



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
HEADQUARTERS
SPACE TECHNOLOGY MISSION DIRECTORATE
300 E. Street, SW
Washington, DC 20546-0001

**GAME CHANGING DEVELOPMENT PROGRAM,
INDUSTRY-DEVELOPED POWER BEAMING TECHNOLOGY -
REQUEST FOR INFORMATION**

NNH15ZOA001L

Request for Information Issued: *December 8, 2014*

Request for Information Due: *January, 31 2015 (5:00pm Eastern)*

Catalog of Federal Domestic Assistance (CFDA) Number 43.009

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Industry-Developed Power Beaming Technology

Responders are reminded:

REQUEST FOR INFORMATION (RFI): THIS IS *NOT* A REQUEST FOR PROPOSAL, QUOTATION, OR INVITATION TO BID NOTICE.

1.0 Introduction

The National Aeronautics and Space Administration (NASA) is continually looking for opportunities to help advance the development of commercial space products and services. With the recent increase of U.S. private-sector companies interested in space exploration and the associated terrestrial spin-off applications, NASA is seeking to better understand U.S. industry's interests in a myriad of exploration activities. One such activity of interest is the capability to wirelessly transfer power between assets. This could include the ability to:

- Beam power in-space between orbiting spacecraft,
- Beam power from an in-space orbiting spacecraft to a planetary asset,
- Beam power from an in-space orbiting spacecraft to a nearby asset,
- Beam power between fixed assets on the surface of a planetary body, and/or
- Beam power between mobile assets on the surface of a planetary body.

NASA recognizes that there are also a number of terrestrial applications that may be enhanced or enabled by the core technologies required to accomplish NASA's power beaming goals. As such, NASA's Space Technology Mission Directorate is seeking input through this Request for Information (RFI) on industry-developed power beaming technology that may support future commercial and NASA space missions while also having the potential to support terrestrial applications. The information sought includes both system and sub-system level technologies. Technologies of interest include, but are not limited to, high power laser or millimeter wave gyrotrons for power transmission, beam pointing, and control systems. NASA is also interested in obtaining information on critical elements such as heat exchangers and monochromatic photovoltaic arrays.

2.0 Industry - NASA Partnership

An industry-NASA partnership would:

- Transfer and capitalize on NASA's history of investments in space technologies and expertise.
- Explore the possibility of beaming power between two (or more) in-space assets (i.e. between two orbiting spacecraft).
- Explore the possibility of beaming power to a target vehicle or terrestrial, surface station from orbit.

- Explore the possibility of beaming power to terrestrial locations that are difficult, or expensive, to reach using traditional power transmission methods.
- Explore the possibility of beaming solar power from space to terrestrial assets.
- Explore the viability of beaming power from an orbiting space asset to a nearby asset (i.e. from a spacecraft to a nearby crewmember).

3.0 Potential NASA Contributions to a Partnership

The potential NASA contributions to a partnership with U.S. industry includes:

- **Technical Expertise:** NASA envisions that an integrated team comprised of NASA civil servants and an industry partner could work together to design, develop, and test power generation and beaming systems.
- **Test Facilities:** NASA can provide industry partners, at no cost, access to testing facilities such as thermal vacuum chambers, high performance lasers, clean rooms, etc., as available.
- **Hardware and Software:** NASA may be able to contribute specific hardware and software elements for the development and testing of power generation and beaming systems. Note that no exchange of funds is envisioned between NASA and the industry partner(s). The type of agreement to be employed for this NASA-industry partnership is to be determined, but options include a Space Act Agreement, Cooperative Research and Development Agreement (CRADA), or other (ref. NASA Policy Directive (NPD) 1050.11, *15 USC §3710a(d)(1)*). As part of this RFI, NASA is interested in obtaining information on other partnering agreements of interest to commercial partners.

4.0 Information Requested

The responses to this RFI should include the following information:

- **Company information:** Company name and address, point-of-contact name, e-mail address, and phone number.
- **Feasibility of a partnership:** Is a NASA-industry cooperation feasible? What type of agreement with NASA is desired by your company and why? Identify any particular considerations, circumstances, or issues that would need to be addressed in an agreement. For example, what are your expectations regarding the allocation of intellectual property rights?
- **Potential industry contributions:** List potential industry contributions that would complement the possible NASA contributions outlined above.

- **Potential NASA contributions:** What expertise and support (including both labor and facilities) does your company need from NASA?
- **Services concept:** What commercial activities do you plan to offer if the partnership is successful? Describe the proposed activity, the equipment required to conduct it, and the role power beaming would play in the concept.
- **Technology Readiness Level:** What is the Technology Readiness Level (TRL) of the technology described in the RFI response? Include sufficient information/data substantiating the documented TRL.
- **Business model:** Does your intended business strategy offer commercial services or is it to conduct exploration and prospecting for your own purposes? Have you identified potential customers or developed business plans around your envisioned activities? What are the concepts for which power beaming is more cost effective than the generation of power in situ (or transmission using traditional means)? How firm is the demand for products or service stemming from this capability? What revenue model and pricing strategy have you established? How stable is your anticipated income stream?

5.0 Submitting Responses

Responses are limited to no more than 15 pages and should be uploaded as a single PDF file attachment not to exceed 10MB at the NPIRES web site (<http://nspires.nasaprs.com>). The information provided in response to this RFI will not be disclosed publicly or used outside of the government for any purposes.

The information is requested for planning purposes only, subject to Federal Acquisition Regulation (FAR) Clause 52.215-3, entitled "Solicitation for Information for Planning Purposes." The release of this RFI does not indicate that the government will issue a solicitation in this area nor does it obligate the government to invest any resources specific to the targeted technology area.