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NGA announces 10 winners in MagQuest Phase 1; launches $1 million Phase 2

SPRINGFIELD, Virginia — Today, the National Geospatial-Intelligence Agency announced 10 winners in the first phase of MagQuest, a $1.2 million global open innovation challenge to advance how we measure Earth's magnetic field. The next phase of the challenge is now accepting detailed designs for geomagnetic data collection methodologies for the World Magnetic Model. Phase 2 is open to solvers from Phase 1, as well as new solvers who did not participate in the first phase of the challenge, and will award $1 million in cash prizes.

In Phase 1 of the competition, U.S. and international innovators in industry and academia submitted 40 novel approaches to geomagnetic data collection. Submissions included space, aerial, oceanic, and land-based solutions. The MagQuest judging panel helped select the 10 winners, according to the Phase 1 selection criteria. Each winner will receive $20,000 in cash prizes.

The 10 Phase 1 winners are:

- **Compact Spaceborne Magnetic Observatory (COSMO) CubeSat.** (University of Colorado Boulder)**.** A CubeSat solution specifically designed and tested for magnetic cleanliness and accurate data from a compact form factor. A compact, scalar-vector magnetometer and a novel deployable boom enable high-quality data to be collected from a CubeSat.
- **CubeSat-powered Geomagnetic Data Collection.** (Spire Global). A global constellation of 75 CubeSats carrying custom magnetometer payloads. This system could leverage Spire's existing infrastructure for satellites, ground stations, and data processing.
- **Diamonds in the Sky: Vector Magnetometry for Space and Airborne Platforms.** (SB Technologies Inc)**.** Diamond magnetometer (Qmag) technology integrated into a network of CubeSats and commercial airplanes. The compact Qmag would decrease cost and improve integration across platforms.
- **Distributed Network of Microsensors Onboard Picosatellites.** (Pumpkin). A swarm of picosatellites in Low Earth Orbit mapping the magnetic field. This solution would keep costs low by minimizing the required functionality, mass, and volume of each individual satellite.
- **EOI Pathfinder with Magnetometry Suite**. (Earth Observant Inc.) Magnetometry payload added to the planned Pathfinder satellite mission. This solution would capture magnetic data during the primary mission's downtime.
- **Equatorial Ground Observations and Scalar Satellite Mission.** (Helmholtz Centre

Potsdam GFZ German Research Centre for Geosciences). Permanent geomagnetic ground stations at the equator paired with a scalar satellite mission. By defining the exact location of the magnetic equator, the necessary data could be collected with a satellite mission of decreased cost and complexity.

- **Global Acquisition of Magnetic Measurements at Altitude (GAMMA).** (Stellar Solutions). Adding magnetometers as hosted payloads to planned satellite launches with optional integration of ground-based sensors. The combination of spaceborne and terrestrial data could increase coverage and decrease risk.
- **MagSAT: Magnetic Field Mapping NanoSat Constellation.** (Hypergiant) A constellation of nanosatellites with self-calibrating, solid-state magnetometers. The proposed magnetometer could decrease cost and complexity while not being affected by the same environmental conditions as a traditional magnetometer.
- **Oceanic Observations from Autonomous Profiling Floats**. (University of Washington Applied Physics Laboratory with partner Oregon State University**.**) The addition of magnetometers to existing autonomous ocean platforms. Sensors could be deployed at scale, yielding continuous sea surface and subsurface magnetic field data.
- **Terrestrial and Seafloor Automated Magnetic Observatories.** (Royal Meteorological Institute of Belgium). An international network of automated magnetic observatories on land and the seafloor. The observatories could be deployed at almost any global location; automation could deliver continuous data while decreasing staffing and support needs.

MagQuest is designed to attract new ideas to increase the efficiency, reliability, and sustainability of geomagnetic data collection. With this open innovation challenge, NGA is inspiring solvers to apply their expertise to a wide range of potential solution areas.

“From seafloor observatories to satellites, the breadth of ideas that emerged from Phase 1 of MagQuest is impressive and energizing,” said Richard Salman, Director of NGA’s Office of Geomatics. “We look forward to seeing the novel thinking and new technologies solvers will bring to Phase 2 of the challenge.”

In Phase 2, NGA seeks detailed designs and plans for data collection methodologies, including a concept of operations, a description of expected performance and potential risks, and an overview of potential future program management. Success in Phase 2 may require increased expertise, and MagQuest encourages participants to explore collaboration opportunities by joining the MagQuest solver community. The challenge is open to U.S. and international participants, as defined in the rules, terms, and conditions.

To participate in Phase 2, solvers must submit their designs by 4:59 p.m. EDT on August 28, 2019. The independent judging panel will help select up to five winners according to the Phase 2 selection criteria. The total Phase 2 prize pool of $1 million will be distributed across Phase 2 winners.

At NGA's discretion, additional phases of the challenge may follow Phase 2. These phases, if executed, are anticipated to award an additional $2.5 million in cash prizes plus potential nonmonetary incentives.

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NGA delivers world-class geospatial intelligence that provides a decisive advantage to policymakers, warfighters, intelligence professionals and first responders.

NGA is a unique combination of intelligence agency and combat support agency. It is the world leader in timely, relevant, accurate and actionable geospatial intelligence. NGA enables the U.S. intelligence community and the Department of Defense to fulfill the president's national security priorities to protect the nation.

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