

## **Request for Proposals to Partner with NASA on the Development of a Massive Multiplayer Online Game to support STEM Learning**

NASA seeks proposals for collaboration with an organization to enhance NASA's ability to achieve its educational goals by creating and managing a Massively Multiplayer Online (MMO) game. The game would be fun and would enhance science, technology, engineering and mathematics (STEM) learning. It is intended that this request will result in the establishment of a **non-reimbursable Space Act Agreement** (defined as one with no exchange of funds) that will define the full roles and responsibilities of NASA and the proposing organization. NASA's Learning Technologies (LT) is the requesting office.<sup>1</sup>

LT encourages respondents to view the requirements in this document as minimum set of criteria and not as limitations. A successful MMO game that enhances STEM education will be a challenging and innovative undertaking that will require extensive creativity, talent, commitment and significant "outside the box" thinking from NASA and NASA's partner in the endeavor.

For purposes of this request, a massively multiplayer online (MMO) game is considered to be a persistent immersive synthetic environment with built in goals, achievement system and rules. Existing examples of MMO games in industry include *EverQuest*®, *World of Warcraft*® and *Eve Online*®. (Note: NASA does not endorse or sponsor any of these games; they are cited only by way of example.)

### **Statement of Purpose**

For this request, the research focus is on the ability to use an MMO to enhance STEM education. The ability for LT to study that area is considered a vital element of any collaboration resulting from this request.

NASA is pursuing three major education goals:

1. Strengthen NASA and the Nation's future workforce: NASA will identify and develop the critical skills and capabilities needed to achieve NASA's mission and goals. To help meet this demand, NASA will continue contributing to the development of the Nation's STEM workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
2. Attract and retain students in STEM disciplines: To compete effectively for the minds, imaginations, and career ambitions of America's young people, NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit

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<sup>1</sup> 1. LT is a research and development incubator for educational technologies projects. It is guided by the research agenda laid out in the *NASA eEducation Roadmap: Research Challenges in the Design of Persistent Immersive Synthetic Environments for Education & Training* (<http://learners.gsfc.nasa.gov/NLT/Roadmap/>). LT is part of the NASA Office of Education's Elementary and Secondary/eEducation program and is managed at Goddard Space Flight Center as an agency-wide project.

of educational disciplines critical to NASA's future engineering, scientific, and technical missions.

3. Engage Americans in NASA's mission: NASA will build strategic alliances, partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive, educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

### **Description of project**

A NASA-based MMO game built with the goal of engaging young people can enhance STEM education by using NASA-based content that draws and holds their attention with fun and challenging game play. The power of games as educational tools is rapidly gaining recognition. Innovative university faculty are already holding classes and taking fieldtrips to synthetic worlds like *World of Warcraft*® and *Second Life*®. A NASA game built on a game engine could:

- Include powerful physics capabilities that support compelling learning opportunities and virtual career exploration.
- Present real NASA engineering and science missions in a medium that is comfortable and familiar to the majority of students in the United States today.
- Provide opportunities for students to investigate STEM career paths.
- Contribute to the development of the critical skills and capabilities needed to build a pipeline of qualified scientific and technical employees required to fulfill the United States Space Exploration Plan.

### **Rationale**

Massive multiplayer online (MMO) gaming and other persistent synthetic environments, initially popularized in the entertainment world, are now finding growing interest in education and training environments. There is increasing recognition that these synthetic environments can serve as powerful "hands-on" tools for teaching a range of complex subjects. NASA has long recognized the power of simulations as learning and training tools. MMO games can help players develop and exercise a skill set closely matching the thinking, planning, learning, and technical skills increasingly in demand by employers. These skills include strategic thinking, interpretative analysis, problem solving, plan formulation and execution, team-building and cooperation, and adaptation to rapid change. Today's students have grown up with digital technology and video games and are poised to take advantage of the MMO communications and community building tools to collaborate on complex projects..

It will be vital for NASA to be able to assess the educational impact of game play as well as the level of adoption in educational settings. An integral part of evaluation of learning will be embedded assessments where completion of game tasks is used as a measure of learning and understanding. Success in the game will also build increased student

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awareness of STEM empowering students to make important academic and career decisions.

### **Target Audience**

The primary audience for this MMO game will be students (13 and older) from the middle school level through college. At the earlier grade levels, the game can empower students to make academic choices as well as supporting learning.

### **Metrics**

NASA must have the ability to assess the educational impact of game play as well as the level of adoption in educational settings. Learning Technologies expects to engage academic partners both to enhance the educational design elements of the MMO and to conduct evaluation. An integral part of evaluation of learning will be embedded assessments where completion of game tasks is used as a measure of learning and understanding.

### **Benefits to Collaborating Partners**

In exchange for a collaborator's investment to create and manage a NASA-based MMO game for fun and to enhance STEM, NASA will consider negotiating brand placement, limited exclusivity and other opportunities.

