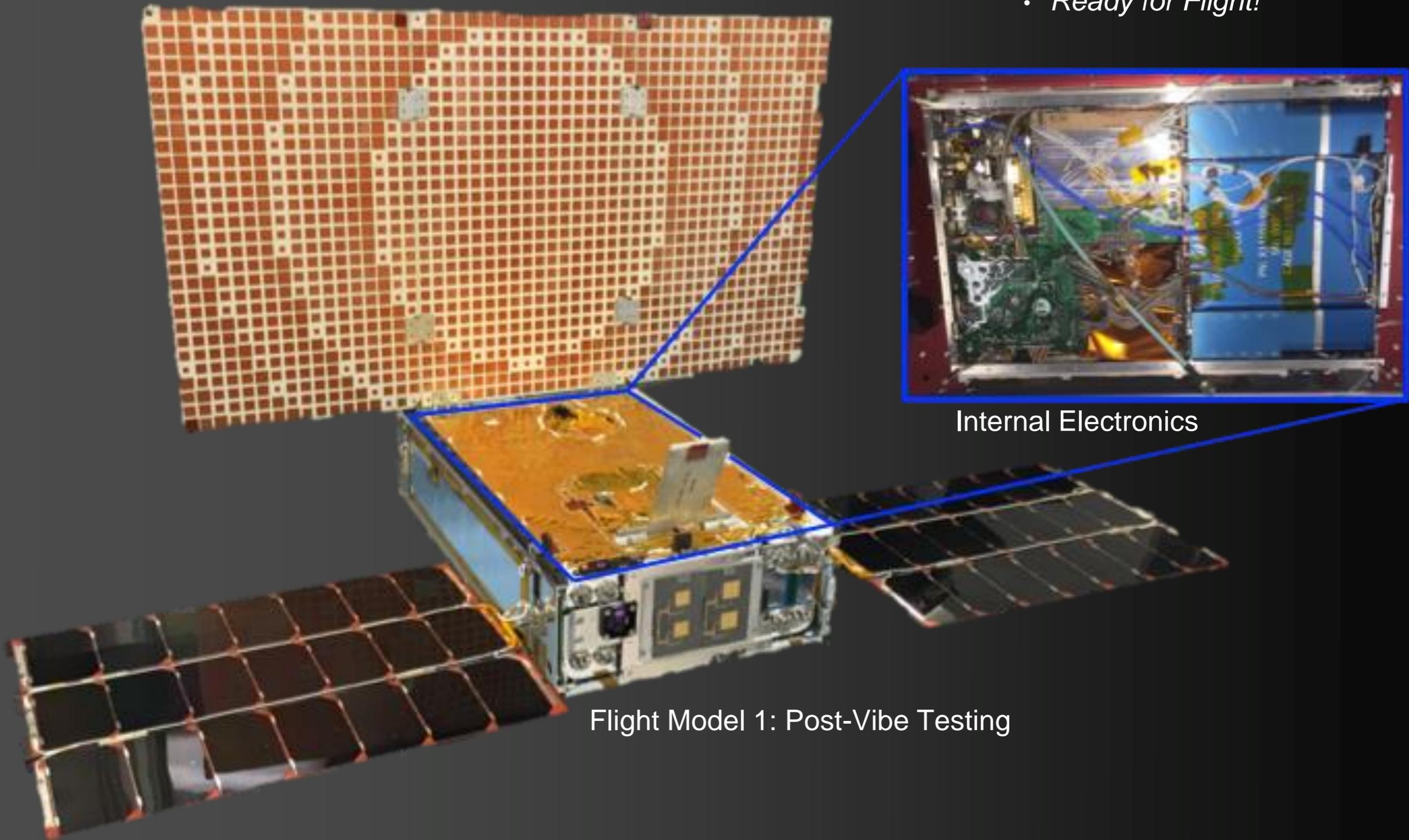
Vacoco Thrusters

Blue Canyon Technologies ADCS



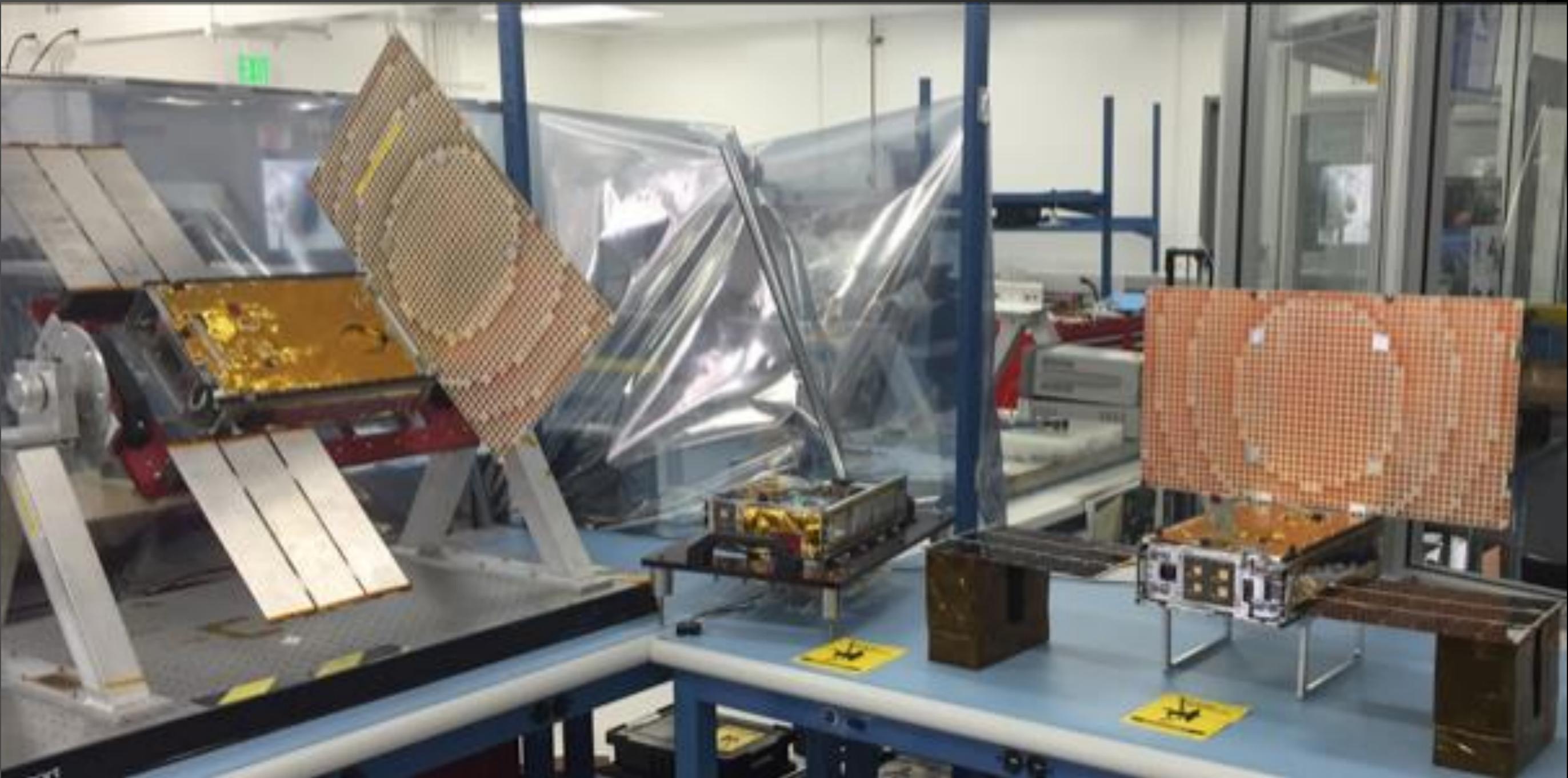
**Flight Deployment Check**

- *Post Environmental Testing*
- *Ready for Flight!*



