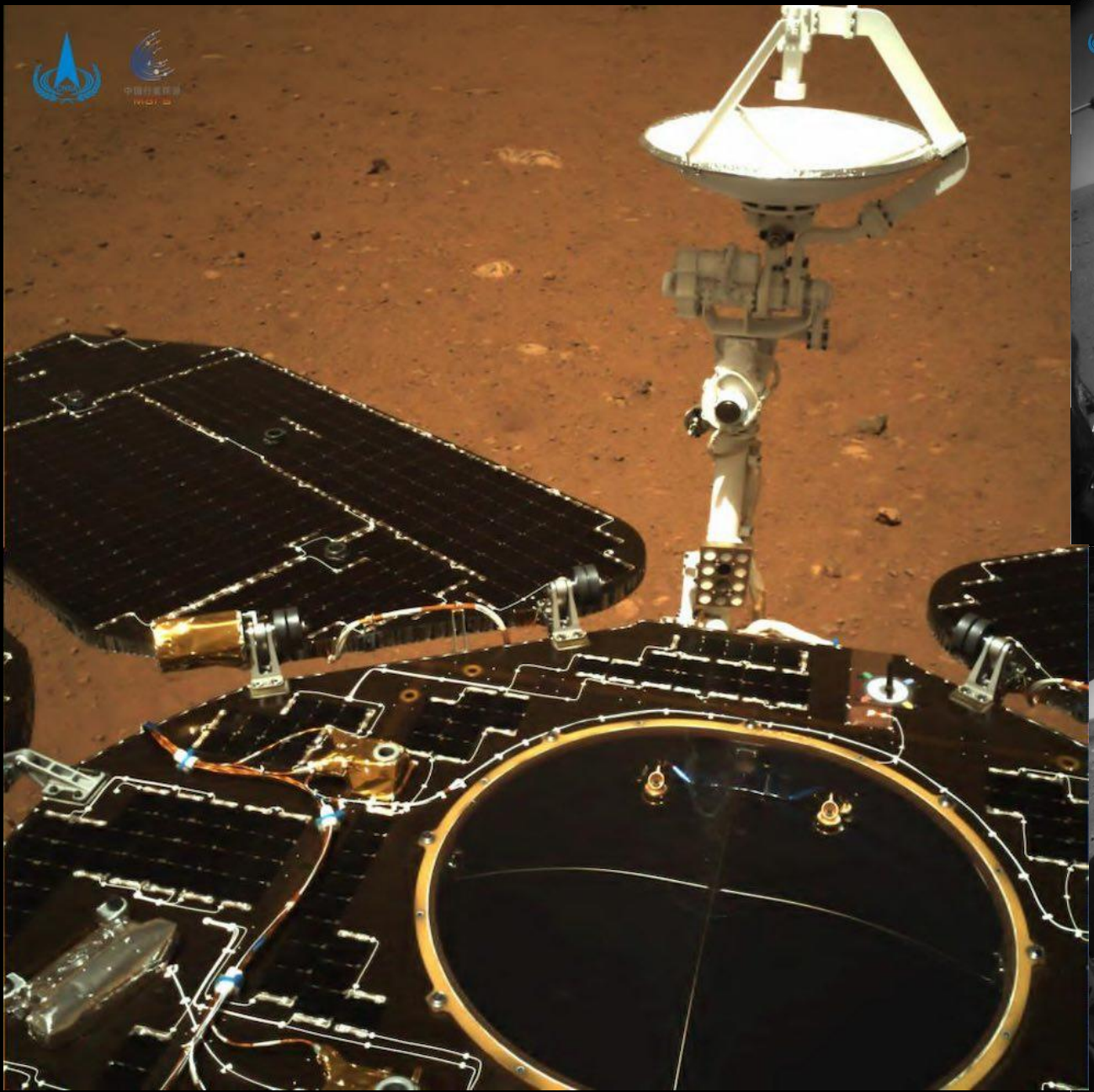
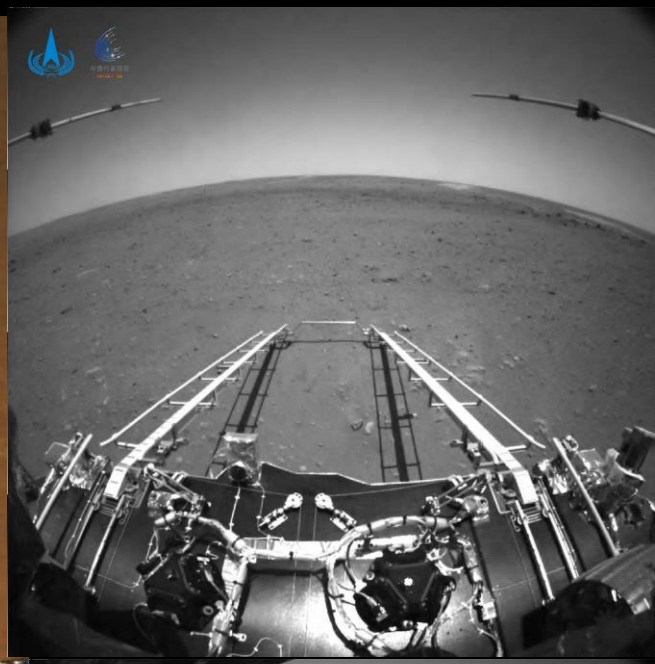
