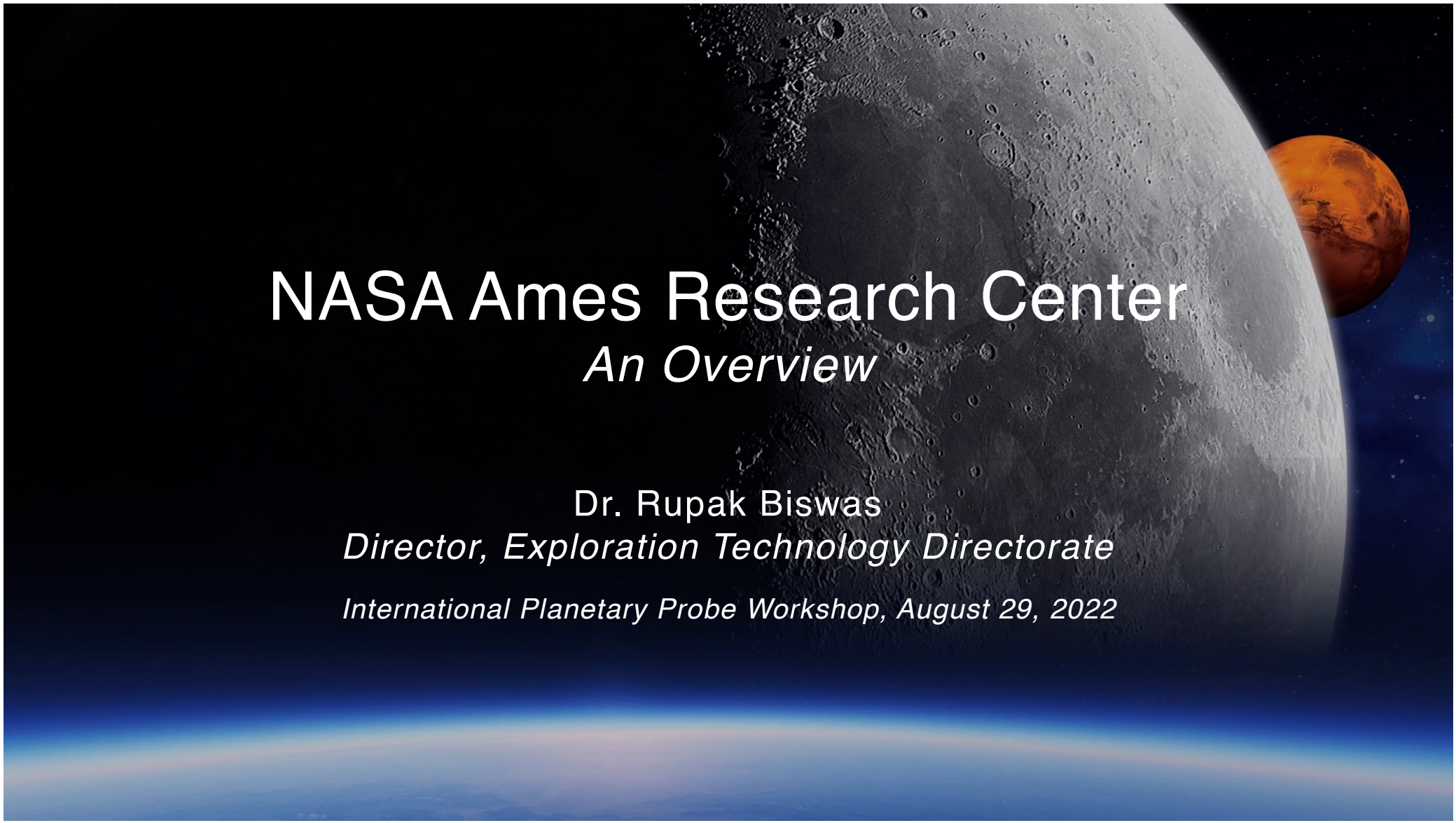


NASA Ames Research Center

An Overview

Dr. Rupak Biswas
Director, Exploration Technology Directorate

International Planetary Probe Workshop, August 29, 2022

What Does NASA Do?

Aeronautics Research







Transform Aviation through R&D

Space Operations





Launch and Space Operations

Deep Space Exploration Sys.









