The Alliance for Space Development
1455 Pennsylvania Ave NW, Ste 400
Washington, DC 20004

Commercial LEO Destinations

Continue to fully fund the Commercial LEO Destinations (CLD) program to ensure continued US access to, and presence in, low Earth orbit (LEO), while promoting economic development in LEO.

Projected: $229.6m FY25

The consensus over multiple Congresses and Administrations is that the successor to the wildly successful International Space Station (ISS) should be a competitive ecosystem of privately built and operated space stations.

Modeled on the successful commercial cargo and crew public-private partnerships, the Commercial LEO Destinations (CLD)[1] program is a series of contracts and milestones to help jump-start an ecosystem of space station services and to help ensure those companies provide services that are compatible with NASA's needs. As of 2023, the CLD program includes the following companies/consortia:

- Axiom Space
- Blue Origin
- StarLab (Voyager/Airbus)

As with previous NASA-led public/private partnerships, the program specifically allows for downselects and failures. ***It is critical, for competition's sake, that there be at least two providers that survive the process and deliver robust and sustainable facilities*** for NASA, other agencies, other companies, academia, and the rest of the economy. The result should be a sustainable ecosystem that can efficiently and cost-effectively support commercial and scientific research, development, and manufacturing of space-produced products for sale back on Earth.

A key feature of NASA's public/private partnerships is that some participants in the final commercial service are not required to have gone through the original program. For example, Sierra Space's Dreamchaser was not an original participant in the development phase of the Commercial Cargo program but is now participating in the program. The long-term result should be an ecosystem that can operate and grow on its own, allowing NASA to concentrate on going to the Moon, Mars, and beyond.

Continued Congressional support for a ***competitive Commercial LEO Destinations program*** is essential to all that comes later in space.

[1] https://www.nasa.gov/leo-economy/commercial-destinations-in-low-earth-orbit

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Increase Funding for NEO Surveyor

Protect Earth from hazardous asteroids by increasing funding for the NEO Surveyor space telescope, to recover from major funding cuts and carry out Congressional direction.

Projected: $337.7M FY25

NEO Surveyor is the only viable means to meet the congressionally directed near-Earth object (NEO) detection goal in as little as 10 years. The requested funding would enable the program to recover from major FY22 and FY23 funding reductions and launch as early as 2027.

Despite ongoing bipartisan support in Congress and the strong recommendations of the science community, NASA has not prioritized funding for NEO Surveyor, handing the program "baffling" cuts in recent years. In the past year, NEO Surveyor received support in the Planetary Science Decadal Survey[1], from space advocacy groups[2], and from Republicans on the House Science Committee.[3]

- In **2005, Congress directed NASA to locate 90% of near-Earth asteroids larger than 140 meters across, within 15 years**.[4] Nearly 25 years later, the **Planetary Defense Coordination Office estimates it will still take at least 30 more years to meet this goal**.[5]

- In FY22, NEO Surveyor's first year in the NASA budget, $142M was enacted, but NASA did not allow the program to execute most of this funding.

- In FY23: the NEO Surveyor program plan called for $170M, but the President's Budget Request included only $39.9M (**a 76% reduction**) and delayed launch by two years to 2028.

- CHIPS & Science Act: directed NASA to develop NEO Surveyor "on a schedule to achieve a launch-readiness date before March 30, 2026, or the earliest practicable date…."

- FY23 Omnibus Appropriations Conference Report provided "not less than $90M for NEO Surveyor" and "notes concern about…the proposed launch slippage to 2028…"

- NEO Surveyor passed its Key Decision Point C review, 29 Nov 2022. In this review, NASA revised the total program cost to $1,200M and expected launch by June 2028.[6]

The requested $337.7M in FY25 will allow the program to recover from draconian, self-inflicted cuts by NASA, and help NASA carry out a congressional direction to expedite the launch of NEO Surveyor.

Endnotes

[1] Marcia Smith, “Planetary Decadal Embraces Planetary Defense, Endorses NEO Surveyor,” SpacePolicyOnline.com, 26 April 2022, https://spacepolicyonline.com/news/planetary-decadal-embraces-planetary-defense-endorses-neo-surveyor/

[2] “A joint-letter in support of NEO Surveyor,” The Planetary Society, 16 June 2022, https://www.planetary.org/articles/tps-nss-joint-letter-supporting-neo-surveyor

[3] “Science Committee Members Seek Answers on NASA's Progress in Identifying Hazardous Asteroids,” House Science Committee, 28 November 2022, https://science.house.gov/press-releases?ID=E6BA6299-C78F-4EB1-AF50-1C503C0DB800

[4] Text - S.1281 - 109th Congress (2005-2006): Sec 321, George E. Brown, Jr. Near-Earth Object Survey Act. 42 USC 16691, 30 December 2005, https://www.congress.gov/bill/109th-congress/senate-bill/1281/text

[5] Lindley Johnson, “Update on Planetary Defense,” NASA PDCO, presented 6 Dec 2022, p. 20, https://science.nasa.gov/files/atoms/files/09-Johnson-Fast-PDCO.pdf

[6] “Near-Earth Object Surveyor.” NASA Blogs, 6 December 2022, https://blogs.nasa.gov/neosurveyor/

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Fund and Protect the Space Technology Mission Directorate (STMD) Budget

Fully fund the Space Technology Mission Directorate research agenda, including in situ resource utilization (ISRU) projects, to close technology gaps critical to an economically sustainable presence beyond low-Earth orbit.