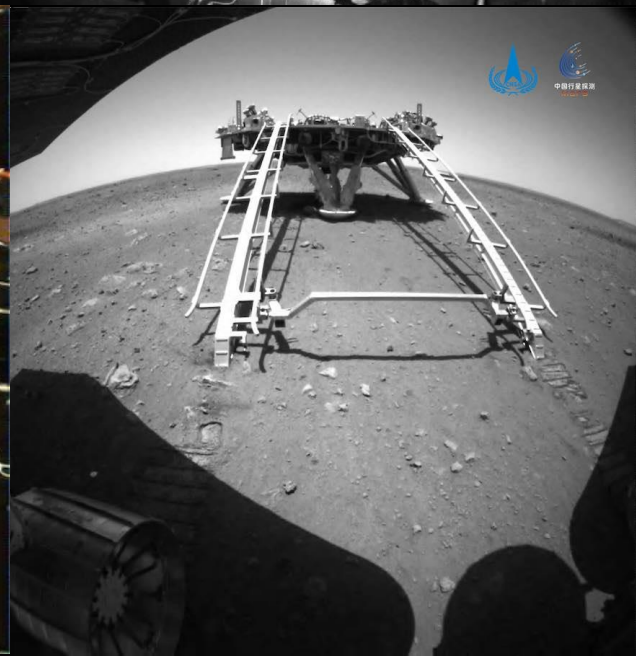
Space News