Internal Electronics

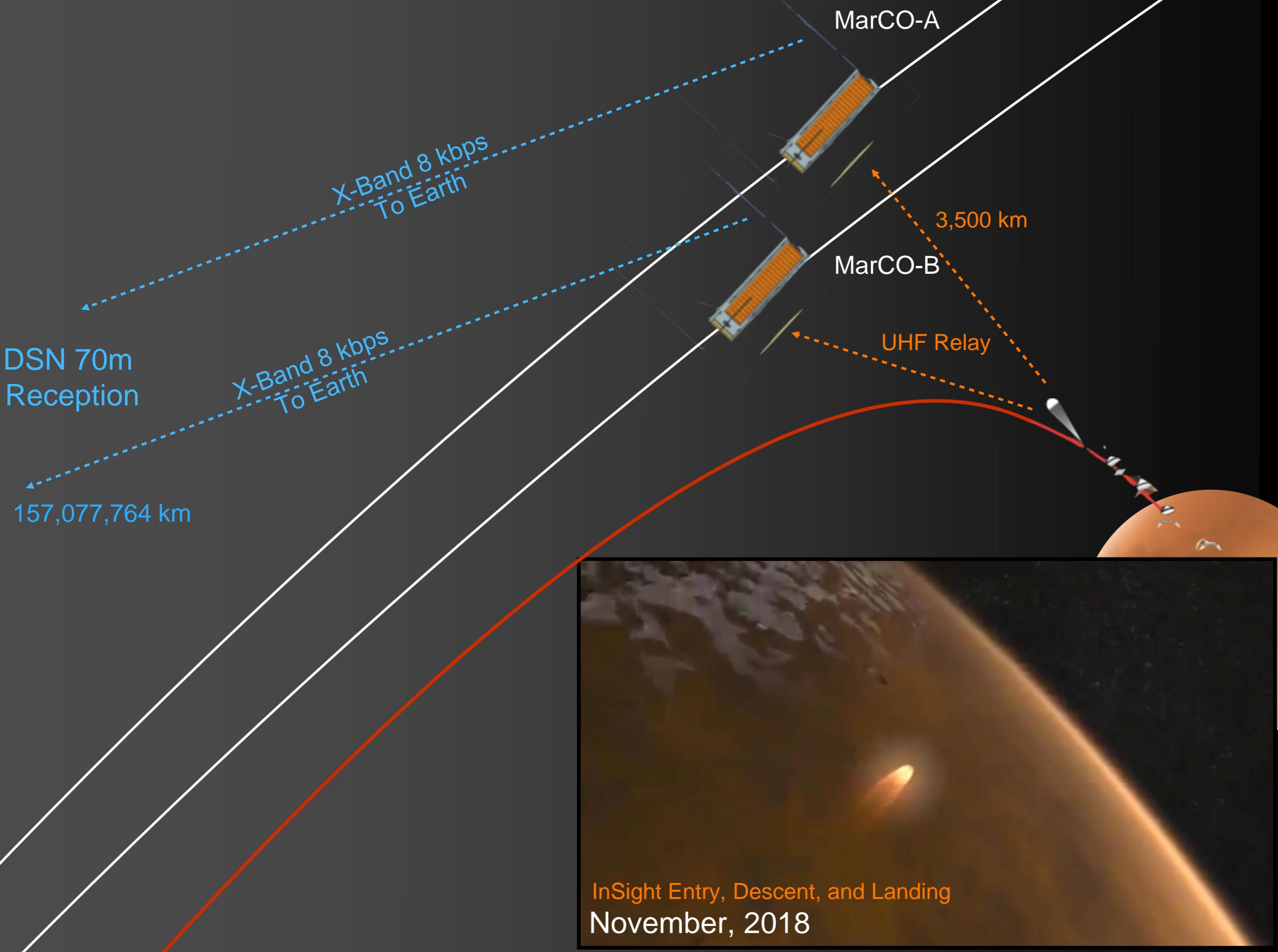
Flight Model 1: Post-Vibe Testing



Mechanical  
Model

Flight Model 2  
(Access Panels Open)

Flight Model 1  
(Deployed)



MarCO-A

X-Band 8 kbps  
To Earth

3,500 km

MarCO-B

UHF Relay

DSN 70m  
Reception

X-Band 8 kbps  
To Earth

157,077,764 km





CubeSats at Mars  
(Now) Arriving 2018



**Jet Propulsion Laboratory**  
California Institute of Technology