

## Federal Business Opportunities

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
Request for Information - Centennial Challenges Nano Satellite Launch (NSL) Challenge  
NNH12ZUA001L

AGENCY: National Aeronautics and Space Administration (NASA).

ACTION: Request for Information by September 10, 2012. Responses must be submitted in electronic form no later than September 10, 2012 to Dr. Larry Cooper, Centennial Challenges Program, NASA Headquarters, 300 E Street, SW, Washington, DC 20546-0001. E-mail address: [larry.p.cooper@nasa.gov](mailto:larry.p.cooper@nasa.gov). For general information on the NASA Centennial Challenges Program see: <http://www.nasa.gov/challenges>.

SUMMARY: This notice is issued in accordance with 51 U.S.C. 20144(c).

Centennial Challenges is a program of prize competitions to stimulate innovation in technologies of interest and value to NASA and the nation. In 2010 NASA announced a Nano-Satellite Launch (NSL) Challenge to encourage development of safe, low-cost, small-payload delivery systems for frequent access to low Earth orbit (LEO) through innovations in propulsion and other technologies as well as operations and management for broader applications in future launch systems that could result in a commercial capability for dedicated launches of small satellites at a cost comparable to secondary payload launches--a potential new market with Government, commercial, and academic customers.

To assist in formulation of the Nano-Satellite Launch Challenge, NASA is seeking additional information on the nano-satellite market and on approaches to address the market needs. There are currently several existing launch vehicles and new launch vehicle programs that could provide ride-sharing opportunities for nano-satellite. A NASA NSL Challenge could focus on a vehicle dedicated to providing greater payload design flexibility for cubesats and other small payloads, more frequent access to space at costs comparable or less than existing or proposed ride-share launch options. Comments are sought on the tradeoffs among these and other launch vehicle design parameters such as reliability, orbital accuracy, payloads, and cost so that the competition may be designed to best incentivize development of commercial vehicles for the nano-satellite launch market. For example, is there a payload market for a very low cost vehicle but with less orbital accuracy or lower reliability? What are the lower limits to market acceptability of vehicle design features? How frequently should the vehicle launch? What are the cost vs feature sensitivities?

Several approaches to the NSL Challenge are being considered by NASA. In one approach an initial competition would require delivery of payloads to LEO twice within a one-week period using a launch system sized to deliver up to 10Kg to LEO. The competition would be for one year and a \$3M prize purse would be divided between all successful competitors. Subsequently, a second competition would be held that would require successful competitors to deliver payloads to LEO at least ten times within a one-year period using a launch system sized to deliver up to 10Kg to LEO. A total prize purse of \$6M would be offered for at least 10 successful payload deliveries: 1st Place receiving \$3M for most deliveries; 2nd place, \$2M for next most deliveries; and 3rd place, \$1M for next most deliveries. NASA seeks comments on the size and features of the prize purses. For example should it require more successful launches; should the purses be based on first to achieve the launch milestones, etc.

An alternative approach to the NSL Challenge would be initially to focus on component and subsystem technology development. In particular the avionics for small launch vehicles is considered a significant cost item and novel approaches will be required to achieve a launch cost that is attractive to most nano-satellite developers. This phase would be followed by launch vehicle demonstration competitions along the lines of the approach described above.

The purpose of the Request for Information (RFI) is to: (1) invite comments on design features and price points of dedicated nano satellite launchers; (2) invite comments on these two approaches to structuring the Nano-Satellite Launch Challenge; (3) invite input on alternative approaches; and 4) determine competitor interest in a Challenge.

The examples provided above are intended to stimulate thoughtful consideration of the future needs of the nano-satellite launch markets. Final competition parameters will depend upon the payload and vehicle community input from this Request for Information.

**NSL Challenge questions:**

NASA is evaluating concepts for future Centennial Challenges for Nano-Satellite Launch vehicles. One concept is a launch vehicle that provides nano-satellite developers with more frequent access to LEO as primary payloads. NASA seeks your input and opinions on the following questions to provide data for evaluating this challenge concept:

A. My interest in nano satellites is:

Educational use

Scientific use

Commercial use

Defense use

Launch Service Provider

Other Please indicate \_\_\_\_\_.

**Section 1: For Nano-Satellite Users/Builders only**

1. Would the freedom to incorporate pressure vessels, propulsion systems, pyrotechnic devices, and/or other primary payload features into your nano-satellite be of value to you?

