

WHO WE ARE:

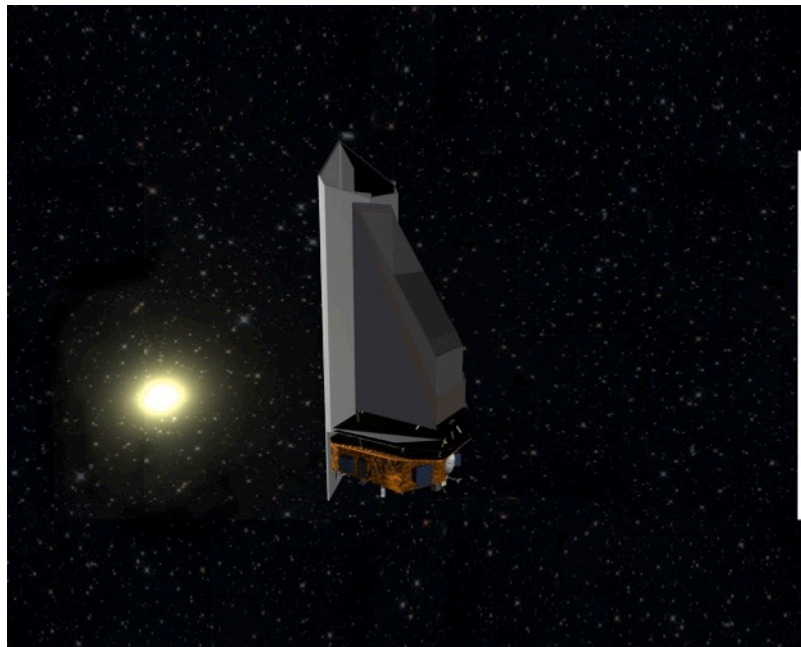
- Private U.S. citizens who advocate at our own expense for a bold and well-reasoned space agenda worthy of the U.S.

NON-PROFIT SUPPORTING ORGANIZATIONS:

- National Space Society
- Space Frontier Foundation
- Foundation for the Future
- The Lifeboat Foundation
- The Mars Foundation
- The Mars Society
- The Moon Society
- Space Development Foundation
- Space Development Network
- Space Development Steering Committee
- Space for Humanity
- Space Renaissance USA
- Space Tourism Society
- Students for the Exploration and Development of Space
- Waypaver Foundation

1. Reducing the cost of access to space
2. Stimulating and accelerating the growth of space industries and commerce
3. Making the development and settlement of space a clearly defined part of why we are sending humans into space

1. Support planetary defense by fully funding NEO Surveyor
2. Support commercial development of Low Earth Orbit by fully funding the LEO Commercialization Program including Commercial LEO Destinations (CLD)
3. Support commercial development of Cislunar Space
4. Start developing and demonstrating Space Solar Power



Near Earth Object Surveyor Mission (NEOSM) Telescope (Source: NASA)



Chelyabinsk Meteor (Source: NASA)

Why is Planetary Defense Important?

- In 2013 an asteroid struck near Chelyabinsk, Russia, damaging buildings, collapsing roofs, shattering windows, and hospitalizing hundreds of people
- About a million asteroids larger than the Chelyabinsk object (~60 ft) cross Earth's orbit. If we do nothing, roughly 20,000 of these objects are expected to eventually hit Earth
- Potential effects range from city killers to regional devastation to mass extinction
- The next major impact could be millennia or more in the future or just a few weeks from now
- Humanity has the technical capacity to discover, track and deflect the vast majority of dangerous objects at modest cost
- Detection of a potential hazard is the essential first step in planetary defense
- Once an object targeting Earth is found, funding deflection will be easy
- The National Academies of Sciences, Engineering, and Medicine recommends a dedicated infrared space based telescope for this task

Why is NEOSM the next critical step in protecting our planet?

