NASA EXPLORATION SYSTEMS ENTERPRISE REQUEST FOR INFORMATION

General Information

Solicitation Number: NMB05182004
Posted Date: May 18, 2004
FedBizOpps Posted Date: May 18, 2004
Response Date: May 20, 2004
Classification Code: A -- Research and Development
Eligible Respondents: NMB04 Finalist Teams *only*

Description

With the announcement of the Vision for U.S. Space Exploration, NASA has formed a new Exploration Systems Enterprise that will be charged with development of systems to be used in the exploration of the moon, Mars, and other destinations. The Exploration Systems Enterprise is responsible for developing and demonstrating the strategies and systems that will allow human and advanced robotic exploration of other worlds through the use of innovative approaches, new vehicles, and breakthrough technologies. Consistent with the National Space Exploration Policy, the NASA Strategic Plan, and the Vision for Space Exploration, the Exploration Systems Enterprise will:

- Support Research at Key Research Destinations: The development of exploration strategies, systems, and technologies will be guided by requirements for conducting research at key destinations in the search for habitable environments and life. These destinations include, but are not limited to, the Moon, the planet Mars, the moons of Jupiter and other outer planets, and deep space telescopes that will search for planets outside our solar system.

- Enable Sustainable Exploration: Exploration architectures and vehicles will be developed with the goal of enabling sustainable, affordable, and flexible exploration of the solar system.

- Employ Humans and Robots: Exploration Systems will design architectures and missions that use humans and robots in partnership, leveraging the capabilities of each where most useful.

- Use the Moon as a Testing Ground for Mars and Beyond: The Exploration Systems Enterprise, working with the Lunar Exploration and Mars Exploration Themes, will use robotic and human missions to further science, and to develop and test new approaches, technologies, and systems, including the use of lunar and other space resources, to support sustained human space exploration of Mars and other destinations.

This is not an actual solicitation. This is a class exercise associated with the NASA Means Business Student Competition 2004. Contact Burke Fort, Texas Space Grant Consortium, for further information at fort@mail.utexas.edu.

- Employ Sound Management Philosophy: The Exploration Systems Enterprise will be guided by a philosophy that ensures that operators and technologists work together to enable the leveraging of technology research and development. Technology will be matured prior to development through performance demonstration. A disciplined Strategy-to-Task-to-Technology process will be instituted for purposes of requirements definition. Rigorous trade study analysis, utilizing modeling and simulation, will be performed by operators and technologists jointly. A focused program management process, using best practices such as earned value management, will be at the core of this enterprise.

- Work Closely With Customers and Partners: The Exploration Systems Enterprise will work closely with NASA's Space Architect, Space Science Enterprise, Biological and Physical Research Enterprise, Space Flight Enterprise, other government agencies, potential international partners, academia, and industry in the development of new exploration strategies, architectures, vehicles, systems, and technologies.

A key focal point for these guidelines and objectives will be the Project Constellation systems development initiative. In broad terms, Project Constellation is one of the critical acquisition programs being developed under the Exploration Systems Enterprise to execute the national vision for Moon and Mars exploration. More specifically, Project Constellation will evolve around the core Crew Exploration Vehicle (CEV) that will carry human crews from the Earth's surface to orbit. When coupled with transfer stages, landing vehicles, and other space transportation architecture elements, the CEV[1] will serve as part of the architecture that supports humans on voyages to the moon and Mars.

Along with the CEV and in-space transportation systems, Project Constellation will include development of supporting surface and in-space systems such as ground and in-space communication systems, robotic investigators and assistants, surface mobility and habitation systems, maintenance and science instrumentation, mission control capabilities, launch vehicles, and Earth-based ground infrastructure. Considered in its entirety, "Project Constellation" refers to the complete system-of-systems required for human and human/robotic exploration activities on the Moon, Mars and beyond.

This is not an actual solicitation. This is a class exercise associated with the NASA Means Business Student Competition 2004. Contact Burke Fort, Texas Space Grant Consortium, for further information at fort@mail.utexas.edu.

Systems development in Project Constellation will be integrated with ongoing efforts in Project Prometheus, which was constituted to support technical development to advance space nuclear reactor, power conversion, radioisotope power systems, and electric propulsion technologies for robotic science missions, with the first identified mission for these technologies being the Jupiter Icy Moons Orbiter (JIMO) mission. With the advent of the Vision for U.S. Space Exploration, Project Prometheus has been directed to examine nuclear systems that can also enable human exploration of the Moon, Mars and beyond. These systems could potentially use nuclear thermal propulsion (NTP), multi-megawatt nuclear electric propulsion (NEP), or a combination of systems. Additionally, highly energetic robotic missions (with high delta V propulsion requirements) may also require these technologies. Human exploration missions requirements could also include the need for high-power, all weather, day and night, electrical power generation for surface applications. Surface power applications could include power for

[1] Crew Exploration Vehicle herein means the system or systems that may provide basic crew transportation from earth to LEO and beyond. CEV functionality nominally includes the crew earth ascent, life support, habitation, maneuvering and propulsion, navigation, and earth entry, descent and landing capabilities required to carry out a lunar exploration mission.

planetary habitats, in-situ resource utilization, mobility, science laboratories and instruments, and drilling systems.

RFI Guidelines

Public Service Announcement (PSA) storyboards are invited that articulate initial challenges facing Project Constellation and Project Prometheus in general, and the Crew Exploration Vehicle (CEV) and the International Space Station (ISS) in particular. Provided below are the key issues and storyboard requirements. Storyboards are invited that convey one or more of the messages and address more than one target audience. Storyboards that address other important aspects (in a manner consistent with the information requested below) are also welcome. Viable storyboards should be consistent with the January 14, 2004, U.S. Space Exploration Vision, as well as with generally accepted laws of physics.

Storyboards will be reviewed by evaluation teams that draw on senior officials from the NASA Johnson Space Center. For this RFI, no awards will be granted.

All work should be presented at the designated time during the May 20, 2004, session of the Sixth Annual NASA Customer Engagement Conference. In addition, related documents should be delivered in an electronic format as a component of your team's Final Report CD.

This is not an actual solicitation. This is a class exercise associated with the NASA Means Business Student Competition 2004. Contact Burke Fort, Texas Space Grant Consortium, for further information at fort@mail.utexas.edu.

Key Issues and Storyboard Requirements

Issue(s): A critical aspect of a sustainable exploration program is the sustained engagement of the public in the vision and the mission. How can NASA design an exploration program that continually engages the public in a visceral manner?

Storyboard requirements: Storyboard should express messages for engaging the public in the Project Constellation exploration program. Consider messages that can be employed in the near-term to maintain sustained interest throughout the long-term course of the Vision, by enabling the public to directly or vicariously relate to some of the challenges that NASA faces in executing exploration missions. The likely roles of the International Space Station in Project Constellation must be represented in some way within the storyboard.

Point of Contact

Name: Burke Fort
Title: Manager, Special Projects
Organization: Texas Space Grant Consortium
Phone: 512/471-7225
Fax: 512/471-35685
Email: fort@mail.utexas.edu

Government-wide Notes – *none*.
NASA-Specific Notes – *none*.