Moon to Mars Exploration

Science





Understand the Sun, Earth, and Universe

Space Technology





Develop and transfer revolutionary technologies

NASA Centers



Ames Research Center



Glenn Research Center



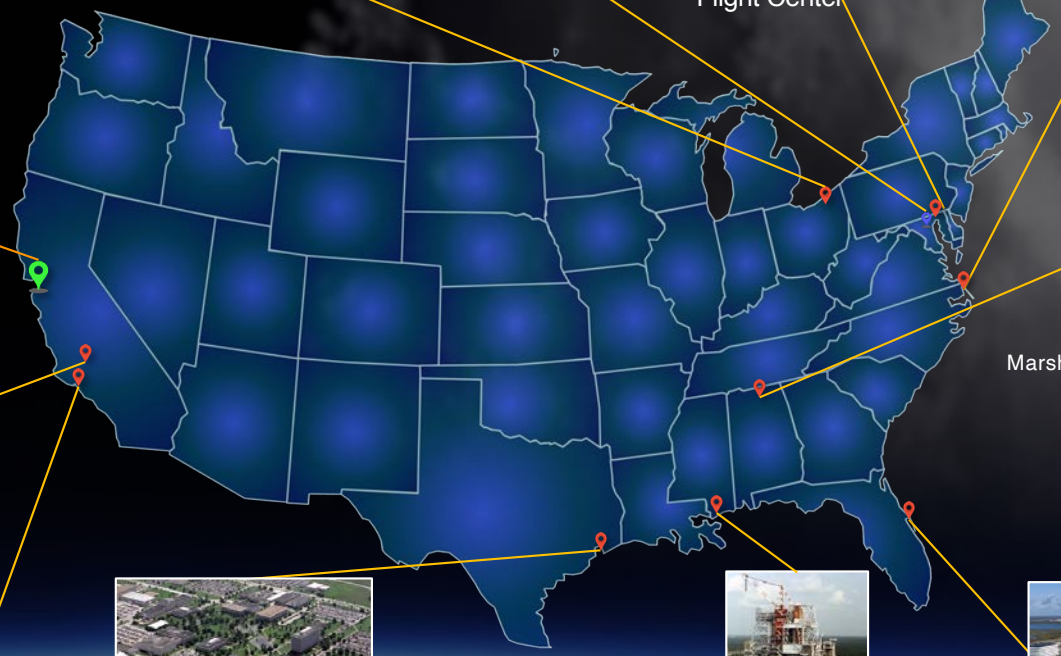
HQ



Goddard Space Flight Center



Langley Research Center





Marshall Space Flight Center



Armstrong Flight Research Center



Jet Propulsion Laboratory

Johnson Space Center



Stennis Space Center



Kennedy Space Center

Ames Aeronautical Laboratory

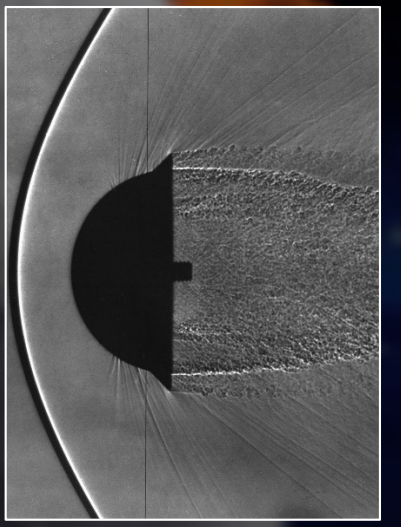
NACA's Second Laboratory

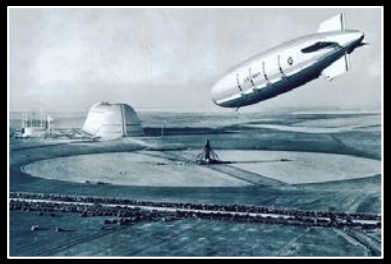












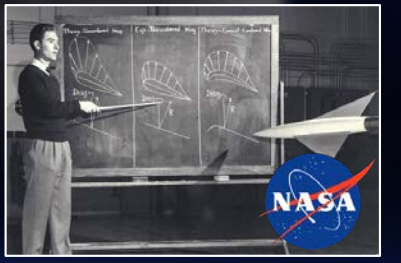












1915 1917 1939 1941 1946 1958

"Langley Memorial Aeronautical Laboratory"
Langley Research Center (LaRC)

"Ames Aeronautical Laboratory"
Ames Research Center (ARC)

"Aircraft Engine Research Laboratory"
Glenn Research Center (GRC)

"Muroc Flight Test Unit"
Armstrong Flight Research Center (AFRC)

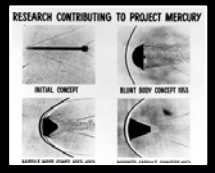
83 Years of Innovation



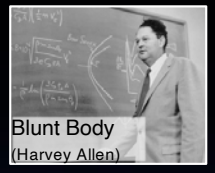




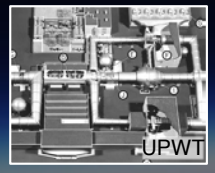














1940 2020

83 Years of Innovation







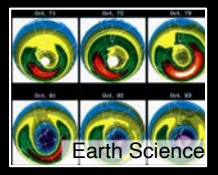




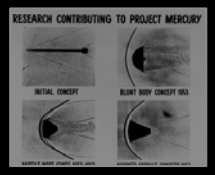






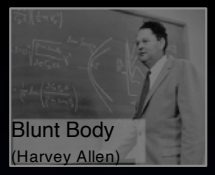








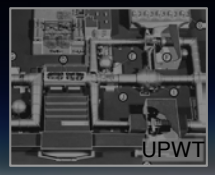


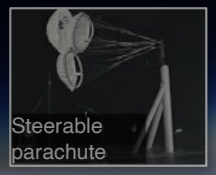


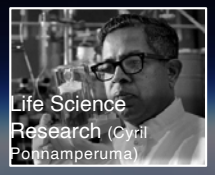














1940 2020

83 Years of Innovation











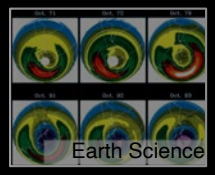










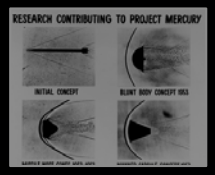












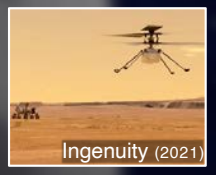


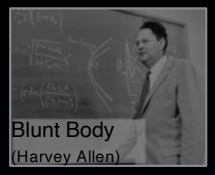








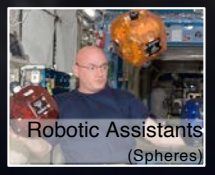






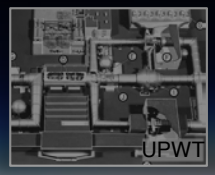


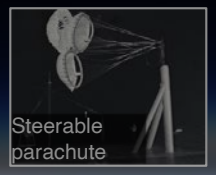


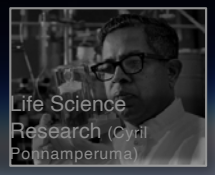








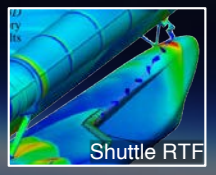














1940 2020

Ames Today



Occupants

- *~1,200 civil servants*
- *~1,900 on-site contractors*
- *~2,500 NRP workforce*
- *~700 summer students in 2019*

