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. Start developing and demonstrating Space Solar Power (SSP)

3. Support development of low-Earth-orbit (LEO) with full funding for the Commercial LEO Program

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?

- 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 ($120M) for NEOSM

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, reducing climate change
  - Export energy to global markets and provide global influence
  - Support military deployments and industrial development in remote areas
- Launch costs have been a major barrier to SSP. However, costs have dropped from $18,900/kg (Shuttle) to $1,200/kg (Falcon Heavy) 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.

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: will you support**
  - **Allocating $400M over five years for a public/private SSP program?**
  - **Full funding ($29.4M in FY2020 $58M in FY2021) the Naval Research Lab power beaming project?**
  - **Funding the Air Force Research Lab's SSP project ($65.9M in FY2020)?**

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
- In the meantime an alternative needs to be developed to maintain presence, provide a test environment for NASA, and develop commercial products and services
- Companies are developing modules to attach to the ISS and eventually fly as an independent, privately owned and operated space station
- 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**