NSS North Houston Space Society

Space News

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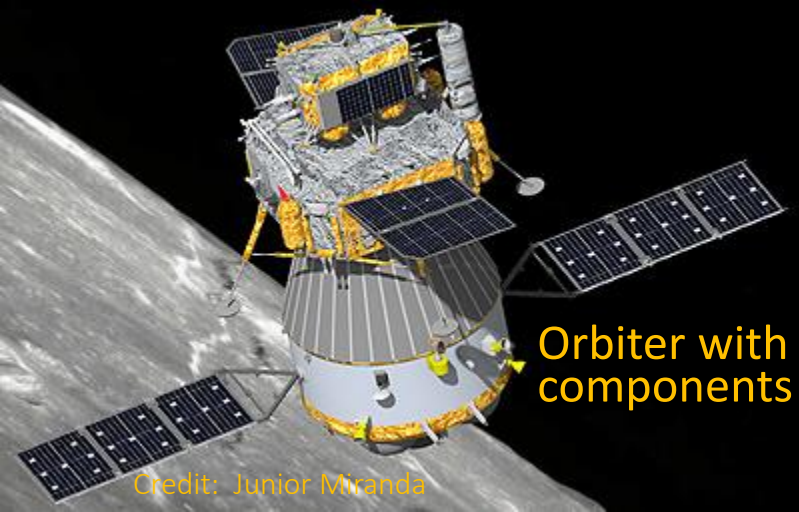
NSS North Houston Space Society

Chinese lunar sample return (Chang'e 5) -- update

Orbiter and return capsule

- Returned lunar rock & dirt to Earth (Inner Mongolia) Dec. 16
  - Turned out to be nearly 3.8 pounds, with both surface and drilled samples
  - Drilled specimens reached 1 meter (3.3 feet) rather than planned 2 meters due to layers of slate, with limited time to drill into that
  - Still presumed to be much younger rocks (1-2 billion years) than Apollo samples (3.5 billion years)
- A portion of the sample will be shared with other countries and the UN
  - Following precedent set by both the US and Russia of giving "diplomatic gifts"
  - But not the US unless the US relaxes restrictions on NASA/China cooperation
- Mission received help from ESA, Argentina, Namibia, Pakistan, others



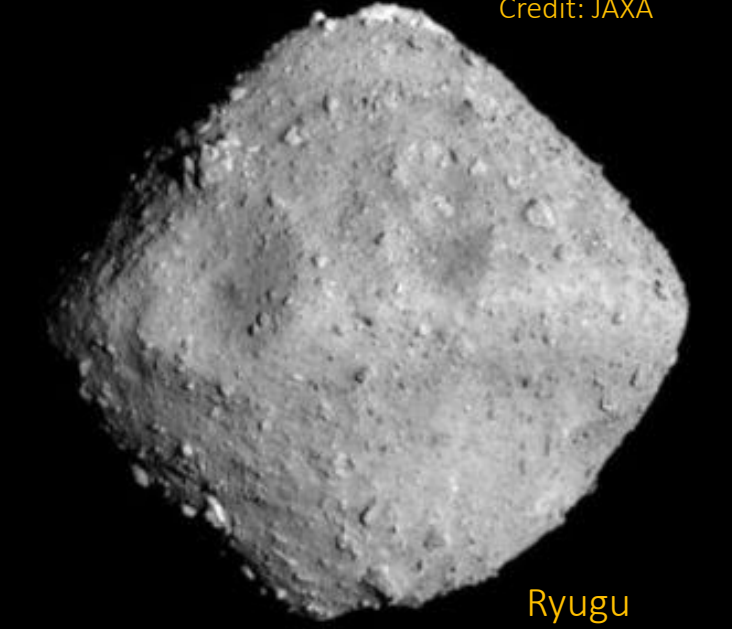
Orbiter with all components enroute

Asteroids: Hayabusa-2 update from Japan

- Japanese probe Hayabusa 2 returned samples from half-mile wide carbonaceous asteroid Ryugu on Dec 5 (launched Dec, 2014)
  - Included first gas sample from material in deep space (surface and beneath the asteroid). Still analyzing that before the solids.
  - Includes black sand grains, but the sample is not completely opened yet.
  - Probably 1 gram, not just the minimum 100 mg, but not sure yet
  - JAXA will share tiny samples with 6 teams worldwide in 2021
- Parent craft is going back to other asteroids through 2031 as planned
  - Only used 80 lbs. of its 146 lbs. of propellant (xenon, for ion thrusters)

Credit: DLR German Aerospace Center, via Wikimedia.org

Credit: JAXA

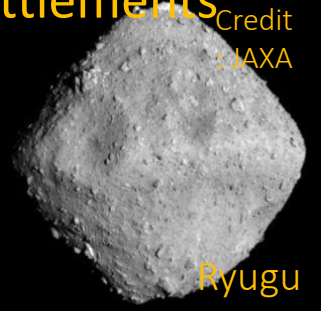


Ryugu

Some lessons about a space-based economy

- We have repeatedly demonstrated that craft can be built to operate for a long time in space, perform complex tasks like excavating and sampling , and operate with some autonomy
- Craft can travel huge distances for very little fuel outside of planets
  - 80 lbs of fuel to move a 1340 lb. craft to an asteroid and back (and start second mission)
  - But it takes a long time and careful orbit planning: 3.5 years out, 1.5 years work + waiting for window, 1 year back. Time is a major constraint, not just distance.
  - Windows for gravity assist from planets may require long waits
- Space based economy including asteroids is feasible, but mainly automated
  - Transport is on a much longer time scale than most are used to
  - Time scales are too long to use pilots for routine exchange of goods
  - Economics would not favor the weight for people and life support
  - “Space freighter captain” is not likely to be a real job!
- Radiation shielding material from asteroids may be feasible for settlements