FY20 Budget

- *~$1B (includes reimbursable/EUL)*

Real Property

- *~1,900 acres*
- *400 acres security perimeter*
- *5M building ft^2*
- *Airfield with ~9,000 and 8,000 ft. runways*

Ames Today (NASA Research Park)



Occupants

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Real Property

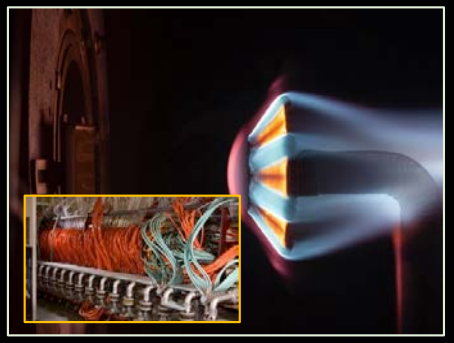
- *~1,900 acres*
- *400 acres security perimeter*
- *5M building ft^2*
- *Airfield with ~9,000 and 8,000 ft. runways*

Core Competencies

Air Traffic Management



Entry Systems



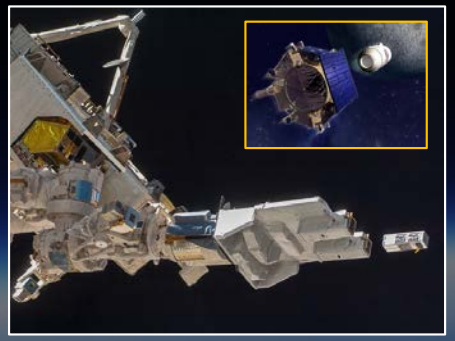
Advanced Computing & IT



Intelligent / Adaptive Systems



Cost-Effective Space Missions



Aerosciences



Astrobiology & Life Science

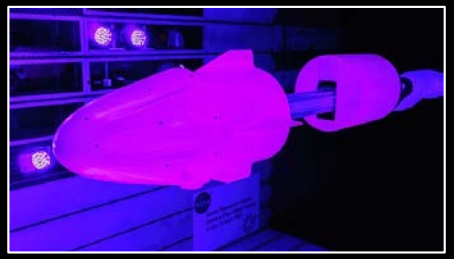


Space & Earth Sciences



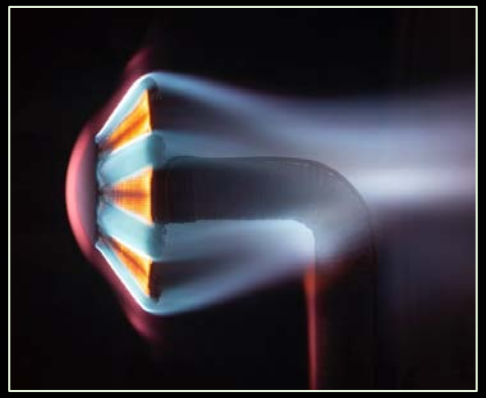
Major Research Facilities

Wind Tunnels





Arc Jet Complex





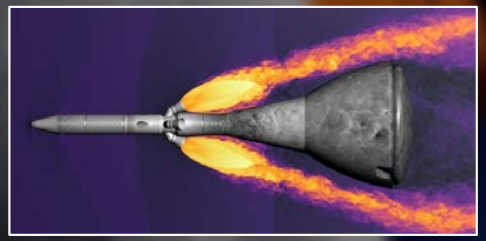
Simulators

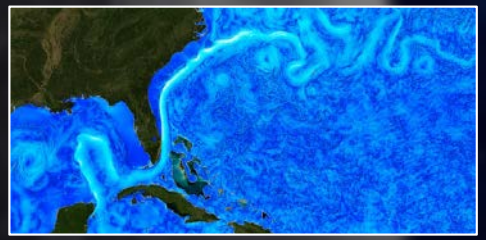