Citizens' Space Agenda

- Current NASA and international efforts to find dangerous Near Earth Objects (NEOs) using primarily ground-based instruments have inherent limitations:
 - Cannot see near the Sun, near the Moon, during daylight, or through clouds
 - The best frequencies for detection (infrared) are absorbed by the atmosphere
- An excellent addition to the search would be JPL/University of Arizona's Near Earth Object Surveyor Mission (NEOSM), a space-based infrared 0.5 meter telescope
 - NEOSM will be located at the Earth-Sun L1 point, allowing it to eventually detect most football-field sized objects or larger, those capable of regional devastation, well before they are near Earth impact
 - Total procurement cost, including launch, is approximately \$800 million
- Objectives
 - Find 2/3 of all objects larger than 140 meters within five years
 - Find >90% of all objects larger than 140 meters within 10 years
- **Request: Will you support full funding NEO Surveyor (\$143M) for FY 2022 and \$811.2M for FY2022-2026?**

Commercial LEO Development

Citizens' Space Agenda



International Space Station (ISS) (Source: ISS)



Falcon 9 (Source: SpaceX)



Crew Dragon (Source: SpaceX)

- We have had a sustained human presence in Low Earth orbit (LEO) with the International Space Station (ISS) since 2000
- The ISS has a limited lifetime, will eventually be decommissioned, and the Russians may pull out starting in 2025. The US needs to ensure a continued presence in LEO
- Companies are developing their own platforms, commercial LEO destinations (CLD). Some start attached to ISS, some start independently. All expect to become independent space stations with a diverse customer base
- A robust commercial ecosystem in LEO can satisfy the government's need for a LEO facility at a far lower cost than ownership
- Commercial LEO stations can provide a greater range of services to international partners than the ISS can currently support

- The Commercial LEO Development Program supports
 - Commercial space industry efforts to develop a sustained commercial LEO presence and transition of LEO human space flight operations to commercial partners
 - Development of commercial LEO destinations (CLD) and capabilities for use by NASA and the private sector to enable a seamless ISS transition
 - Stimulation of the growth of commercial activities in LEO
- LEO products currently in development include:
 - Very high quality fiber optic cable
 - Artificial retinas
 - Artificial hearts and other organs derived from a patient's own cells
 - Single crystal semiconductor development
 - Media, entertainment, and private human spaceflight

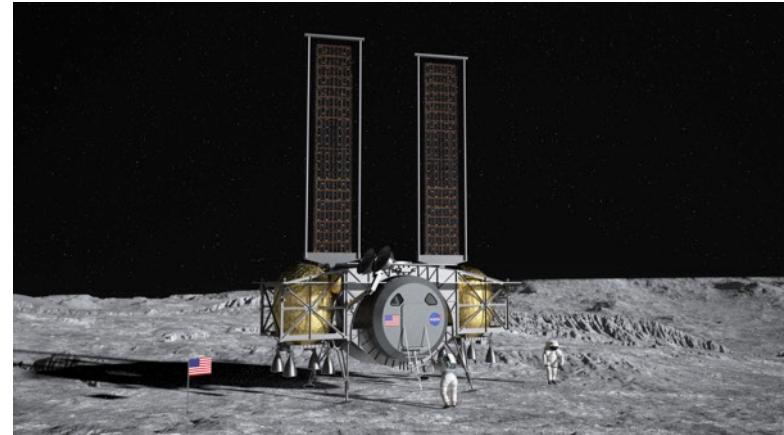
Request: Will you support \$101.1M for FY2022 and \$300-400M over FY2022-2025 for 2-4 Commercial LEO Destinations?