Projected: $1.4194B FY25

Pending the release of the PBR, funding levels reflect FY23 funding information.

The Space Technology Mission Directorate's space technology research and development program has been regularly underfunded for two decades. This has delayed development and increased costs for critical technology necessary to enable and economically sustain a human presence in cislunar space and beyond.

- Congress has not funded STMD at the requested levels over many years. In FY23 enacted levels were 17% less than the PBR. This has significantly disrupted the R&D technology program plan, resulting in delays and increased near term costs. Ultimately this will have negative impacts on Artemis, through increased out-year costs and technology capability gaps.

- In addition to program reductions, unfunded space technology earmarks have exacerbated challenges. The unfunded earmarks further disrupt the STMD program, when NASA must pay for these earmarks at the expense of planned research projects.

- Without the maturation of key technologies, costs to access and operate on the lunar surface (and beyond) will be higher, making missions more difficult and riskier. This will put America and her Artemis partners at a competitive disadvantage, compared to nations that are actively seeking an economic advantage with their technology development activities.

- In situ resource utilization (ISRU)[1], the ability to process or use in-place lunar resources to 'live off the land,' is particularly in need of support. Much of this R&D is performed by many small businesses and universities, across the country. Without ISRU technology, NASA will build Artemis around the "supply-everything-from-Earth" approach, which results in the highest life cycle cost.

- Continuous human presence on the Moon, enabled by ISRU and a public-private approach (where NASA can lease privately operated lunar surface facilities similar to

[1] In situ resource utilization includes processing resources that exist in-place to derive hydrogen and oxygen for fuel and breathing, and lunar "soil" for landing platforms and building materials. Blue Origin recently announced a breakthrough in constructing silicon chips from simulated lunar soil, but there is much more to be done.

Commercial LEO Destinations), is expected to dramatically increase scientific discovery, similar to gains on ISS as compared to Shuttle single-sortie missions.

- Continuous human presence does not mean an ISS on the Moon. Rather it involves human activities over an extended period of time, with lower cost and lower risk. This “ability to stay” is necessary to avoid lunar missions that resemble Apollo’s short visits. And these capabilities will be necessary not just to eventually operate on Mars, but even to make the journey.

The space environment beyond LEO is harsh and challenging. A long-term human presence beyond LEO will require new technology, developed by NASA, the private sector, universities, and international partners. STMD’s R&D budget directly supports these technologies to enable sustainable operations in cislunar space and beyond. It is imperative that Congress support STMD’s R&D budget to ensure America’s competitiveness and strategic position in cislunar space.

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Pass the ORBITS Act (S.447)

The ORBITS Act of 2023 directs several agencies to begin to figure out how to remove orbital debris (human-made space objects that are no longer in use and can harm orbiting satellites and on-orbit activities) from important orbits.

The Act requires the NASA to:

- publish and periodically update a list of debris that poses the greatest immediate risk of harm to orbiting satellites and on-orbit activities,
- establish a demonstration program to foster the development of technologies to remediate the orbital debris on the list, and
- carry out other research and development activities to advance technologies for remediating orbital debris.

NASA (and other relevant agencies) may also contract for remediation services to support the commercial availability of such services.

Second, the National Space Council must update the Orbital Debris Mitigation Standard Practices within 90 days of the bill's enactment with periodic updates after that. The updates address satellite constellations and other planned space systems, collision risks, and disposal of space systems after missions. The updates will also inform regulations of other agencies concerning orbital debris and bilateral and multilateral discussions with other countries concerning certain space activities.

Third, the Department of Commerce must facilitate the development of standard practices to coordinate on-orbit space traffic. Upon completion of the practices, Commerce and other federal departments must *promote* their adoption and use for space missions.

Space debris and when/how to manage it

Space debris can be a problem but often it is not. There is a great deal of hype around the problem due, in part, to a few movies and something called the Kessler Syndrome[1]. The Kessler Syndrome is a theorized limit to orbital crowding that can lead to a catastrophic cascade of debris forming collisions that can make entire orbits unusable.

A recent cost/benefit analysis by NASA[2] on orbital debris mitigation strategies suggests that better situational awareness and maneuverability by spacecraft is a far better strategy. In Kessler's original analysis, there was no assumption that spacecraft could simply move out of the path of an oncoming bit of debris. NASA's analysis showed that the larger threat is not large pieces of debris but very small ones that are very hard to

[1] Kessler syndrome - Wikipedia
[2] Cost and Benefit Analysis of Orbital Debris Remediation | NASA

track. The report suggested that a ground or space-based laser system could be used to slow down these smaller pieces of debris sufficiently for them to reenter the atmosphere safely. NASA's analysis indicates clearly that there are many ways to deal with the problem and that a methodically responsive approach is necessary.

The ORBITS Act is a good first step to learning how to manage and/or mitigate the problem and should be supported.