Monthly space news

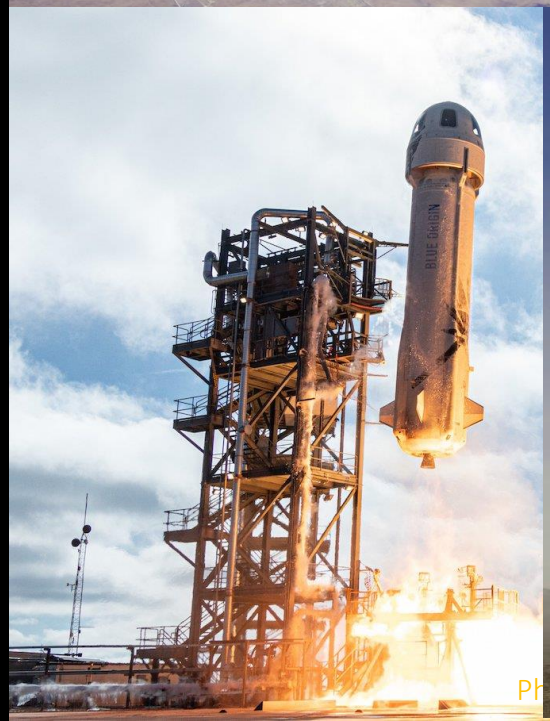
Greg Stanley August 7, 2021

NSS North Houston Space Society

Suborbital space tourism finally started

- Virgin Galactic launched July 11 (test)
  - First launch with passengers (+ 2 pilots)
  - Richard Branson + 5 other employees
  - 90 minute ride, mostly in the carrier aircraft, 3 minutes of weightlessness, 53.5 miles up
  - Next test late September, with Italian Air Force
  - Already 600 reservations at $200K-$250K
  - Tickets now increased to $450K !!

- Blue Origin launched July 20
  - First New Shepard launch with people
  - 4 passengers: Jeff Bezos, his brother, oldest, youngest person to fly in space
  - 11 minute automated ride (no pilots), 3 minutes of weightlessness, 66.5 miles up
  - Sold $100M for future flights



ISS (International Space Station) upgrade

- Russia launched the Nauka Science Lab module July 21, arrived July 29
  - 44,500 lbs., 43 feet long, first large pressured ISS element since 2011
    - In development for 20 years, originally as backup to first ISS module in 1998 (Zarya)
    - Launch scheduled for 2007, but delayed
  - 5x the mass of the old Pirs docking module in place since 2001, discarded July 26
  - Adds: science areas, sleeping compartment, toilet, O2 generation
- Included 37 foot European Robot Arm, built 15 years ago but never delivered
  - First to be able to crawl over the Russian parts of the station

Illustration credit: NASA TV/Spaceflight Now

ISS (International Space Station) upgrade, contd.

Nauka module (at right), docked with ISS. Photo credit: NASA

Cosmonauts in Nauka July 31. Credit Thomas Pesquet/ESA/NASA/Flickr

Nauka software glitch upset ISS orientation

- After docking, accidental 15 minute engine firing rotated the ISS 1.5 times
- Overwhelmed the normal gyro stabilization for the 930,000 lb ISS
- Fought 1 hour using thrusters in Zvezda module and a Progress cargo ship
- NASA flight director Zeb Scoville: “The ISS brought a knife to a gun fight”

“ Yeehaw! That. Was. A. Day.”