Commercial Cislunar Development

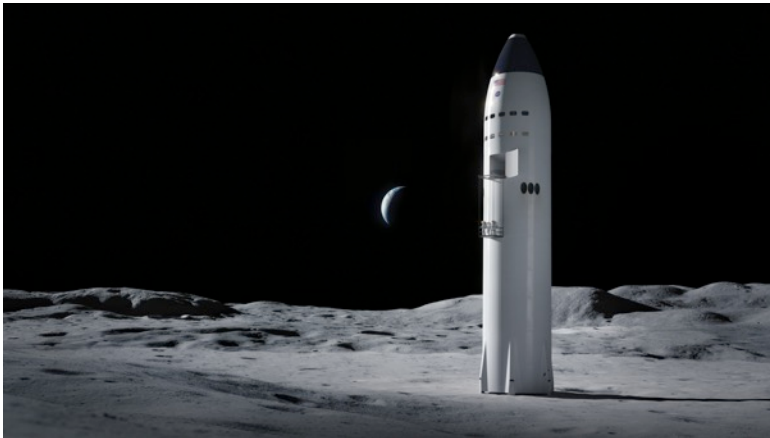
Citizens' Space Agenda



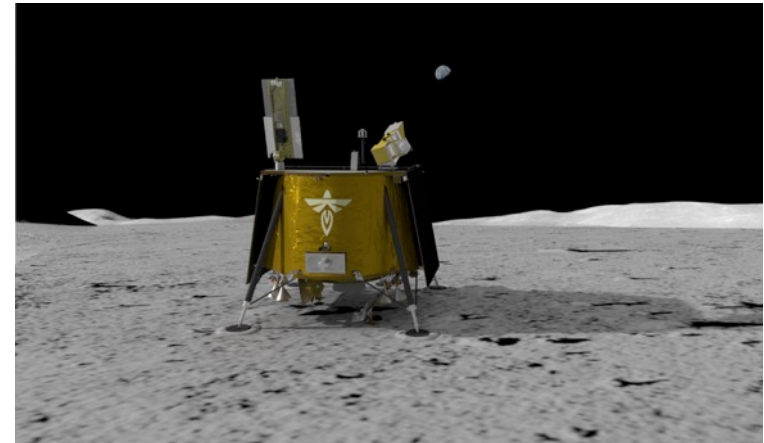
Integrated Lander Vehicle (Source: Blue Origin)



Dynetics Human Landing System (Source: Dynetics)



Starship (Source: SpaceX)



Blue Ghost (Source: Firefly Aerospace)

- Artemis includes commercial providers for lunar development with:
 - Human Lander Systems (HLS) to put astronauts on the Moon
 - Commercial Lunar Payload Services (CLPS) to put robots on the Moon
 - The Volatiles Investigating Polar Exploration Rover (VIPER) which will look for commercially significant quantities of ice for propellant
- “Living off the land” using permanent in-space infrastructure is the most cost-effective way of exploring cislunar space
- Development of cislunar space using lunar resources and infrastructure is an investment that reduces future costs, including the exploration of Mars

The first steps toward an affordable, sustainable, and ultimately successful return to the Moon involve

- being able to deliver payloads and humans to the surface,
- identifying near-surface materials for propellant and construction,
- and using commercial partners as often as possible

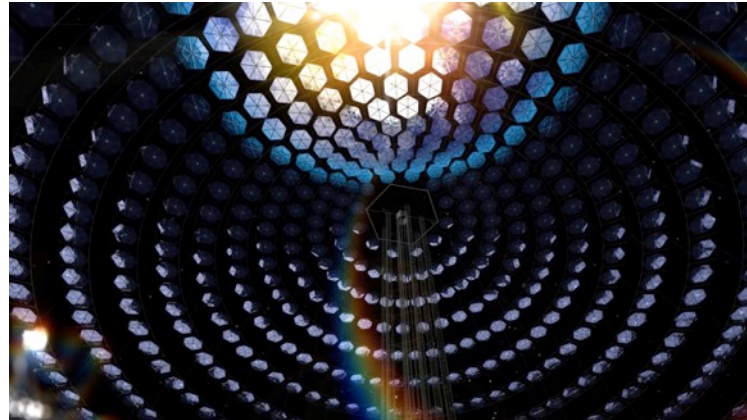
Request 1: Will you support

- funding the Office of Space Commerce to develop a plan for implementing a Strategic Space Commodities Reserve?
- funding the Office of Space Commerce to analyze public policy tools for encouraging, supporting, and privately financing cislunar commercial markets
- a Sense of Congress resolution that it is the goal of the United States to have 1,000 Americans living and working in space by the year 2040?

