7510-13

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice: (19-043)]

Centennial Challenges Space Robotics Challenge Phase 2

AGENCY: National Aeronautics and Space Administration (NASA).

ACTION: Notice.

SUMMARY: Phase 2 of the Space Robotics Challenge is open, and teams that wish to compete may now register. Centennial Challenges is a program of prize competitions to stimulate innovation in technologies of interest and value to NASA and the nation. Phase 2 of the Space Robotics Challenge is a prize competition with a $1,000,000 USD total prize purse available for development of software to enable long-term autonomous robotic surface mobility for a notional lunar In-Situ Resource Utilization (ISRU) mission. NASA is providing the prize purse, and the Manned Space Flight Education Foundation, Inc. (i.e., Space Center Houston) will be conducting the Challenge on behalf of NASA.

DATES: Challenge registration for Phase 2 opens August 12, 2019, and will remain open until 5:00PM Central Time on December 20, 2019. No further requests for registration will be accepted after this date.

Other important dates:

January 15, 2020	Packet of Robot Information Delivered to Competitors
March 16, 2020	Qualifying Round opens
August 19, 2020	Qualification Round closes
November 9, 2020	Finalists Announced
December 7, 2020	Final Competition Begins
June 30, 2021	Competition Round Closes

September 2021 Winner(s) Announced

ADDRESSES:

The Space Robotics Challenge is a virtual competition. The Challenge competitors will complete their development and practice rounds at their own labs. Final software solutions will be submitted to Space Center Houston for evaluation and testing.

FOR FURTHER INFORMATION CONTACT:

To register for or get additional information regarding the Space Robotics Challenge, please visit: www.spaceroboticschallenge.com

For general information on the NASA Centennial Challenges Program please visit: http://www.nasa.gov/challenges. General questions and comments regarding the program should be addressed to Monsi Roman, Centennial Challenges Program, NASA Marshall Space Flight Center Huntsville, AL 35812. Email address: hq-stmd-centennialchallenges@mail.nasa.gov.

SUPPLEMENTARY INFORMATION:

Summary

Phase 2 of the Space Robotics Challenge seeks to foster the creation of new or advance existing autonomous capabilities of lunar surface robots. Future ISRU missions may occur on surfaces such as Earth's moon and Mars, and will likely need to operate autonomously for long periods of time before, during, and after the presence of astronauts. Robots that can successfully perform ISRU tasks with little to no human intervention are valuable due to both the communication latencies and limited bandwidth between these destinations and Earth. Additionally, NASA has unique constraints for robotic systems in space compared to terrestrial applications, namely the radiation and thermal environments encountered, which affect the processing and sensing capabilities available for robotic systems. It is also recognized that many of the robotic capabilities needed for future exploration missions could translate into highly valuable functionality for terrestrial robotic

applications, such as disaster relief, exploration of difficult and/or dangerous terrains, and industrial plant maintenance and servicing.

The challenge will consist of a qualification round and a competition round. Both rounds will require fully autonomous operations, such that competitors will not be able to interact with their virtual robotic teams during a challenge run. The qualification round will consist of three tasks, each to be completed individually, and the virtual robotic systems needed to complete these tasks will be provided to competitors. Successful completion of these tasks will provide confidence that competitors can attempt, or possibly complete, the competition round. The tasks will consist of autonomously locating resources in a lunar simulation world, extracting these resources, and navigating about the lunar simulation surface. The top 25 scoring teams will move on to the competition round. For the competition round, competitors will select their own robotic team from a compiled list of different robot archetypes, while meeting a specified mass constraint for the overall team. During this round, competitors' virtual robot teams will locate various resources within the lunar regolith, excavate and collect resources, transport them and deposit them into a processing plant. Constraints will be introduced randomly, including maintenance issues, degradation of systems and recharging needs. The top 10 scoring teams will win prizes.

I. Prize Amounts

The Space Robotics Challenge total prize purse is up to $1,000,000 USD (one million dollars) to be awarded across two (2) rounds of competition. The top 25 scoring competitors in the Qualification Round that meet or exceed a given threshold score, will be awarded prizes from a prize purse of $375,000 USD. Competitors will be able to win a maximum of $15,000 USD. Should a competitor not complete all required tasks, but still be in the Top 25 scoring competitors, a percentage of the $15,000 will be awarded based on the percentage of the trial that was

completed. Only the top 25 scoring competitors will be invited to compete in the Competition Round.

The top ten (10) scoring competitors in the Competition Round that meet or exceed a given threshold will be awarded prizes from a purse of $625,000 USD.

First Place: $185,000 USD

Second Place: $125,000 USD

Third Place: $75,000 USD

Fourth Place: $50,000 USD

Fifth Place: $40,000 USD

Sixth through Tenth Place: $30,000 USD

II. Eligibility to Participate and Win Prize Money

To be eligible to win a prize, competitors must:

(1) Register and comply with all requirements in the Official Rules and Team Agreement;

(2) In the case of a private entity, be incorporated in and maintain a primary place of business in the United States, and in the case of an individual, whether participating singly or in a group, be a citizen or permanent resident of the United States; and

(3) Not be a U.S. Government entity or U.S. Government employee acting within the scope of their employment.

The eligibility requirements (including requirements for foreign participation) can be found on the official challenge site: www.spaceroboticschallenge.com

III. Official Rules

The complete official rules for the Space Robotics Challenge can be found at: www.spaceroboticschallenge.com

Cheryl Parker,

NASA Federal Register Liaison Officer.

[FR Doc. 2019-17061 Filed: 8/8/2019 8:45 am; Publication Date: 8/9/2019]