Alliance for Space Development 2020

Citizens' Space Agenda

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
- Lifeboat Foundation
- Mars Foundation
- Mars Society
- Moon Society
- Students for the Exploration and Development of Space
- Students on Capitol Hill
- Space Development Foundation
- Space Development Steering Committee
- Space for Humanity
- Space Renaissance USA
- Space Tourism Society
- Tea Party in Space
- Waypaver Foundation

Alliance for Space Development 2020 Objectives

Citizens' Space Agenda

1. Support planetary defense by fully funding NEOSM
2. Support commercial development of Low Earth Orbit by fully funding the LEO Commercialization Program
3. Support commercial development of the Lunar surface by fully funding the Artemis Program
4. Start developing and demonstrating Space Solar Power (SSP)

Why is Planetary Defense Important?

- In 2013 an asteroid struck near Chelyabinsk, Russia damaging buildings, collapsing a factory roof, shattering windows, and sending hundreds of people to the hospital
- 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 or regional devastation to mass extinction
- The next major impact could be centuries or more in the future or just a few weeks from now
- Humanity has the technical capacity to discover and track the vast majority of objects that would cause significant damage on Earth at modest cost
- *A simple truth:* There will be no space development or settlement if our civilization lies in ruin due to an unanticipated impact

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

Citizens' Space Agenda

- Detection of a potential hazard is the essential first step in planetary defense
- Current NASA and international efforts to find dangerous Near Earth Objects (NEOs) using primarily ground-based instruments have inherent limitations:
  - Cannot see in direction of Sun, near the Moon, during daylight, or through clouds
  - The best frequency for detection (infra-red) is absorbed by the atmosphere
- An excellent solution is JPL's NEOSM space-based infra-red 0.5 meter telescope
  - JPL NEOSM will be located at the Earth-Sun L1 point, allowing it to detect football-field sized objects near Earth, including potential impactors
  - Total procurement costs, including launch, is approximately $600M over several years
- Objective is to find 2/3 of all objects larger than 140 meters in five years
  - Goal is to discover >90% of 140 meter and larger asteroids within 10 years

Request: Support full funding for Planetary Defense ($196M) including NEOSM ($90M) for fiscal year 2021

Commercial LEO Development

- America has had a sustained human presence in low Earth orbit (LEO) with the International Space Station (ISS) since 2000
- The ISS has a finite lifetime and will eventually be decommissioned. The US needs to ensure it will have a presence in LEO when this happens
- Companies are developing platforms for LEO. Some start out attached to ISS, some start independent of ISS. But all are planned to become independent space stations.
- A robust commercial ecosystem could provide NASA LEO needs while spreading the cost over many private customers and developing new products and services
- LEO products currently in development include
  - Very high quality fiber optic cable
  - Artificial hearts and other organs grown from a patient's own cells
  - Single crystal semiconductor development

Commercial LEO Development Program

- Supports commercial space industry efforts to develop a sustained commercial low-Earth orbit (LEO) presence
- Continues transition of LEO human space flight operations to commercial partners
- Supports development of commercial destinations in LEO and capabilities for use by NASA and the private sector to enable a seamless transition from the ISS
- Increase efforts to develop a commercial space ecosystem in LEO
- Funding in FY 2020 was $15 million
- **Request: support full funding ($150 million) for Commercial LEO Development in 2021**

Lunar Development

- Periodic cancellation of NASA exploration programs due to budget overruns and lack of achievable goals is harming America's position as a global leader in space.

- The Artemis project includes programs such as commercial human landers, Commercial Lunar Payload Services (CLPS), and the Volatiles Investigating Polar Exploration Rover (VIPER).

- The development of lunar resources and infrastructure is an investment in capabilities that reduce future costs, *including the exploration of Mars*.

- The Artemis Program, using these capabilities, is an achievable goal that our international partners and commercial industry are excited about participating in.

Lunar Development Program

- To ensure an affordable, sustainable, and ultimately successful return to the Moon, these programs need to be fully funded

Request: Will you fully fund

- **the Commercial Lunar Payload Services (CLPS) Program at $254M in FY2021?**
- **the Volatiles Investigating Polar Exploration Rover (VIPER) at $67.5M in FY2021?**
- **the Human Lander Systems (HLS) Program at $3.4B in FY2021?**

Space Solar Power (SSP)

- SSP refers to gathering the Sun's energy in space and beaming it to Earth. SSP satellites could:
  - Supply large amounts of energy with no carbon emissions
  - Export energy to global markets and provide global influence
  - Support military deployments and mining in remote areas
- Launch costs have been a major barrier to SSP. However, costs have dropped and new vehicles in flight test may reduce costs even more
- Much needed technology has been developed, but significant technical and financial risks remain. Many of these risks could be retired by demonstrating a sub-scale SSP plant
- The energy market is so large that those who develop SSP first will dominate near-Earth space. China is making big investments in SSP
- A power beaming experiment is flying on the X-37B now

SSP Demonstration

- Sub-scale prototypes could be developed by public/private partnerships. A program to define such partnerships might include the following:
  - Funding at least two commercial partners to completion, if possible using different technology to insure competition
  - Demonstrating SSP systems, including critical supporting technologies (e.g., robotic assembly)
  - Requiring significant financial input from partners and making payments conditional on passing milestones. Payments should be fixed price, not cost-plus
  - Delivering significant quantities of power from space to Earth for at least one year. Prototype systems need not be profitable or full sized. Target remote markets with very high energy costs
  - Involving international partners to help with frequency allocation, among other issues

Request: support

- **Continue funding SSPIDR (Space Solar Power Incremental Demonstrations and Research) at $65M in 2021**
- **Continue funding SSP related OECIF (Operational Energy Capability Improvement Fund) ($70M total) activities at NRL in 2021**
- **Creating a new start of a public/private SSP prototype program**