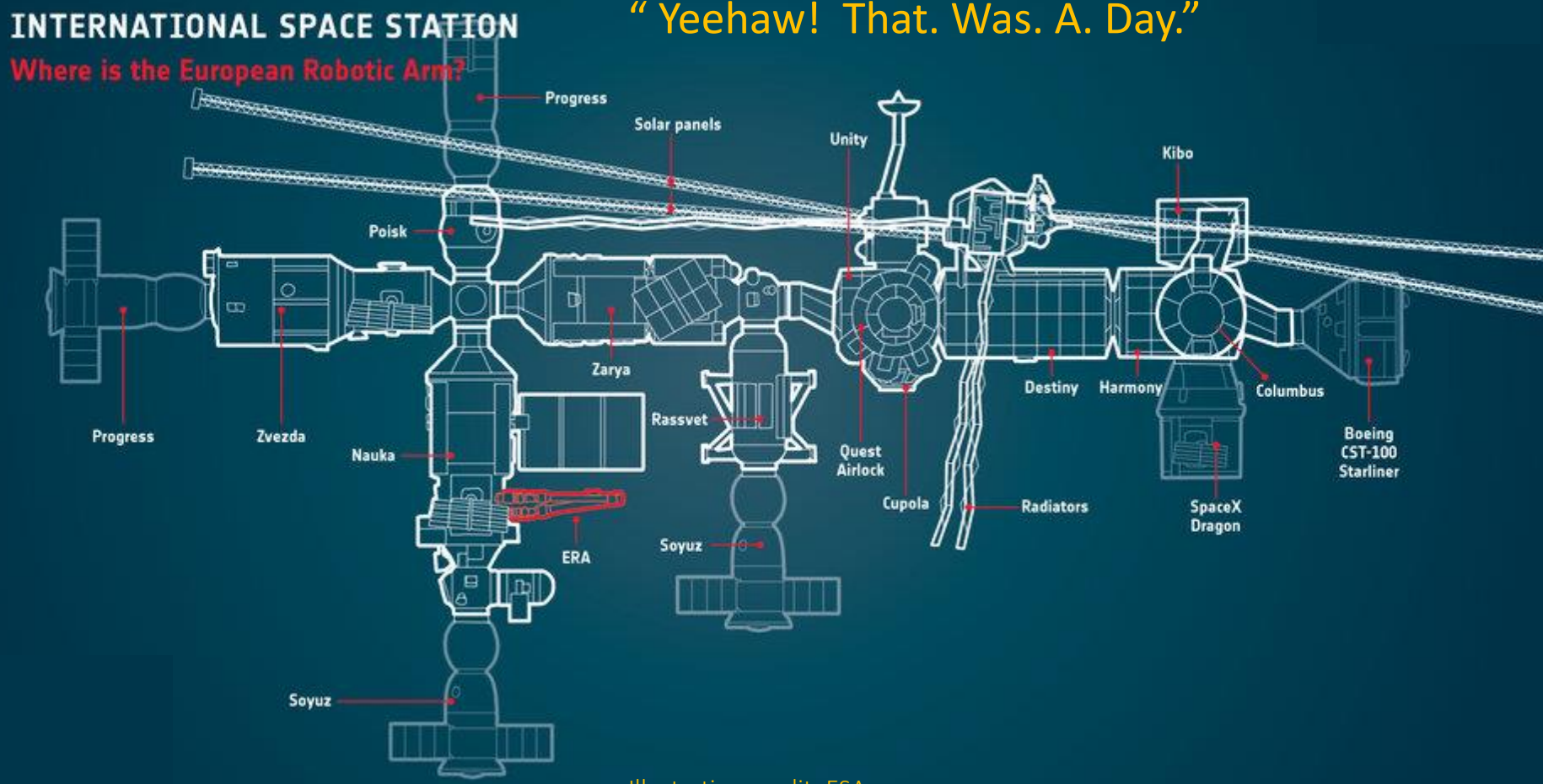


Illustration credit: ESA

Boeing Starliner launch delayed again

- Starliner is 1 of 2 “Commercial Crew” contracts from NASA to take astronauts to ISS
  - Uses an Atlas V rocket
  - Return to NM by parachute
- Dec. 2019 test failed to reach ISS due to software glitches
  - Wrong orbit, communications difficulties, glitch affecting thrusters
- New test will take cargo to ISS
  - Delayed due to ISS instability caused by Nauka module
  - New delay for a valve problem
- Next launch window not announced

Image credit: ULA

Lunar news

- SpaceX award for lunar Human Landing System upheld
- Missions researching in-situ lunar resource recovery

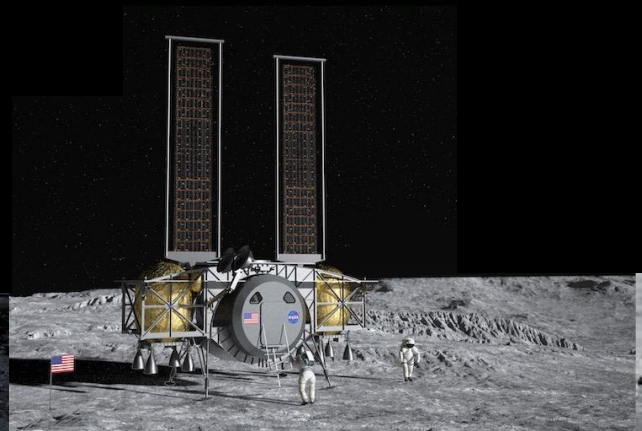
GAO upholds NASA Human Landing System (HLS) choice (2024+ lunar lander for Artemis program)

- Out of 3 choices, NASA awarded HLS to SpaceX in April
  - Forced by Congress budget limits on HLS
- Blue Origin, Dynetics appealed, so all funding stopped
- GAO (Government Accountability Office) rejected appeal

- (In desperation?) Bezos offers to forego $2B in payments for 2 years, add a test flight, and guarantee fixed price to develop alternative lander

Blue Origin (partnered with Lockheed Martin & Northrop Grumman)