June 5, 2021

Greg Stanley

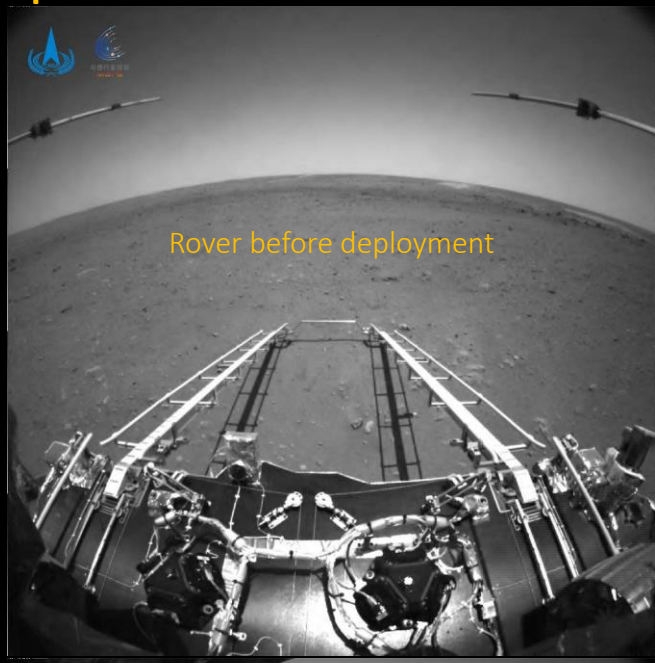


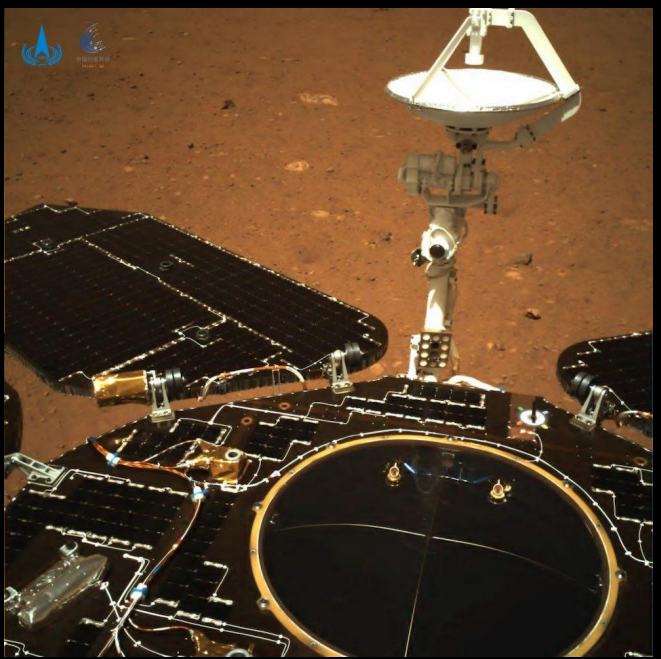




Chinese Tianwen-1 Mars mission update

- Lander arrived at Utopia Planitia, a broad plain
- Orbiter continues its mission and relays data
- Zhurong rover driving on Mars – 2nd country to succeed
  - 529 lbs, 6 feet tall, speed up to 0.12 mph
  - All 6 wheels can turn any direction
  - Solar powered
  - 3D cameras, subsurface radar, composition analyzers, magnetic field monitors, weather station
  - 90 day mission


