“Fifty years after the creation of NASA, our goal is no longer just a destination to reach. Our goal is the capacity for people to work and learn and operate and live safely beyond the Earth for extended periods of time, ultimately in ways that are more sustainable and even indefinite. And in fulfilling this task, we will not only extend humanity’s reach in space -- we will strengthen America’s leadership here on Earth.”

- President Obama - April, 2010
Expand human presence into the solar system and to the surface of Mars to advance exploration, science, innovation, benefits to humanity, and international collaboration.
Strategic Principles for Sustainable Exploration

• Implementable in the near-term with the buying power of current budgets and in the longer term with budgets commensurate with economic growth;

• Exploration enables science and science enables exploration

• Application of high Technology Readiness Level (TRL) technologies for near term missions, while focusing sustained investments on technologies and capabilities to address challenges of future missions;

• Near-term mission opportunities with a defined cadence of compelling and integrated human and robotic missions providing for an incremental buildup of capabilities for more complex missions over time;

• Opportunities for U.S. commercial business to further enhance the experience and business base

• Multi-use, evolvable space infrastructure, minimizing unique major developments;

• Substantial international and commercial participation, leveraging current International Space Station and other partnerships.
EARTH RELIANT

NEAR-TERM OBJECTIVES

DEVELOP AND VALIDATE EXPLORATION CAPABILITIES IN AN IN-SPACE ENVIRONMENT

• Long duration, deep space habitation systems
• Next generation space suit
• Autonomous operations
• Communications with increased delay
• Human and robotic mission operations
• Operations with reduced logistics capability
• Integrated exploration hardware testing

LONG-DURATION HUMAN HEALTH EVALUATION

• Evaluate mitigation techniques for crew health and performance in micro-g space environment
• Acclimation from zero-g to low-g

COMMERCIAL CREW TRANSPORTATION

• Acquire routine U.S. crew transportation to LEO
PROVING GROUND
NEAR-TERM OBJECTIVES

VALIDATE
• SLS and Orion in deep space
• Solar Electric Propulsion (SEP) systems
• Long duration, deep space habitation systems
• Mitigation techniques for crew health and performance in a deep space environment
• In-Situ Resource Utilization
• Operations with reduced logistics capability

CONDUCT
• EVAs in deep space, micro-g environments
• Human and robotic mission operations
• Capability Pathfinder and SKG missions
Notional Proving Ground Vehicle Capability

Concept trade for co-Manifest large payloads with Orion on early Exploration Missions

- Co-manifesting large payloads enables significant opportunities
- Proving ground vehicle is SLS with Exploration Upper Stage (EUS) – Block 1B
  - Volume between EUS and Orion for large payloads
  - Approximately 10mt capability, subject to analysis
  - Flight rate is one/year beginning with EM-2
- Supports development of Mars capabilities and enhances value of Proving Ground missions
Major Results to date

• SLS one launch per year flight rate combined with Exploration Upper Stage (EUS) and associated co-manifested cargo capability greatly increases value of crewed missions

• ARV derived SEP vehicle can serve as an effective tool for human Mars missions
  – SEP provides more sustainable and efficient transportation

• Regardless of Mars vicinity destination, common capability developments are required
  – ISS provides critical Mars mission capability development platform
  – Proving Ground approach enables development of capabilities regardless of future Mars vicinity destination
    • Habitation in cis-lunar space will be an essential next step
Lunar CATALYST

(Lunar CArgo Transportation And Landing by Soft Touchdown)

• Private investment in space transportation systems is increasing

• Commercial lunar cargo transportation is a potential new area of opportunity that could provide services to both public and private customers and enable science and exploration missions

• Per National Space Transportation Policy, NASA is "committed to encouraging and facilitating a viable, healthy, and competitive U.S. commercial Space Transportation Industry."

• NASA has accumulated decades of technical experience relevant to lunar cargo transportation
Lunar CATALYST Selectees – April 2014

Griffin Lander
Astrobotic Technology Inc., Pittsburgh, PA
*Credit: Astrobotic Technology, Inc.*

XEUS Lander
Masten Space Systems Inc., Mojave, CA
*Credit: NASA/Masten Space Systems, Inc.*

MX-1 Lander
Moon Express Inc., Moffett Field, CA
*Credit: Moon Express Inc.*
• Returning from Mars, the crew will return to Earth in Orion and the Mars Transit Habitat will return to the staging point in cis-lunar space for refurbishment for future missions
Broad Agency Announcement Coming Soon

Concept studies or technology development project to support future deep space exploration.

3 Capability Areas
- Advanced Propulsion systems
- Habitation Systems
- Small Satellite Missions
  - Secondary Payloads on SLS

- Minimum of 50% cost share and/or matching, which may include prior investment

NEXT SPACE TECHNOLOGIES FOR EXPLORATION PARTNERSHIPS - NEXTSTEP - BAA SYNONYS

Synopsis - Oct 09, 2014

General Information
- Solicitation Number: NNH15ZCQ001K
- Posted Date: Oct 09, 2014
- FedBizOpps Posted Date: Oct 09, 2014
- Recovery and Reinvestment Act Action: No
- Original Response Date: N/A
- Current Response Date: N/A
- Classification Code: A – Research and Development
- NAICS Code: 541712

Contracting Office Address

Description
- NASA intends to issue a Next Space Technologies for Exploration Partnerships (NextSTEP) Broad Agency Announcement (BAA) in the near future. NASA has increasingly embraced public-private partnerships for achieving its strategic goals and objectives for expanding the frontiers of knowledge, capability, and opportunities in space. The next step for human spaceflight is the development of deep space exploration capabilities to expand architectures to support more extensive missions in the proving ground around and beyond cis-lunar space. An important part of NASA’s strategy is to stimulate the commercial space industry while leveraging those same commercial capabilities through partnerships to deliver mission capabilities.
- NASA is seeking proposals for concept studies or technology development projects to support future deep space exploration. This BAA is intended to enable a robust exploration of public-private partnership opportunities with NASA. The Advanced Exploration Systems Division within the Human Exploration and Operations Mission Directorate has identified three key long-term potential capability areas that could benefit human space exploration and they are:
  1. Advanced Propulsion Systems
  2. Habitation Systems
  3. Small Satellite Missions as secondary payloads on the first Space Launch System flight
- The duration of the contracts will vary depending upon the complexity of the studies or development effort. NASA anticipates phased approaches that may extend up to 5 years. Pending final approval, NASA intends to require a minimum of 50% cost sharing and/or matching for the proposed efforts, which may include prior industry investment.
- Submission information, participant eligibility, additional topic information and specific evaluation criteria for the solicitation will be identified in the BAA.

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