Supercomputing





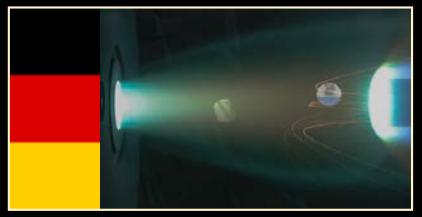




Partnership

International







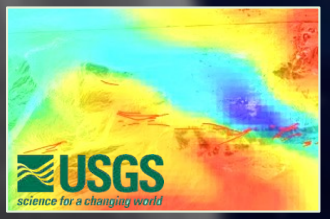






Inter-Agency







Commercial









Academic

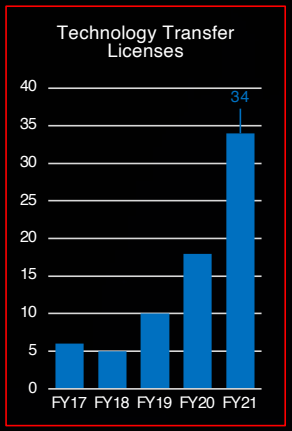
Carnegie Mellon University

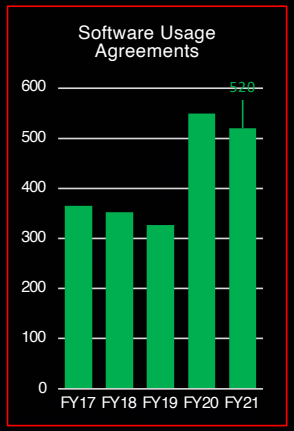
MIT

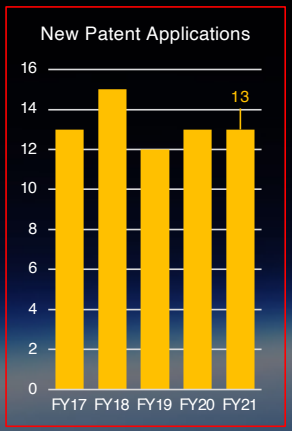


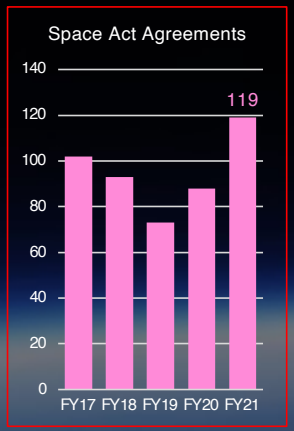
Technology Transfer

Metrics

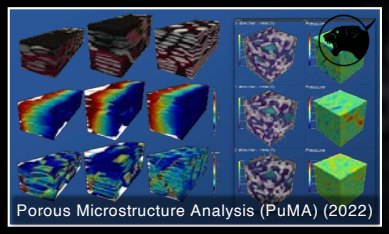


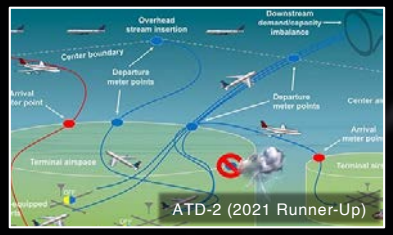






Software of the Year


Porous Microstructure Analysis (PuMA) (2022)




Astrobee Robot and Ground Software (2020 Runner-Up)

Past 10 years: 7 Winners, 3 Runner ups

Invention of the Year



NASA Technology Transfer System (NTTS) (2022)


National Airspace System Constraint Evaluation and Notification Tool (NASCENT) (2021 Co-Winner)

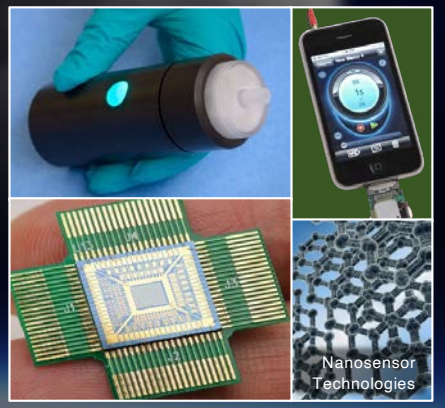

Unmanned Aerial System (UAS) Traffic Management (UTM) (2020 Winner)

