Rapid Launch
Keeping US Connected

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Spending Bills - most of the oxygen

FY 2023 Annual Appropriations Bills

- Regular, 12 annual approps bills still need to be passed by the end of the current fiscal year (September 30).
- If not, Congress must pass a continuing resolution ("CR") to avoid government shutdown.
- Duration of the CR is yet to be determined, if applicable.

"**Inflation Reduction Act**" was signed into law in August of this year. This is and will be President Biden's most significant legislative victory.

- This has a focus on climate and healthcare spending.
- $739 billion tax increase.

Space Legislation

S. 3306 “Space Act”

- Introduced by Senator Marco Rubio (R-FL)
- This bill prohibits the purchase of certain telecommunications or aerospace equipment and services from China and requires reporting on investment by foreign persons in U.S. space companies.
- No funds made available to the Department of Commerce or the National Aeronautics and Space Administration (NASA) may be used to purchase or lease telecommunications or aerospace hardware or software equipment or services from any telecommunications or aerospace corporation, subsidiary, or affiliate associated with China or the Communist Party of China.
- The National Space Council shall submit a specified report to Congress on space investment competition from China and Russia.

S. 360: “21st Century Space Grant Modernization Act of 2021”

- The bill revises the purposes of the program to support space research programs that promote equally the state and regional STEM (science, technology, engineering, and mathematics) interests of each space grant consortium.
- The National Aeronautics and Space Administration (NASA) shall carry out the program with the objective of providing hands-on research, training, and education programs with measurable outcomes in each state.
- Introduced by Sen. Capito (R-WV). Bi-partisan co-sponsors.

Orbital Sustainability Act of 2022 (ORBITS Act) *

- The ORBITS Act is a bi-partisan bill from Senators Hickenlooper, Cantwell, Wicker, and Lummis that addresses the need for safe and sustainable operations in low-Earth orbit and nearby orbits from the increasingly dangerous amounts of orbital debris.
- The bill directs the NASA Administrator, in coordination with the National Space Council, to identify and make public the orbital debris that poses the greatest threat to the safety of orbiting satellites and other on-orbit activities.
- The ORBITS Act directs the Space Technology Mission Directorate within NASA to establish a new debris remediation program and authorizes $150M for fiscal years 2023 through 2027. It directs the procurement of orbital debris removal services through an open and honest competition.

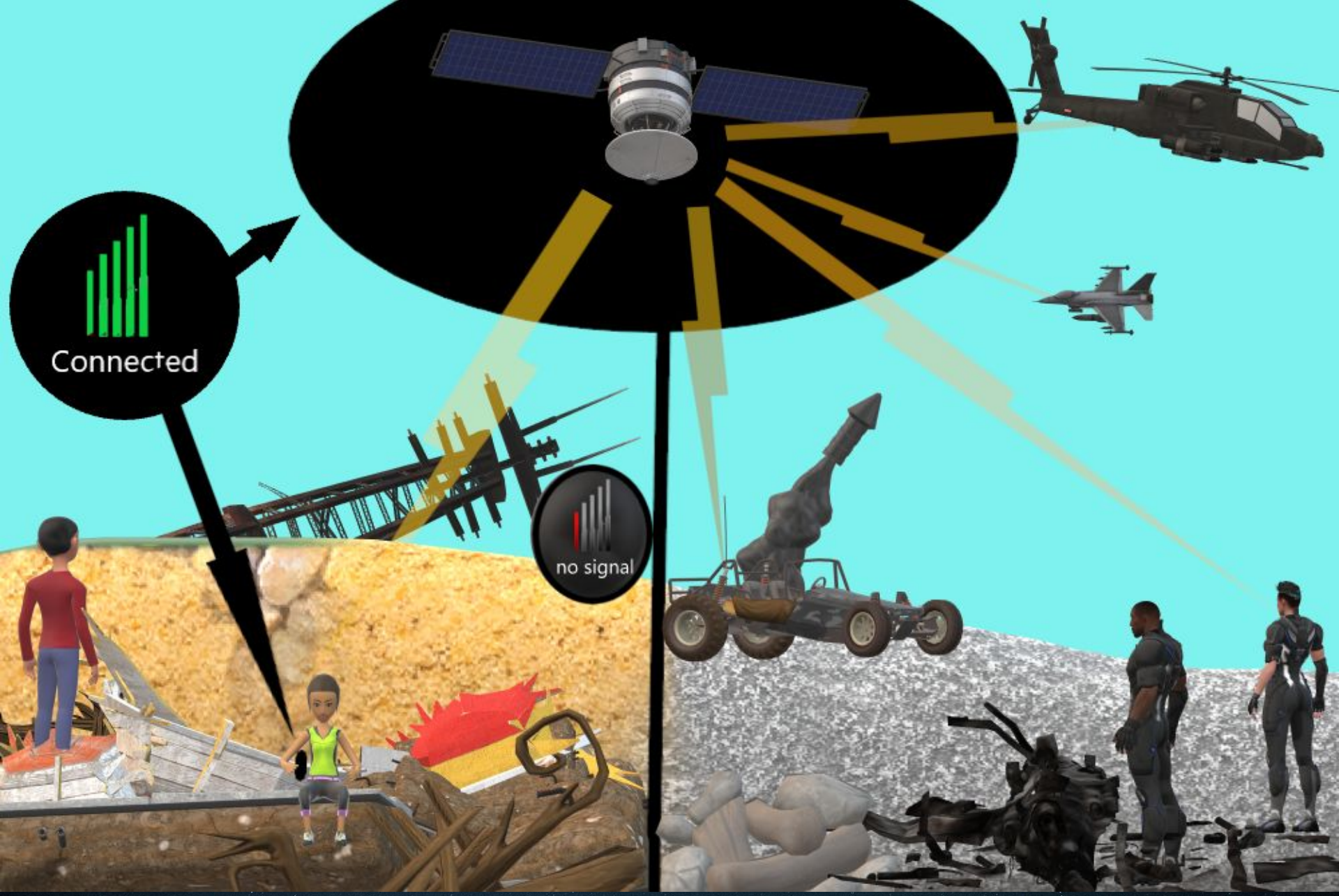
CubeCab and Rapid Launch

Rapid launch is possible! Two things can help!