LT will coordinate the engagement of educational design and evaluation experts and NASA subject matter experts (SME) to support design and assessment of the MMO. LT will take the lead in meeting all NASA reporting and evaluation requirements for the project.

Consideration will be given only to those offers that are commensurate with the value of the above, and that reflect NASA mission, values and goals.

### **Eligibility Requirements and Evaluation Criteria**

#### Threshold Requirements

All proposals must demonstrate the following threshold requirements to be considered. LT will not consider any proposal that does not address these requirements satisfactorily:

1. A commitment to developing an MMO game with an outstanding user experience. (While LT seeks to employ the MMO for STEM education enhancement, it is recognized that any game that sacrifices good game play will be inherently limited as a learning tool.)
2. Significant experience in successful design and implementation of an MMO game.
3. Support for realistic physics where practical and a commitment not to propagate physics and science misinformation and misperceptions.
4. Support for the development of a strong user community and extensive use of Web 2.0 style communications tools.

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5. A commitment to work with NASA to enhance formal and informal education in alignment with *The NASA Education Strategic Coordination Framework: A Portfolio Approach* ([http://education.nasa.gov/pdf/151156main\\_NASA\\_Booklet\\_final\\_3.pdf](http://education.nasa.gov/pdf/151156main_NASA_Booklet_final_3.pdf)).
6. Ability and commitment to support research on the proposed MMO as an educational tool and to build STEM education content and career exploration into game play.
7. Ability and commitment making the game accessible to disabled players.
8. No funding requirements from NASA.

All proposals must include:

1. Project plan describing the proposed game design and development including identification of the proposed platform and brief sample scenarios.
2. Documented metrics on the demographics and popularity of the proposed method.
3. Business plan describing the proposed method of funding and supporting the project.
4. Description of how the proposer will support infusion of educational elements and NASA content into the game.

In addition LT is looking, to the greatest extent possible, for an open architecture to support expandability and linkages to multiple technologies and media and for editing/authoring tools that will allow local customization of content for educators.

### Evaluation Criteria

All proposals that meet the threshold requirements will be evaluated in the following areas:

Technical Plan (25%):

1. Feasibility of game design.
2. The extent to which game design offers a compelling player experience.
3. Feasibility of plan to infuse NASA content game design.
4. Feasibility of plan to infuse educational experiences into the game design

Management Ability (25%):

1. Ability to schedule and meet realistic milestones.
2. Management team experience (include information on location, points of contact and top-level organizational structure.)
3. Projected schedule and milestones for accomplishing project.

Financial Stability (25%):

1. Strength of market analysis and strategy analysis.
2. Strength of financial plan and evidence of financial stability (include annual audits, balance sheets and appropriate documentation.)

Other (25%):

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1. Level of NASA assets and resources, such as the NASA identity, people, content and facilities, requested for the collaboration.
2. How the organization's strategy, mission statement, values and goals reflect NASA's.
3. Evidence of the proposer's experience and expertise in the development of massively multiplayer online games.
4. Level of additional value and benefits offered to NASA.

All proposals meeting the threshold requirements will be subject to review under the evaluation criteria listed above. Proposals will be assigned a numerical score for technical plan, management ability, financial stability, and other. Those numerical scores will be multiplied against the percentage assigned to each criteria, which represents the relative weight or importance of that criteria. The four weighted scores will then be added for a total score assigned to each proposal. The review panel will be comprised of a mixed of internal and external experts. The recommendations prepared by the panel will be submitted to the NASA Learning Technologies Project Office for final selection. A written final selection decision will be distributed to all proposers. Each proposer will be notified of the panel's evaluation of their own proposal. NASA reserves the right to not select any proposal received in response to this solicitation.

### **Submission Instructions**

Submittals should address all the areas to be evaluated as stated under "Eligibility Requirements and Evaluation Criteria."

This request will be open for sixty days following date of release of this announcement. All proposals must be received by June 18, 2008 to be considered. Submittals should be limited to no more than 15 pages, double-spaced, 1" margins using Times New Roman 12-point type. Exceptions to the 15-page limitation are documentation of "Financial Stability." Submission must be submitted via email in Adobe PDF format. Submission must be received at the address indicated below no later than 4:30 p.m. Eastern time, on June 18, 2008. Late submissions will not be considered under any circumstances. NASA will use submissions only for evaluation purposes under this announcement. All proprietary information must be clearly marked in the proposals. Submit proposals electronically at <http://ipp.gsfc.nasa.gov/MMO/submit.html>.

There is no restriction on the teaming arrangements for any proposal, including teaming with employees of NASA's field Centers and the Jet Propulsion Laboratory.

This request is not to be construed as a commitment by NASA, nor will NASA pay for the information solicited. Respondents will be sent an acknowledgement of the receipt of their materials. Any questions regarding this request should be directed to the identified point of contact.

Point of Contact

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