Past 10 years: 5 Winners, 1 Co-winner, 1 Runner up

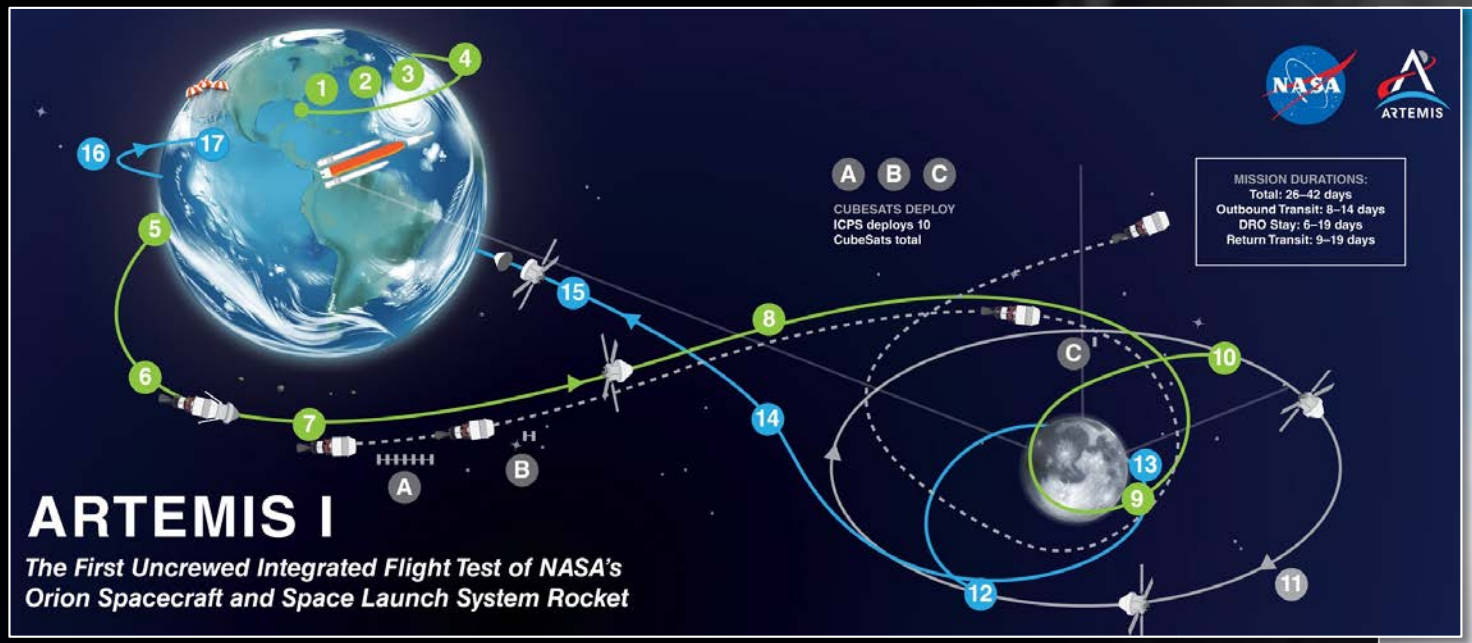
Patents



Protective Ceramic Coating

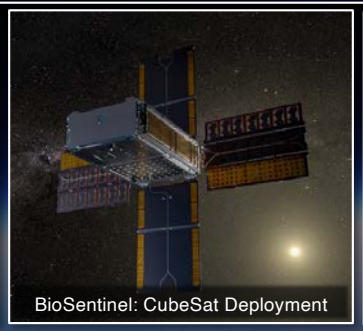

Nanosensor Technologies

Artemis I



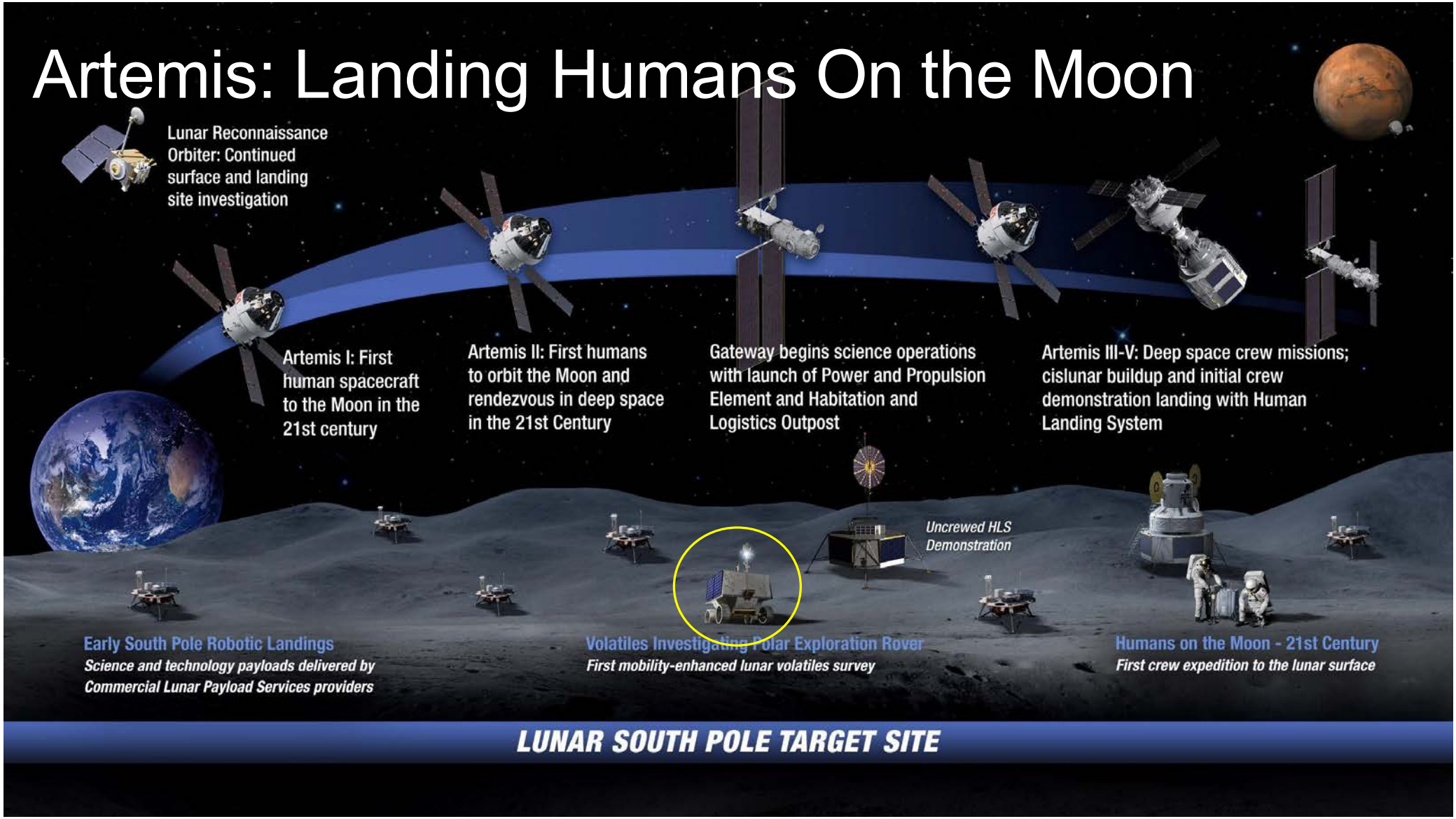



Launch Pad 39B, KSC
Aug. 29, 2022
8:33 a.m. EDT to 10:33 a.m.