- Government funding of Rapid Launch Procedures
- FAA streamlining the Launch Paperwork process to allow for Rapid Launch

Why do we need Rapid Launch Capabilities?

1. Restoring Communications Quickly
2. Early Detection of Natural Disasters
3. Repair or Replace Damaged or Outdated Satellites
4. Rapid Response to On-orbit Events



Drawing by Sabrina Westerman for the article
“Space, Freedom, and the Future- How Rapid Satellite Launch Capabilities Can Support Critical DoD Missions”:
https://nstxl.org/space-freedom-and-the-future-how-rapid-satellite-launch-capabilities-can-support-critical-dod-missions/

Restoring Communications Quickly

Natural disasters threaten the United States every year such as hurricanes, earthquakes, and even tsunamis.

- “The 2021 Atlantic hurricane season was the third-most active Atlantic hurricane season on record, producing 21 named storms and becoming the second season in a row – and third overall – in which the designated 21-name list of storm names was exhausted.”

According to Zayan EL Khaled and Hamid Mcheick in their article “Case studies of communications systems during harsh environments: A review of approaches, weaknesses, and limitations to improve quality of service” in 2019:

- During disasters, TI [telecommunications infrastructure] may fail through a variety of reasons. Many investigations demonstrate the main three reasons for CS [communications systems] failure: Destruction of CS components, Damage of supporting infrastructure, [and] Congestion”

- https://en.wikipedia.org/wiki/2021_Atlantic_hurricane_season
- https://journals.sagepub.com/doi/full/10.1177/1550147719829960

Restoring Communications (continued)

- “During the first 72 h after a ND [Natural Disaster], rescuers are more likely to save lives of victims, and fast evaluation of losses is required. CSs [Communication Systems] are essential during this period to support the exchange of information between entities such as humanitarian organizations, communities, and governments.”
- “During ND [Natural Disaster] like earthquakes, hurricanes, and tsunamis, traditional means of communications such as fixed or wireless phones might be damaged. Thus, each country must prepare alternatives for such situations so that DM organizations can respond quickly and efficiently.”

FEMA could fund rapid launch of satellite constellations to restore communications, programmed upon deployment to work with equipment used by the relevant first responders, to cut down on response time and deliver resources after a disaster. Limited emergency funding means small satellites are appropriate, as an immediate patch until more permanent solutions can be deployed.

- https://journals.sagepub.com/doi/full/10.1177/1550147719829960

Early Detection of Natural Disasters

NOAA's Work with Ocean Sensors

According to Debra Werner's article "NOAA to take first step toward a small satellite constellation" published July 7, 2021:

- "NOAA is exploring the benefits of feeding data supplied by a constellation of small satellites in low Earth orbit into weather forecast models."
- "NOAA is not the only government agency exploring the benefits of gathering weather data with small satellites. The U.S. Space Force is funding development of small satellites to characterize clouds and provide weather data in military theaters of operations."

This data could prove instrumental in early warning systems for tsunamis and hurricanes, and leads to our next point.

- https://spacenews.com/noaa-to-take-first-step-toward-a-small-satellite-constellation/

Repair or Replace Damaged or Outdated Satellites

Satellite components fail, get hit by orbital debris too small to track, or become outdated. Rapid launch capabilities could expand what we do with existing satellites.

- Replace a failed satellite quickly to restore communications
- Send a repair drone to fix a large satellite so it does not have to be remade and relaunched years later
- Test out new satellite components in space every 1-2 weeks instead of waiting months or years for the next testing opportunity
- Update current satellite communications
  - ""With small satellites, you could update technology on a much more rapid schedule and at lower cost," said Kevin Maschhoff, BAE Systems engineering fellow."

- https://spacenews.com/noaa-to-take-first-step-toward-a-small-satellite-constellation/

Rapid Response to On-orbit Events

Last November's ASAT

- As we have seen, destroying a satellite from earth creates orbital debris that should be cleaned up immediately upon creation to contain or eliminate the damage to other space assets.

Late-detected orbital visitors

- "Oumuamua has not yet been definitively classified as a comet or an asteroid – it might be something else entirely…"

Orbital collisions creating debris

- Current policies can only "advise" two satellites to more orbit if they are on a collision path - and if they have no propulsion or way to change their orbit, then they will collide and cause debris that need to be cleaned up before they get out of hand.

- https://www.bbc.com/future/article/20210506-the-interstellar-voyagers-that-visited-our-sun

Rapid Launch can help keep US connected

We need to have the ability to rapidly launch satellites - not only for our interests in space, but also to keep us here at home safe. The ways to do this is through fully developing and funding the technology to make this possible, but also through streamlining the requirements and restrictions for satellite launch permissions.

- CubeCab has the technology for a next day rocket launch of a 3U CubeSat, but needs funding like many other companies out there.
- Once funded, satellite operators who want rapid launch must fill out a lot of paperwork from the FAA and other agencies to get their satellite launched.

Both are important to fund and streamline, so we can save lives when disaster strikes.

Links to Further Information

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See our latest article “Space, Freedom, and the Future- How Rapid Satellite Launch Capabilities Can Support Critical DoD Missions”: https://nstxl.org/space-freedom-and-the-future-how-rapid-satellite-launch-capabilities-can-support-critical-dod-missions/