Agree

Disagree

No Opinion

2. Would the opportunity to access monthly flights to LEO would be of value to you?

Agree

Disagree

No Opinion

3. Do you have interest a particular orbit?

Perigee (km) \_\_\_\_\_ ± \_\_\_\_\_

Apogee (km) \_\_\_\_\_ ± \_\_\_\_\_

Inclination (degrees): \_\_\_\_\_ ± \_\_\_\_\_

No preference

4. On a scale of 1-10 (with 10 being very important and 1 being unimportant), how important is a particular orbital destination to you? \_\_\_\_\_.

5. Would you be interested in getting your nano satellite launched on a Nano Satellite Launch Challenge vehicle?

Agree

Disagree

No Opinion

6. If the price to place nano-sats into LEO were \$100,000/kg and you can pick you orbital destination, how many nano-satellites would you wish to have launched annually?

1U Cubesat -----

2 U Cubesat -----

3 U Cubesat -----

Other (please indicate size and weight and number) -----

7. If the price to place nano-sats into LEO were \$50,000/kg and you can pick you orbital destination, how many nano-satellites would you wish to have launched annually?

1U Cubesat -----

2 U Cubesat -----

3 U Cubesat -----

Other (please indicate size and weight and number) -----

8. If the price to place nano-sats into LEO were \$35,000/kg and you can pick you orbital destination, how many nano-satellites would you wish to have launched annually?

1U Cubesat -----

2 U Cubesat -----

3 U Cubesat -----

Other (please indicate size and weight and number) -----

9. If the price to place nano-sats into LEO were \$15,000/kg and you can pick you orbital destination, how many nano-satellites would you wish to have launched annually?

1U Cubesat -----

2 U Cubesat -----

3 U Cubesat -----

Other (please indicate size and weight and number) -----

10. If the price to place nano-sats into LEO were \$5,000/kg and you can pick you orbital destination, how many nano-satellites would you wish to have launched annually?

1 U Cubesat -----

2 U Cubesat -----

3 U Cubesat -----

Other (please indicate size and weight and number) -----

**Section 2: For Potential Launch Service Providers only**

A. NSL Challenge – Alternative 1

An initial Nano-Satellite Launch Challenge competition (<http://www.spaceflorida.gov/nano-sat-launch-challenge>) to deliver payloads to LEO, twice within a one-week period, with a vehicle or system designed for 10kg to LEO. Length of competition would be one year and a \$3M prize purse would be split among successful competitors. This would be followed by a competition to

deliver payloads to LEO, at least ten times within a one-year period. Prize Purse of \$6M: 1st Place \$3M; 2nd place \$2M; and 3rd place \$1M

1. Are you interested in competing in these Nano Satellite Launch competitions?
2. Do you have any recommendations or suggestions on these competitions?
3. What are the primary technological and/or operational cost challenges that you will need to overcome to be successful? For example, the price of specific subsystems such as avionics, propulsion, etc.

For the 2<sup>nd</sup> competition:

4. Considering the Prize Purse, the number of launches (10) is:

Acceptable	<input type="checkbox"/>	
Too Many	<input type="checkbox"/>	Recommended Number: _____
Too Few	<input type="checkbox"/>	Recommended Number: _____

5. Considering the number of launches (10), the one-year duration is:

Acceptable	<input type="checkbox"/>	
Too Short	<input type="checkbox"/>	Recommended Duration: _____
Too Long	<input type="checkbox"/>	Recommended Duration: _____

#### B. NSL Challenge – Alternative 2

1. What component and subsystem technologies should be developed before launch vehicle demonstrations?
2. Are you interested in competing in these Nano Satellite Launch technology development competitions?
3. Do you have any recommendations or suggestions on these competitions?

C. NSL Challenge – Other Alternatives?

Do you prefer Alternative 1 or Alternative 2?

What other NSL Challenge Approaches should be considered?

D. Additional Comments (add pages as desired):

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NOTES:

This RFI is for informational purposes only and the Government will not pay for the information received. This RFI is NOT to be construed as a commitment by the government to enter into a contractual agreement or to pursue a challenge.

This document is for information and planning purposes, to gauge interest from the community in participation, and to promote competition. The Government encourages all segments of industry, academia, and government, including associations, innovators, and enthusiasts to reply.

Responses should be submitted in Adobe PDF or Microsoft Word format. Responses should include (as applicable): name, address, email address, and phone number of the respondent, business, or organization, with point of contact for business or organization. All responses are to be for general access by Government evaluators, and comments on the proposed challenge may be provided to the public. Names and contact information will be kept Confidential.