Rover before deployment



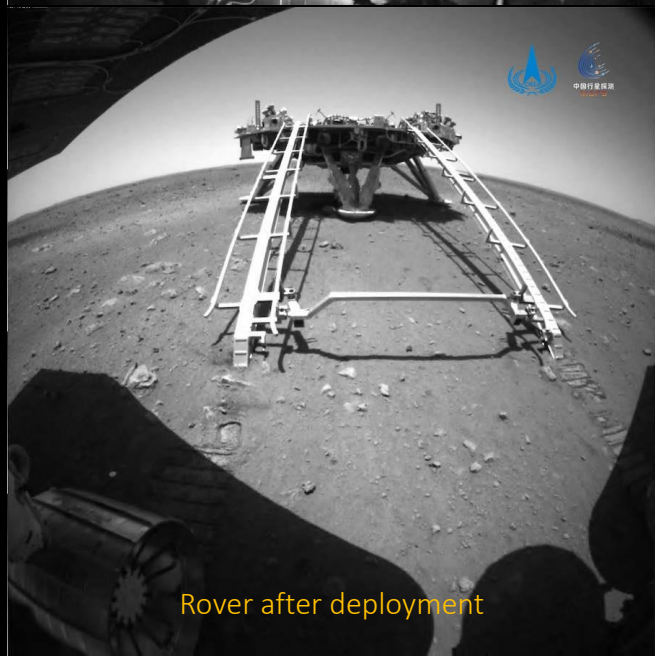

Rover after deployment

Photo credits: CNSA

Mars update: Perseverance rover, Ingenuity helicopter

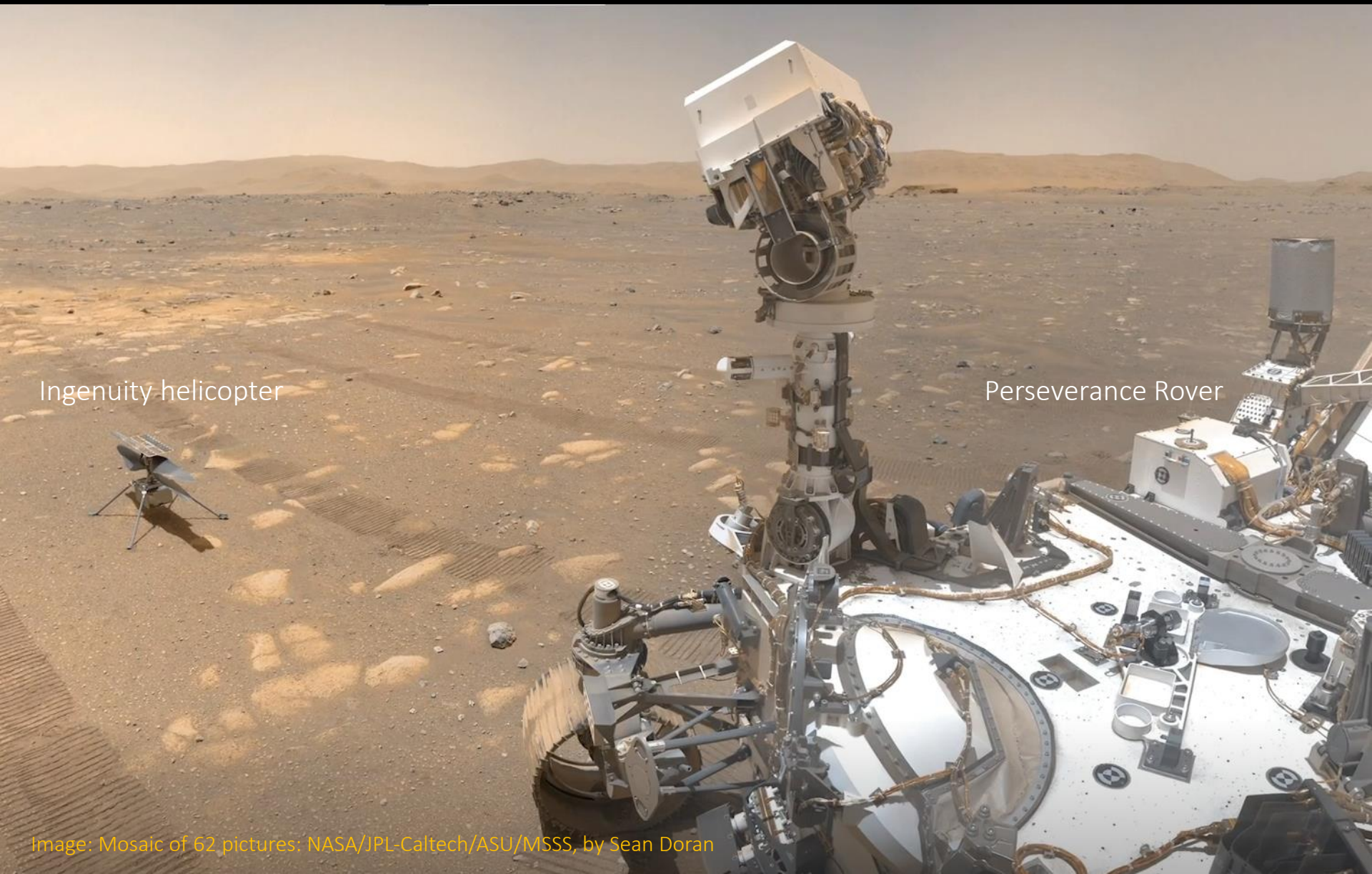


Image: Mosaic of 62 pictures: NASA/JPL-Caltech/ASU/MSSS, by Sean Doran

Ingenuity helicopter completed 2 more flights

- 5th flight: first one-way “aerial scout” trip south to accompany Perseverance
  - Altitude 33 feet/10 meters (limit of laser altimeter)
  - Flew 423 feet/129 meters, in 108 seconds
- 6th flight testing distance limits had a glitch
  - Altitude 33 feet/10 meters
  - Flew 705 feet/215 meters total in 140 seconds,
  - Flew 9 mph (above expected limit of 8 mph for analyzing photos to find position)
  - Collected color stereo imagery
  - Glitch after 54 seconds, 492 feet/150 meters of flight
    - One navigation image disappeared, throwing off timestamps on subsequent images, causing bad overcorrections
    - Lurched, oscillated up to 20 degrees
    - Safety system kicked in, landed 16 feet short of intended touchdown spot