Credit: DLR German Aerospace Center, via Wikimedia.org

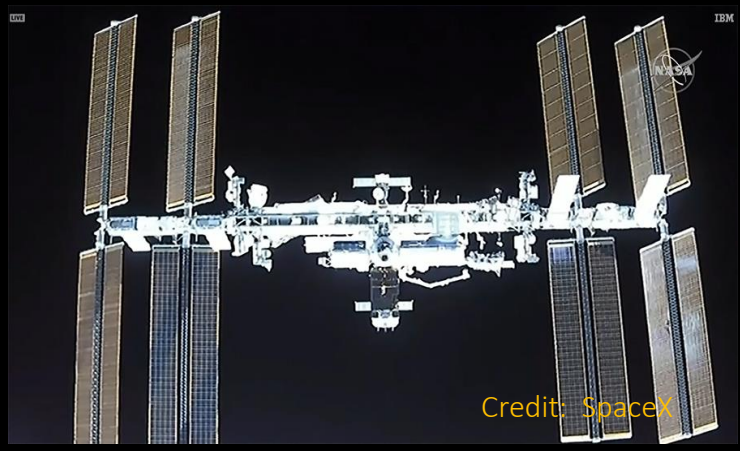


Credit : JAXA

Ryugu

Unimportant space news

- Revealed: The ashes of James Doohan (Scotty from Star Trek) were smuggled aboard the ISS in 2008
  - He has now orbited the earth 70,000 times (1.7 billion miles)



- Revealed: US, Russian smuggling has long been common in space, e.g., sandwiches & alcohol
  - Alcohol is prohibited, due to electronics & toilets
  - Russians like cognac more than vodka
  - Everyone wanted better food

Alexander Lazutkin (far left) and other Russian crew members drinking cognac about the Mir space station in 1997. Former cosmonauts have admitted to sneaking alcohol aboard missions in their space suits, in mislabeled 'juice' containers and even in hollowed-out books

- Members of the US Space Force will officially be called “Guardians”
  - From an old USAF Space Command motto “Guardians of the High Frontier” (Not … “of the Galaxy” or undead warriors in a video game that you’re thinking!)
  - Sure, and the official logo was inspired by older USAF Space command logos, not the Starfleet logo from Star Trek.

How many launches since the last meeting (Dec 12)?

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

Russian Angara A5 – new heavy lift rocket to ultimately replace the Proton M. Credit: Russian Ministry of defense, via spaceflightnow.com

Launches since last meeting (Dec 12, 2020)


Dec 13 – Falcon 9 – 15,000 lb. satellite for SiriusXM broadcasting


Dec 14 – Angara A5 (Russian heavy lift rocket)– test flight, 1st since 2014


Dec 15 – Electron (Rocket Lab) – 1st of 30 Synspective radar satellites


Dec 15 – Rocket 3.2 (Astra) – test launch from Alaska (FAIL)

- Launch sites can set up in a few days anywhere, on a concrete pad
- Small rocket competition for Rocket Lab, Virgin Orbit, Firefly, Relativity Space


Dec 17 – PSLV (India's Polar Satellite Launch Vehicle) – comm. satellite


Dec 18 – Soyuz – 36 OneWeb satellites (internet service).

- OneWeb is back from bankruptcy, planning 650 satellites, 325 lbs. each


Dec 19 – Falcon 9 – classified, for US NRO (Nat. Reconnaissance Office)


Dec 21 – Long March 8 (new Chinese medium lift) – 5 payloads


Dec 27 – Long March 4C – Military reconnaissance satellite


Dec 29 – Soyuz – French military reconnaissance satellite


Jan 7 – Falcon 9 – Turkish communications satellite

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Summary of launches (orbit or deep space) in 2020

- US: 44 missions, with 40 successes (includes Rocket Labs)
- China: 39 missions, with 35 successes
- Russia: 17 missions, 17 successes (including two by ESA in French Guiana)
- Europe (ESA): 5 missions, 4 successes
- Japan: 4 missions, 4 successes
- India: 2 missions, 2 successes
- Iran: 2 missions, 1 success
- Israel: 1 mission, 1 success

- Total: 114 attempts, 104 successes (vs. 102 attempts/97 successes in 2019)
- Tied 2018 for most orbital launches since 1990
- Most number of launch failures since 1971

Discussion & questions?

Credit: NASA

Featured Speaker: Gary Stephenson

- Topic: Space walks and space suits (ISS EVA Operations and the EMU)
  - Overview of space suit technology
  - Getting in, out, and around the space station
  - Technology to walk on the moon

- Houston lead systems engineer at Collins Aerospace supporting EVA Mobility Unit (EMU), spacesuit development, life support, hardware certification, …
- Previously at LinQuest, Boeing Satellite Systems, Hughes, ITT Aero-Optical division, …
- BS in physics, MS degree in systems engineering, with studies in space systems engineering, geophysics, astrophysics, electrical engineering, …
- Currently senior Staff Systems Engineer at Wisk Aero (Palo Alto, CA)