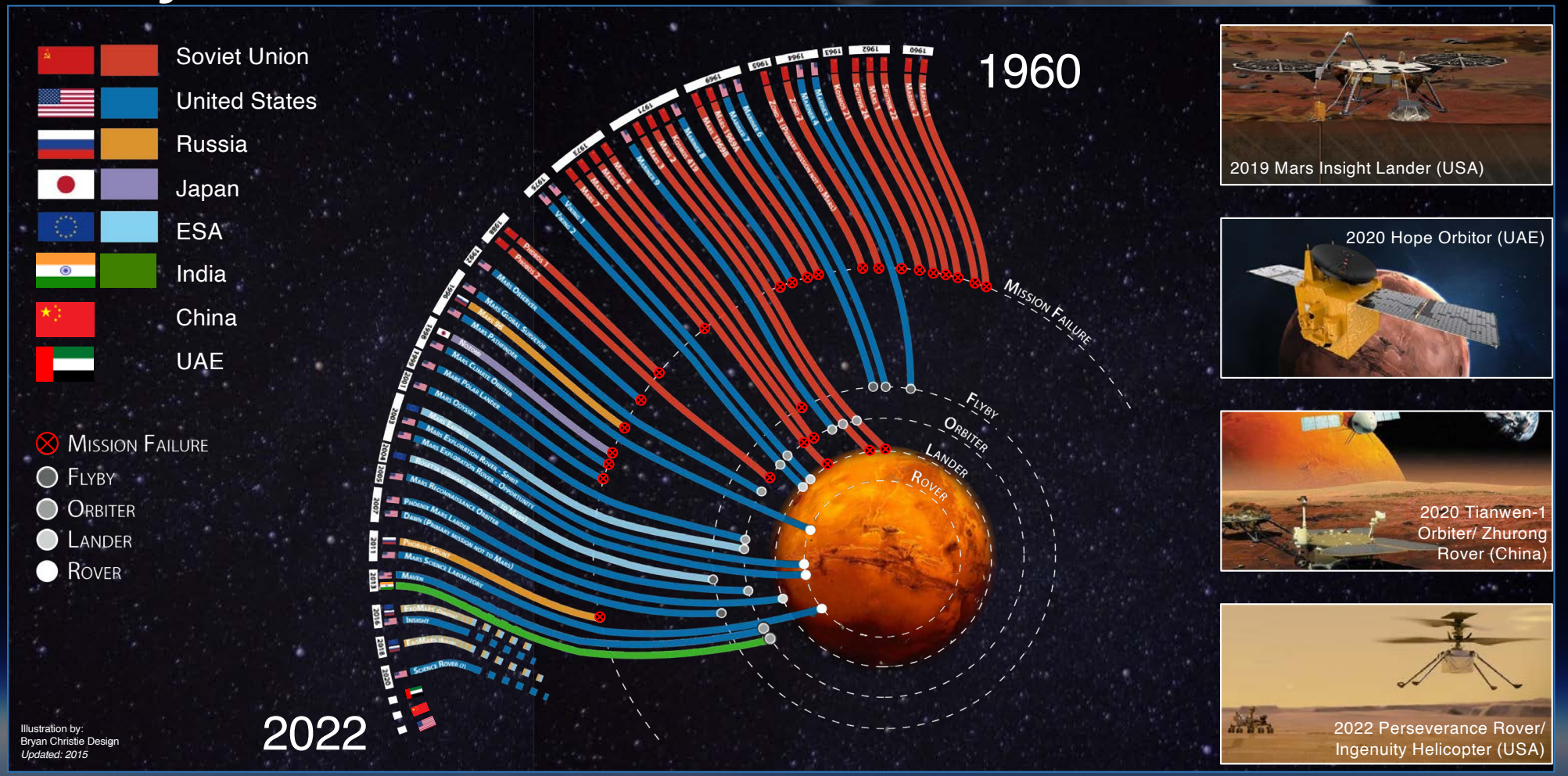

BioSentinel: CubeSat Deployment






Artemis: Landing Humans On the Moon
Lunar Reconnaissance Orbiter: Continued surface and landing site investigation
Artemis I: First human spacecraft to the Moon in the 21st century
Artemis II: First humans to orbit the Moon and rendezvous in deep space in the 21st Century
Gateway begins science operations with launch of Power and Propulsion Element and Habitation and Logistics Outpost
Artemis III-V: Deep space crew missions; cislunar buildup and initial crew demonstration landing with Human Landing System
Uncrewed HLS Demonstration
Early South Pole Robotic Landings
Science and technology payloads delivered by Commercial Lunar Payload Services providers
Volatiles Investigating Polar Exploration Rover
First mobility-enhanced lunar volatiles survey
Humans on the Moon - 21st Century
First crew expedition to the lunar surface
LUNAR SOUTH POLE TARGET SITE