View of Mars from Ingenuity helicopter at 33 foot altitude during 6th flight : NASA JPL/Caltech

Where is Perseverance now? (Moving to new area)

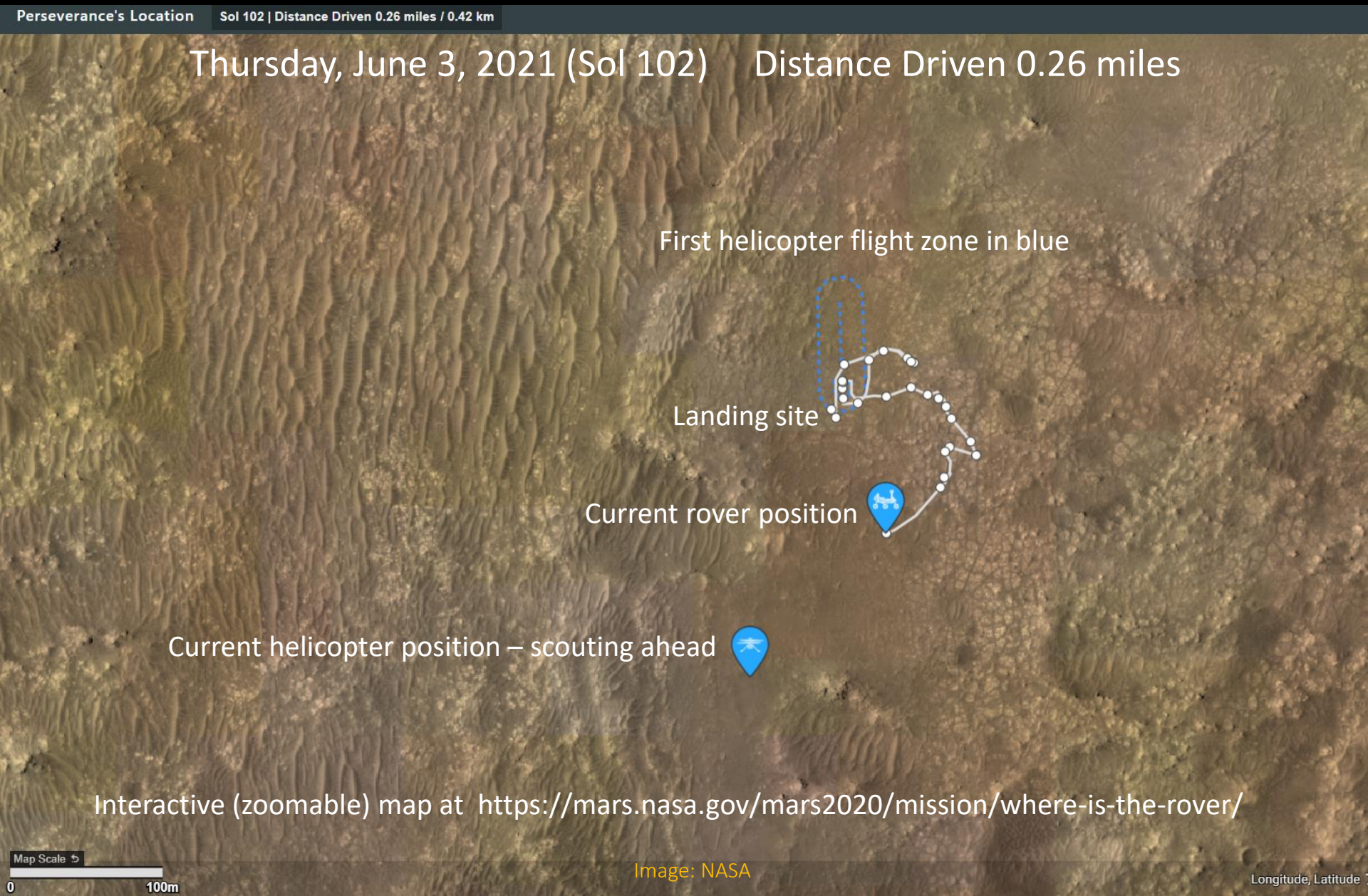


Image: NASA

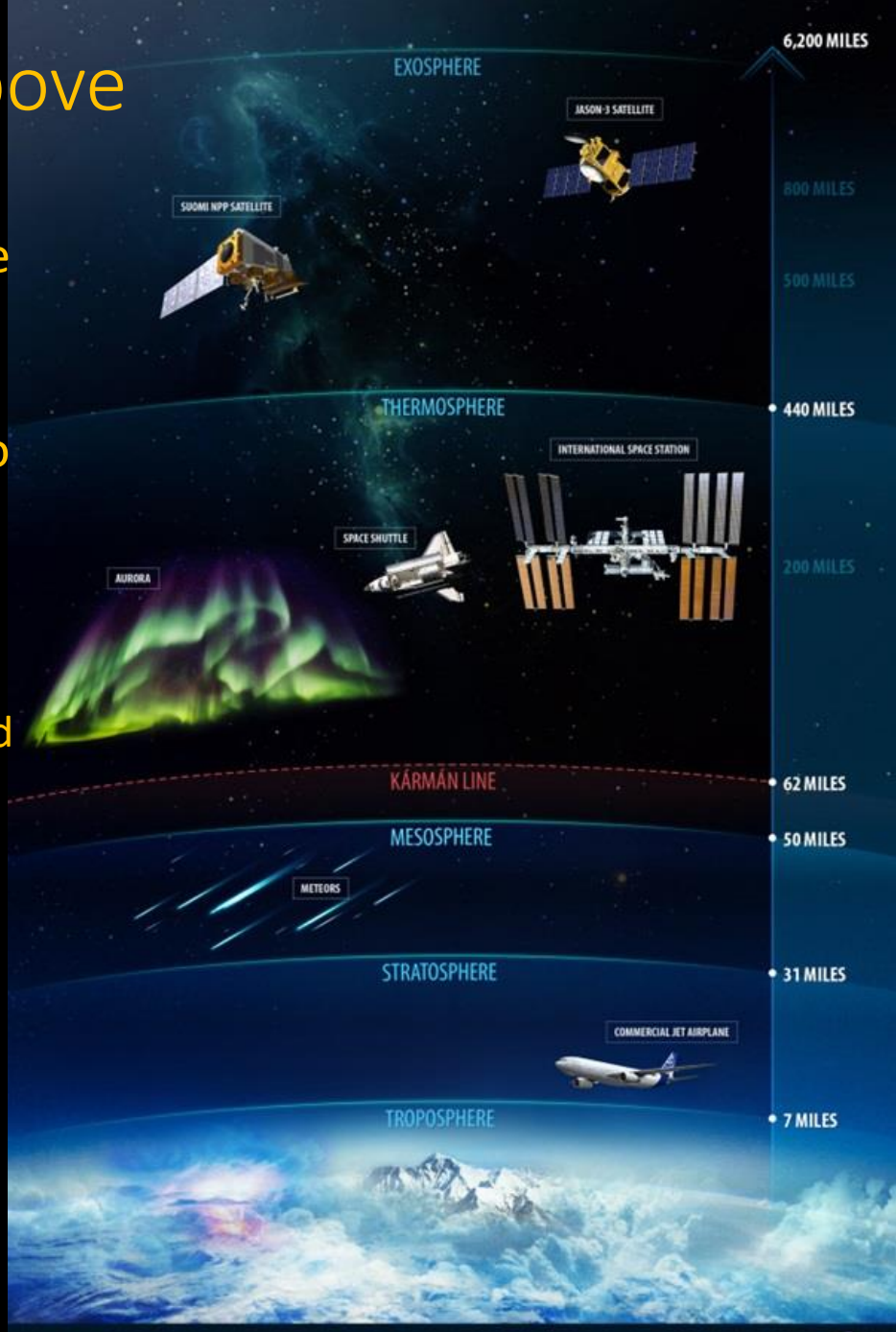
Virgin Galactic first space flight test in 2 years