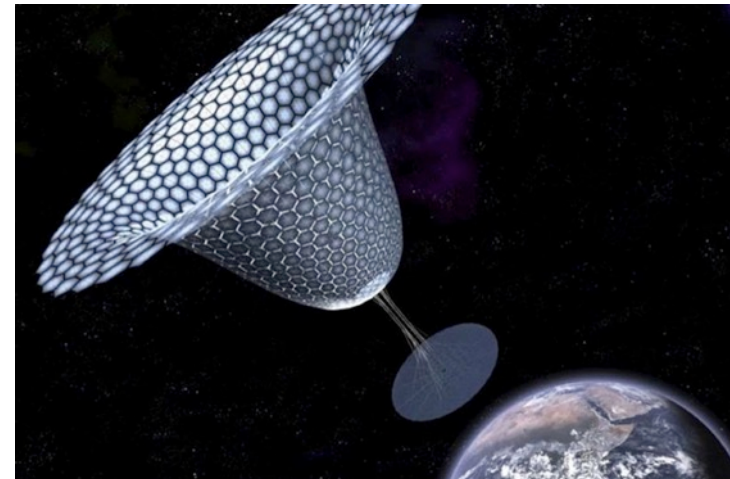
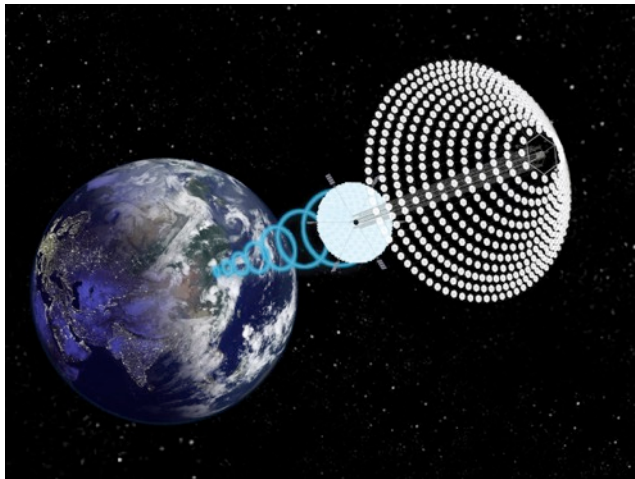
Request 2: Will you support full funding for

- CLPS at \$254M in FY2022?
- HLS at \$1,195M in FY 2022, and in out years enough to support two viable commercial partners?
- VIPER at \$433.5M through 2023?

Space Solar Power (SSP)



SSP mirrors that reflect onto panels that take in sunlight on one side and put out microwaves on the other (Source: John Mankins)



Space Solar Power (SSP)

- SSP refers to gathering the Sun's energy in space and beaming it to Earth.
 - Supplies extremely large quantities of reliable, predictable carbon free energy
 - Integrates well with ground solar and wind
 - Exports energy to global markets
 - Supplies substantial electrical power to remote areas
- Traditionally SSP has a hard time competing with ground production. However:
 - Launch cost is a large fraction of SSP expense. It has dropped substantially (from \$20,000/kg to \$1,400/kg) in the last 10 years, and new vehicles in flight test today may reduce these costs a great deal more
 - Manufacturing space hardware is an even larger fraction. Hyper modular designs consisting of large numbers of identical modules amenable to mass production have been demonstrated by fleets of identical communication satellites to reduce hardware cost by as much as 99%.
- Much of the needed technology has been developed, but significant technical and financial risks remain. Most of this risk could be retired by sub-scale SSP demonstration plants built as public/private partnerships.

Space Solar Power (SSP)

- SSP momentum:
 - UK government commissioned a September 2021 report which found SSP could be price competitive and that 15% of UK energy could be SSP by 2042 while making a significant contribution to achieving carbon Net Zero by 2050
 - Caltech revealed donations for SSP research of over \$100M going back to 2013
 - Beyond Earth Institute published a very positive August 2021 report and a draft Space Policy Directive placing SSP at the heart of a government-wide initiative
 - Progressive Policy Institute published a very favorable report in August 2021
- The energy market is so large that those developing successful SSP will dominate cislunar space. China has a vigorous SSP program

Request: Will you support

- **A vigorous U.S. SSP program?**
- **DOD's Space Rapid Capabilities Office (sunlight to microwave conversion) at \$67M? (PE 1206857SF)?**
- **DOD's Operational Energy Capability Improvement Fund (power beaming) at \$74M? (PE 0604055D8Z)**
- **DOD's OECIF – Non S&T (PE 0604555D8Z) at \$23M?**