Sixty Years of Mars Missions



2019 Mars Insight Lander (USA)

2020 Hope Orbitor (UAE)

2020 Tianwen-1 Orbiter/ Zhurong Rover (China)

2022 Perseverance Rover/ Ingenuity Helicopter (USA)

MARS Perseverance Rover and Ingenuity Helicopter


Testing a Parachute Made for Mars

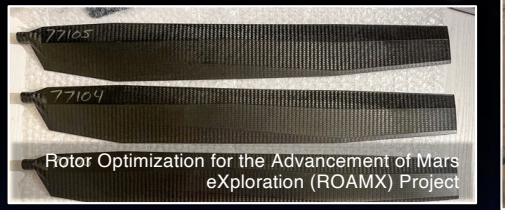

July 30, 2020

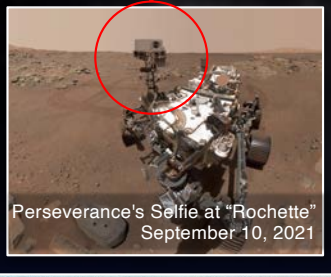



Shielding the Spacecraft During Its Fiery Descent


Feb 18, 2021


Measuring the Extreme Environment During Landing


Rotor Optimization for the Advancement of Mars eXploration (ROAMX) Project


Perseverance's Selfie at "Rochette" September 10, 2021