- VSS Unity is second of “SpaceShipTwo” suborbital spaceplanes
  - Third test, included some NASA-funded scientific research payloads
- 2 pilots flew VSS Unity to 55.45 miles/89.2 km
  - Carrier aircraft released spacecraft at 44,000 ft
  - Glided and landed on runway of Spaceport America in New Mexico
  - First humans launched from New Mexico into space (“almost”: 100 km/62 miles)
- Commercial launches coming soon (6 passengers/2 pilots)
  - 3 more tests: 4 passengers, Richard Branson flight, Italian air force flight
  - Company has 600 reservations for tickets, sold at $200K - $250K

Pictures credit: Virgin Galactic

Who says “space” starts above 100 km/62 miles?

- “Kármán line” is named after Theodore von Kármán
- He calculated that near this altitude (rounding up), atmosphere becomes to thin to support aerodynamic flight
  - Aircraft around this altitude would have to travel faster than orbital velocity to obtain enough lift to support itself
  - More recent calculations suggest it should be 84 km/52 miles
  - There is a rapid increase in atmospheric temperature below 100 km
  - World Air Sports Federation (FAI) may change to 80 km/50 miles (USAF definition) – lowest a satellite can go and still complete an orbit
- May get used in treaties – flying in someone’s airspace vs. space



How many launches since the last meeting (May 1)?

This includes failed launches only if they lift off the launch pad and only includes launches that attempt going into orbit

Falcon 9/Cargo Dragon cargo launch to the International Space Station. Image credit: SpaceX

Launches since last meeting (May 1, 2021)


May 4 – Falcon 9 – 26th batch of 60 Starlink (internet service) satellites


May 6 – Long March 2C – 3 military surveillance & 1 data relay satellites


May 9 – Falcon 9 – 27th batch of 60 Starlink (internet service) satellites


May 15 – Electron – 2 small satellites (FAIL)


May 15 – Falcon 9 – 28th batch of Starlink (internet service) satellites (52 Starlink, 2 small rideshares)


May 18 – Atlas 5 – US Space Force satellite for early missile detection


May 19 – Long March 4B – Oceanography satellite


May 26 – Falcon 9 – 29th batch of 60 Starlink satellites, now at 1634


May 28 – Soyuz – 36 OneWeb (internet service) satellites, now at 218


May 29 – Long March 7 – Supply ship docking with Chinese space station


June 3 – Falcon 9 – "Cargo Dragon" resupply to International Space Station

- First new SpaceX booster this year (out of 17 launches)

NSS North Houston Space Society

Discussion & questions?

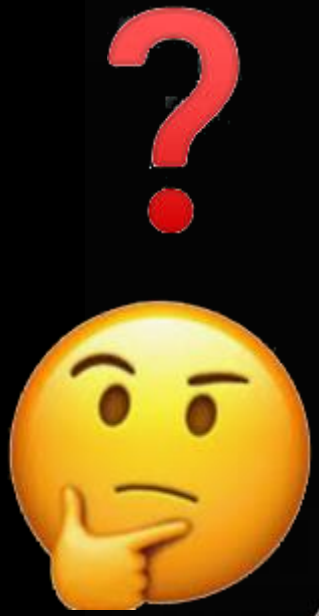


Image: NASA

Featured speaker: Mahsa Esfandabadi

TOPIC: Projects at Sasakawa International Center for Space Architecture (SICSA)

- Unique research, design & teaching organization at University of Houston
  - Founded 1987 with endowment from Ryoichi Sasakawa, chairman of Japan Shipbuilding Industry Foundation
  - Mission: plan and implement programs to advance peaceful and beneficial uses of space and space technology
  - Leader in space architecture

- Designs habitats & greenhouses for Mars, Moon, Zero-G
  - Research, numerous technical papers
  - Space Architecture Technical Committee (SATC-AIAA) board
  - CapCom (mission support) at Mars Desert Research Station (Mars Society)
- 10 years experience as an architect, project manager, and assistant professor
  - Currently, project architect at AUTOARCH Architects
- Board of directors of NSS North Houston Space Society
- M.A. Architecture, M.S. in Architectural Engineering, M.S. in Aerospace Architecture (UH/SICSA)