

Round: 5A
Category: Technology
Time: 3 minutes

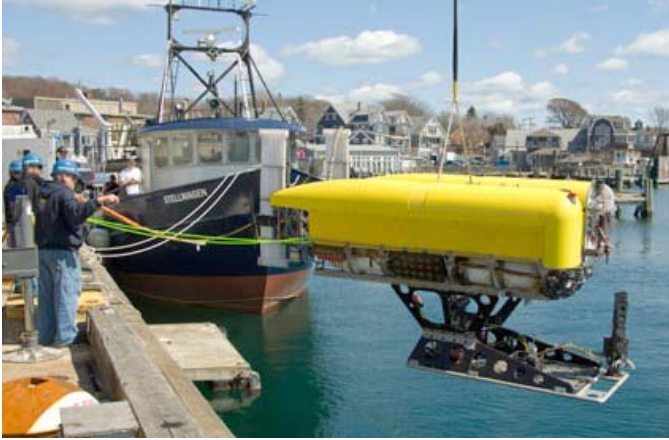


Figure 1: A deep-sea robotic hybrid vehicle

1. What was the name of the new hybrid vehicle (Figure 1) that sampled to 10,902 meters deep on May 31, 2009? (2 pts)
2. Which location did it sample? (2 pts)
3. Why is this new vehicle called a hybrid? (2 pts)
4. What factors had to be considered during the design of this new vehicle? (8 pts)
5. What three technologies were incorporated into the design to make the program successful? (6 pts)

ANSWER

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Figure 1: A deep-sea robotic hybrid vehicle

1. What was the name of the new hybrid vehicle (Figure 1) that sampled to 10,902 meters deep on May 31, 2009?
Nereus (2 pts)
2. Which location did it sample?
The Challenger Deep (2 pts)
3. Why is this new vehicle called a hybrid?
It can be configured to be an Autonomous Underwater Vehicle (1 pt) or a (tethered) Remotely Operated Vehicle (1 pt)
4. What factors had to be considered during the design of this vehicle?
4 pts each for any two of the following factors (8 pts total):
 - *The extreme pressures at this depth*
 - *The length and weight of the tether*
 - *Power endurance for the missions*
 - *Safety of the batteries under these conditions*
5. What three technologies were incorporated into the design to make the program successful?
Fiber Optics / glass fiber core for data transmission (2 pts)
Ceramics Spheres for floatation and equipment packaging (2 pts)
Autonomous command and control (2 pts)