Solar Eclipse on Mars April 20, 2022


Ingenuity's Second Flight As Seen by Perseverance April 22, 2022


Helping the First Mars Helicopter Fly

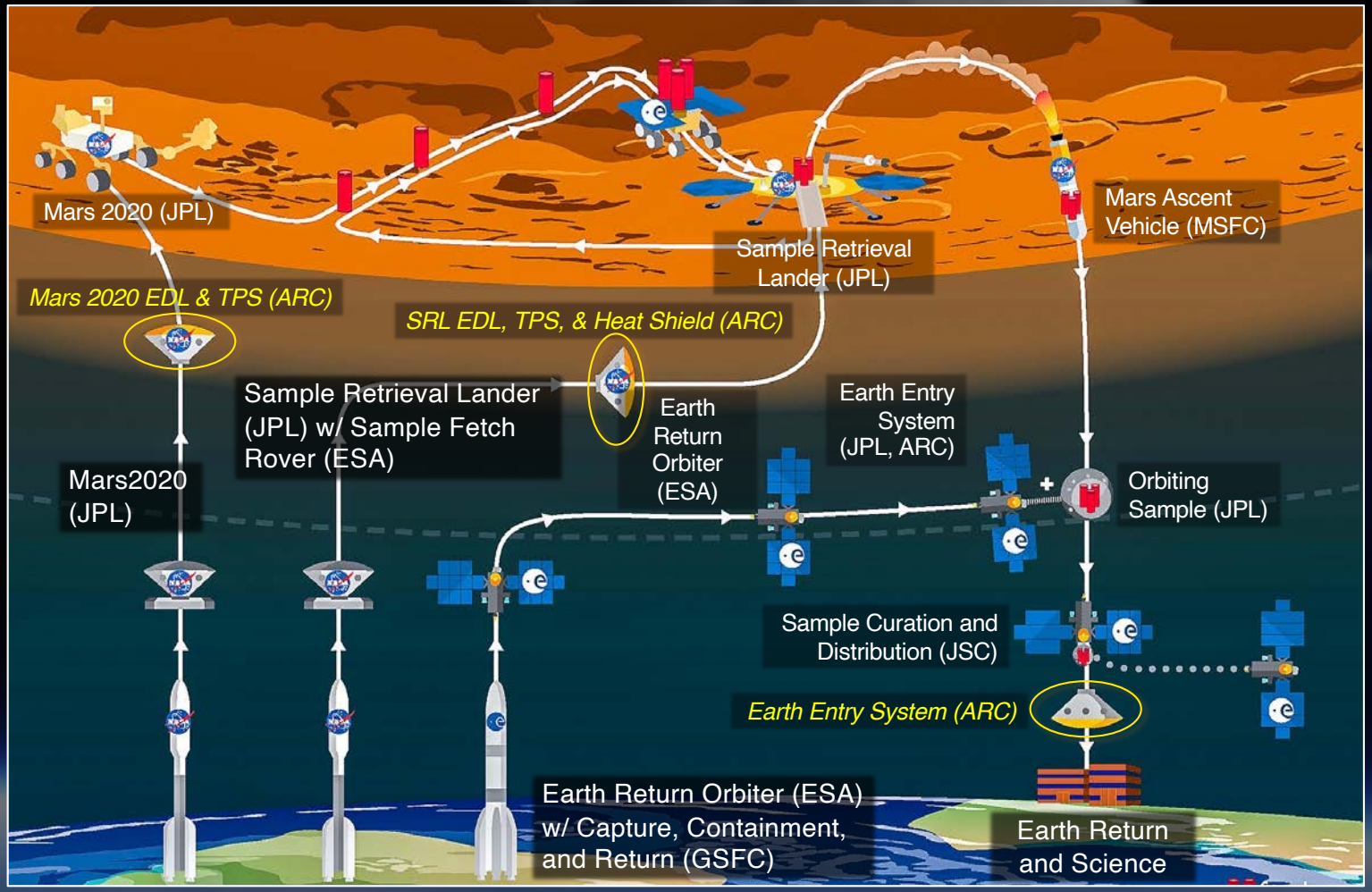

Perseverance Views Dust Devils Swirling Across Jezero Crater, June 01, 2022

Mars Sample Return



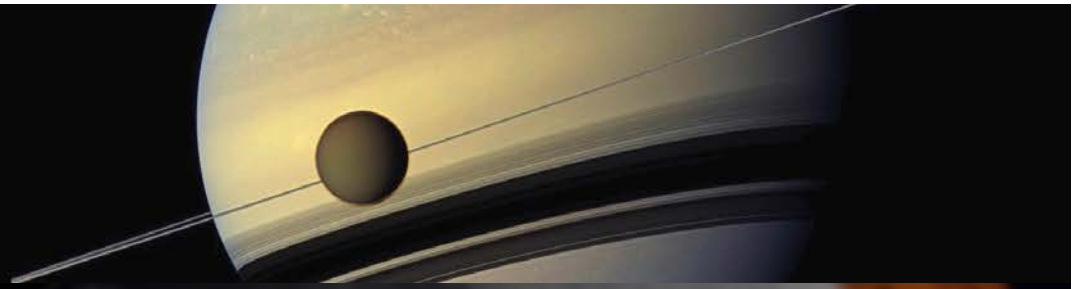




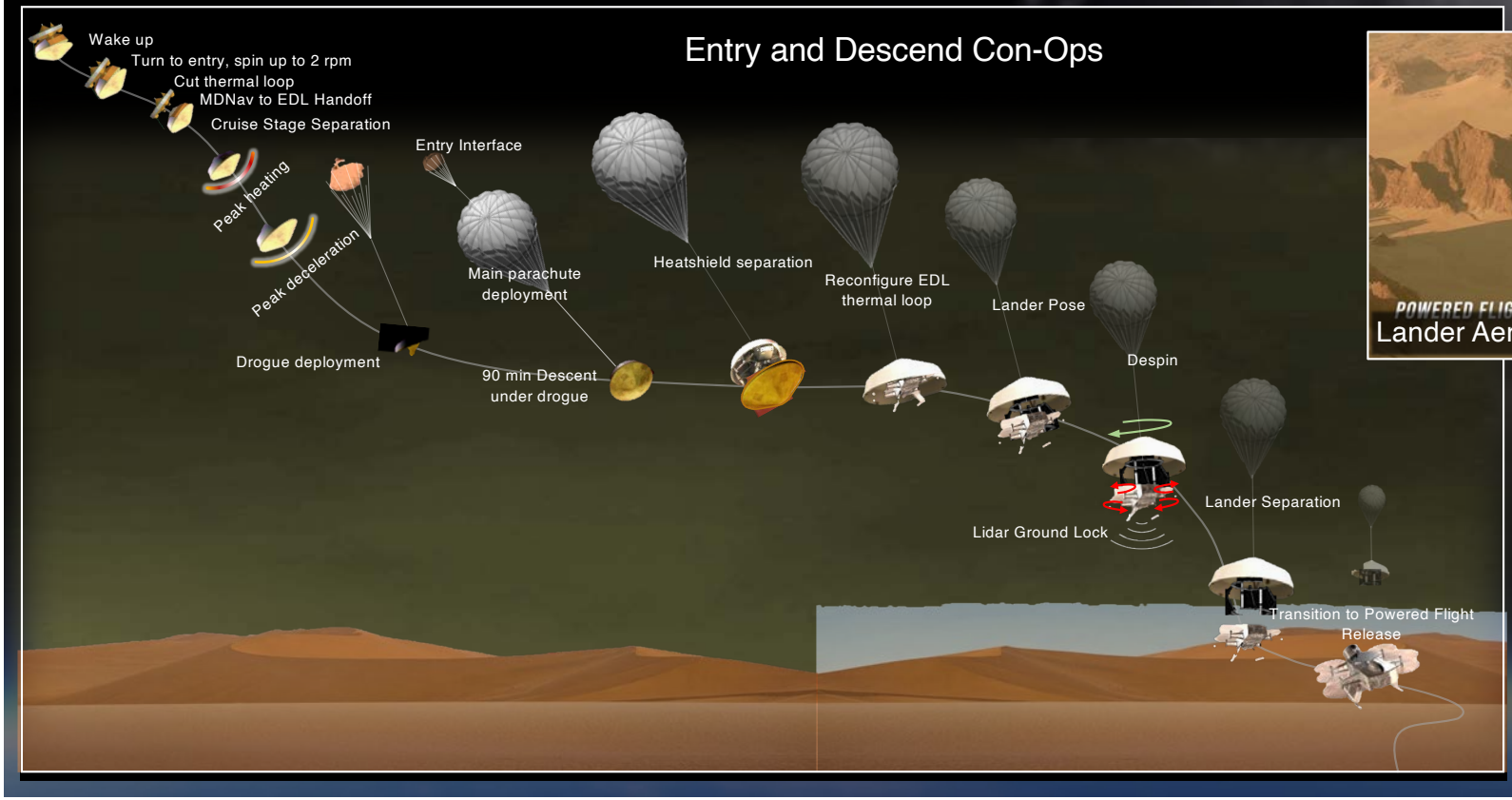


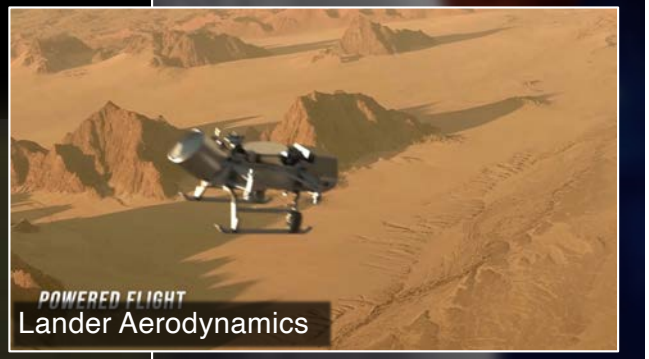
DRAGONFLY



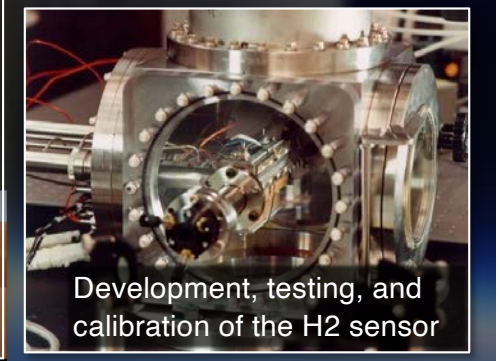


Entry and Descend Con-Ops





Lander Aerodynamics



Development, testing, and calibration of the H2 sensor


NASA
*Concept image