21 Semi-finalist Teams Advancing in Shell Ocean Discovery XPRIZE

XPRIZE has announced the 21 teams representing 13 countries advancing in the USD7M Shell Ocean Discovery XPRIZE. This three-year global competition challenges teams to advance ocean technologies for rapid, unmanned and high-resolution ocean exploration and discovery. Their innovative approaches run the gamut: gliders and drones, underwater robotic swarms, autonomous underwater vehicles, robotics, artificial intelligence and massive computing platforms.

From a 25-country field, a panel of independent expert judges chose the semi-finalist teams who will move forward into the first round of testing. Semi-finalist team leads hail from Canada, China, France, Germany, Ghana, India, Japan, New Zealand, Portugal, South Africa, Switzerland, the United Kingdom and the United States. Launched in 2015, the Ocean Discovery XPRIZE features groups including university teams of undergraduate and graduate students, non-profits, startups and professional scientists and engineers.

Creating Next Generation Tools

Jyotika Virmani, Ph.D., prize lead and senior director with XPRIZE's Energy and Environment Group, who announced the semifinalists from the Catch the Next Wave conference in San Diego. "Through the Ocean Discovery XPRIZE, we have an opportunity to create next generation tools, technologies and techniques that will illuminate deep-sea wonders and unlock a new era of ocean exploration. We look forward to seeing the teams' innovative approaches come to life over the next 10 months."

During Round 1, teams will deploy their entries to operate at a depth of 2,000 metres, aiming to map at least 20 percent of the 500 km^2 competition area at five meters resolution, identifying and imaging at least five archeological, biological or geological features at any depth, all within 16 hours. In other words, the competition technologies will aim to reach depths deeper than the Grand Canyon and map an area that is nearly five times the area of Paris.

The 21 teams advancing are:

- ARGGONAUTS (Karlsruhe, Germany) – Led by Gunnar Brink, the team is creating a swarm of 12 intelligent deep-sea robot drones using insight gained through two previous projects.
- BangaloreRobotics (Bangalore, India) – Led by Venkatesh Gurappa, the International team is developing innovative and low-cost Underwater Swarm AUVs.
- Blue Devil Ocean Engineering - Duke University (Durham, NC, United States) – Led by Martin Brooke, the Duke University team is working with heavy lift aerial drones that drop retrievable diving SONAR pods.
- CFIS (Arnex-sur-Nyon, Switzerland) – Led by Toby Jackson, the team is designing a swarm of underwater robots that use lasers for ocean floor mapping as well as imaging of interesting creatures and formations.
- Eauligo (Nice, France) – Led by Christopher Lewis, the team is developing miniature micro subs that mimic bees and their behavior to map and explore the deep ocean.
- ENVIRODRONE (Windsor, Ontario, Canada) – Led by Ryan Cant, the team is using aerial drones that launch next-gen AUVs.
- Exocetus (Wallingford, CT, United States) – Led by Joe Turner, the team employs several low-cost underwater gliders equipped with side-scanning sonar to map for extended periods of time.
- GEBCO-NF (New Zealand, Global) – Led by GEBCO-Nippon Foundation scholars, the 12 nation team is integrating existing technologies with a new unmanned surface vessel to contribute to comprehensive mapping of the entire ocean floor by 2030.
- PISCES (Portugal) – Led by Nuno Cruz, the team is aggregating Portuguese technologies developed at INESC TEC (Porto) and CINTAL (Algarve) to create the PISCES system that leverages cooperative robotics.
- KUROSHIO (Yokosuka, Japan) – Led by Takeshi Nakatani, the team is integrating technologies owned by Japanese universities, institutes and companies for a unique collaborative approach centered around AUVs.
- Lehigh Tide (Bethlehem, PA, United States) – Led by Matthew Ciolino - The Lehigh University team is creating a cost-effective autonomous underwater vehicle that can accurately scan the ocean.
- Ocean Quest (San Jose, CA, United States) – Led by Danny Kim, the team endeavors to design a marine STEM platform for students worldwide to enable project-based learning with new technology and techniques.
- Oceanzus (Durham, NH, United States) – Led by James Case, the team is creating a continuous operating platform that supports multiple survey assets to realize the mapping goal.
- OD-Africa (Accra, Ghana) – Led by Mark Amo-Boateng, the team is building intelligent low-cost modular AUV/ROV systems to

democratize ocean discovery, using advanced artificial intelligence and algorithms to navigate and explore the ocean.

- Orca Robotics (San Diego, CA, United States) – Led by Phillip Rhyner, the team is creating an underwater system that uses phase array radar and computing power to provide results in real time, which is a new use for this approach.
- SubUAS (Piscataway, NJ, United States) – Led by Rutgers professor Javier Diez, the team has created an AI-enabled drone that can fly quickly to remote survey locations, dive into the water and use a second set of propellers to navigate and intelligently explore underwater before flying home for data download, repowering and return flights.
- Tampa Deep-Sea X-plorers (Tampa, FL, United States) – Led by Edward Larson, the team is using existing technology and side scanning sonar on multiple AUVs to fully cover the large mapping area.
- Team Tao (Newcastle, United Kingdom) – Led by Dale Wakeham, the team is developing an autonomous swarm system for rapid surface to deep ocean exploration.
- Texas A&M University Ocean Engineering (College Station, TX, United States) – Led by Dylan Blakeslee and working in partnership with successful alumni of Texas A&M; the University team is using drone ships and AUVs equipped with innovative navigation systems, renewable power generation and chemical sensing technologies to explore remote ocean habitats.
- Virginia DEEP-X -- Virginia Tech and Old Dominion University (Virginia, United States) – Led by Dan Stilwell, the team is developing small and low-cost underwater vehicles that operate in coordinated teams.
- X994 (Austin, TX, United States) – Led by David Ryan, the team is working to optimize robotic mapping of the ocean through advancements in software, AI, and data analytics.

More details of the competing teams are posted on the XPRIZE site.

Deeper Challenge

Up to 10 finalist teams will be selected to proceed past Round 1 and will split a $1M milestone prize purse. In Round 2, they will need to operate their entries at a depth of 4,000 meters, aim to map at least 50 percent of the 500 km^2 competition area at five meters resolution, identifying and imaging at least ten archeological, biological or geological features at any depth, all within 24 hours. At the end of the competition, a USD4M Grand Prize and USD1M Second Place Prize will be awarded to the teams that receive the top scores for demonstrating the highest resolution seafloor mapping, after meeting all minimum requirements for speed, autonomy and depth.

As part of the total USD7M prize purse, 12 teams will also be competing for the National Oceanic and Atmospheric Administration (NOAA) USD1M bonus prize and will need to demonstrate that their technology can ‘sniff out’ a specified object in the ocean by tracing a biological and chemical signal to its source.

Partnership with Fugro and Esri

The Shell Ocean Discovery XPRIZE has entered into a partnership with Fugro. As the world’s foremost independent provider of geo-intelligence and asset integrity solutions, Fugro will utilise an autonomous underwater vehicle equipped with high-resolution multibeam echosounder technology to acquire the competition’s baseline bathymetry data that are needed in judging team mapping results. The competition is also partnering with Esri, the global leader in geographic information system (GIS) software and geodatabase management, who will donate its award-winning ArcGIS Online platform for the teams to use, enabling the Ocean Discovery XPRIZE competitors to submit their maps via Esri ArcGIS Online to ensure all participants are judged from a consistent technology platform.