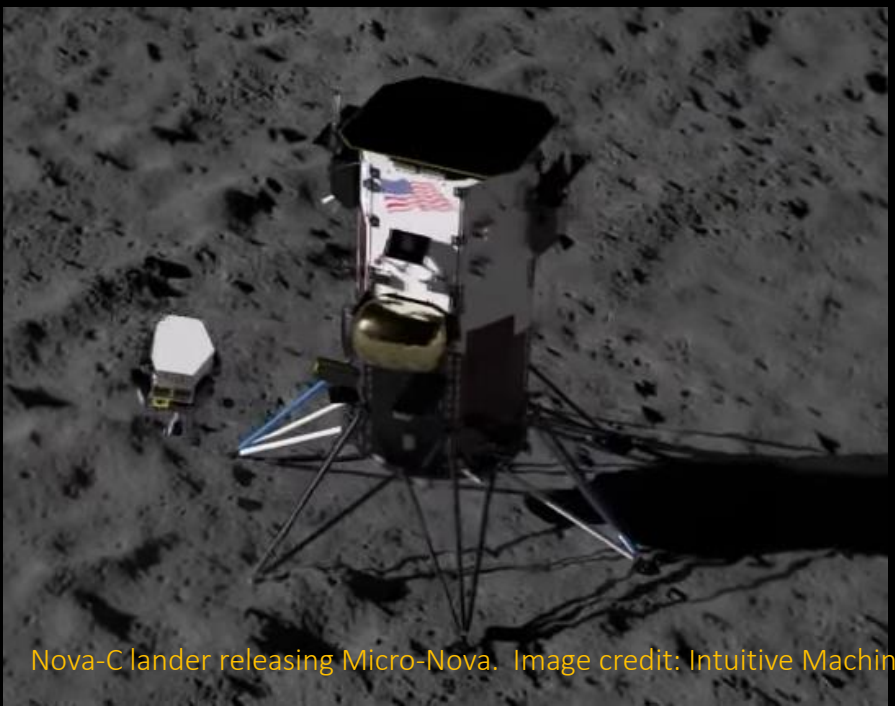
Dynetics (partnered with Sierra Nevada Corp)



SpaceX

Looking for water with a drone on the Moon

- NASA funding Arizona State University/Intuitive Machines to take first-ever pictures inside craters close to the lunar south pole
- $41.6 M to develop, fly, operate a deployable lunar “hopper lander” (Micro-Nova) – a drone on the moon – in December, 2022
  - 76 x 76 x 76 cm
  - Carry 1 kg payload 2.5 kilometers in multiple hops
  - Carried on the Nova-C lander (4 meters tall: VW beetle size) / Falcon 9 rocket
  - High resolution photos, temperatures inside PSRs (Permanently Shaded Regions), where water likely accumulates



Nova-C lander releasing Micro-Nova. Image credit: Intuitive Machines

Micro-Nova image credit: Intuitive Machines

Research: mining O_2 from lunar regolith (Helios/ispace)

- Helios (Israel) technology electrolyzes lunar regolith to extract O2, metals
  - O2 is a key to expansion in space: 70% of propellant weight, breathing
  - Regolith is 40% O2 by weight
  - Might cast metal into a mold: would be first human artifact produced on the moon
- Ispace (Japan) will deliver this test aboard its landers in 2023, 2024

Image credit: ispace

Image credit: Haya Gold for Helios

SpaceX Falcon Heavy now officially chosen for 2024 Europa Clipper mission (arriving 2030)

- Mission to Jupiter's ocean moon Europa dropped SLS in January
  - SLS cost, schedule, vibration; and the few SLS are dedicated to Artemis (Moon) program
- $178 million contracted to SpaceX for a Falcon Heavy rocket
  - Saved $1B in rocket cost, $1B in redesigning SLS for vibration, likely launch delays
- Longer trip, starting on time

Image credit: NASA/JPL-Caltech

How many launches since the last meeting (July 10)?

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

Russian Proton rocket with Nauka science lab. Credit: Roscosmos

Launches since last meeting (July 10, 2021), part 1


Jul 9 – Long March 6 –5 small spy satellites (belated report)


Jul 18 – Long March 2C – 3 spy satellites, 1 commercial data relay satellite


Jul 21 – Proton – Nauka lab module to ISS (International Space Station)


Jul 29 – Electron (Rocket Lab) – small US military R&D satellite


Jul 29 – Long March 2D – Chinese military mapping satellite

Jul 30 – Ariane 5 – 2 communications satellites for Brazil & France


Aug 3 – Hyperbola-1 (iSpace, a private Chinese company) – FAIL


Aug 4 – Long March 6 – small satellites testing electric thrusters, comms.


Aug 5 – Long March 3B – communications satellite, probably military

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Award for most scenic launch site

Xichang Satellite Launch Center in Southwest China (since 1984)

- But there's a price: These inland site launches end up dropping boosters and fairings (nose cones) into inhabited areas
  - Early Chinese launch sites were all located inland, out of easy reach of the US Navy
- On this recent launch, the Chinese are experimenting with guiding the fairings to a controlled landing site with a parachute

Chinese Long March 2C launch from Xichang Satellite Launch Center, Southwest China, July 18, 2021. Credit: CASC

Discussion & questions?

Image: NASA

Featured speaker: Gitika Gorthi

- Founder/CEO of IgnitedThinkers (space education for all)
- Does aerospace medicine research with Baylor, Brown
- NASA Ames Center 2021 GeneLab intern
- Rocketry enthusiast
- Senior at Chantilly High School (Northern Virginia)

- TOPICS
  - IgnitedThinkers
  - Aerospace medicine research
  - Career paths besides astronaut, for people interested in space