New Deep-sea underwater camera now in use

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Scientists and technicians at the University of California, San Diego's Scripps Institution of Oceanography have developed and are now using a new deep-sea underwater camera system, the first free-falling photographic equipment utilized for ocean-bottom investigations.

Standard deep-sea photographic equipment was modified and re-packaged to function in a free vehicle system that is dropped over the side of a research vessel and descends freely to the sea floor without a conventional cable connection to the ship.

The camera system takes pictures at 15-minute intervals for a pre-set period and surfaces automatically at the end of a picture-taking mission. Its development was funded by the National Science Foundation.

The free vehicle system was developed by George Schick and Meredith Sessions, engineers in the Ocean Technology Section of Scripps' Marine Life Research Group (MLRG) under the direction of John D. Isaacs, professor of oceanography and director of MLRG.

"The new system performed admirably in its first deep-ocean test recently," Schick said. "Three 30-to-60-hour missions were completed off Cape Colnett, Baja California. They were at depths of 4,560 feet, 6,788 feet, and 11,262 feet, and 100 to 240 clear, distinct photographs were taken at 15-minute intervals during each mission. On one of them, color photographs were taken.

"This free vehicle camera system departs from previous deep-sea photographic systems in two important aspects. Deployment of the camera as a free instrument overcomes the many limitations of previous ship-connected camera systems. Long time-sequence photography of one area of the sea floor is made feasible and should provide an essential tool for the study of the relations of marine organisms to their environment.

"The other unique aspect of this system is the use of a baited lure to attract and concentrate benthic, or ocean bottom, creatures."

The test was made during an expedition of the Scripps research ship, Thomas Washington, with Dr. Warren Wooster, professor of oceanography, as scientific leader.

Professor Isaacs and other Scripps scientists were enthusiastic about the test results and the varied species of marine life that were photographed, especially the picture of what was subsequently identified by the Institution's marine biologists as a 22-foot sleeper, or Greenland, shark, found usually in Arctic waters. Temperature of the water where the shark was photographed was about 35 degrees Fahrenheit.

In preparing for a launch of the equipment, the camera and flashtube assembly, a Syntactic foam float, a location buoy with radio transmitter, and the baited ballast weight are attached to a 65-foot line. The entire arrangement is maintained perpendicular to the ocean floor, with the locating buoy at the top. The baited ballast weight at the bottom of the line attracts marine life into camera range. For the first missions, the camera was 12 feet above the ocean floor pointing vertically downward to photograph an area of approximately 9xl2 feet.

The camera shutter remains continuously open and a photograph is taken each time the light is triggered. The device that activates the light also advances the film ie frame at a time.

A mission is concluded when the free vehicle is released by the parting of a magnesium bar link. The magnesium link acts as a timer and breaks after an electrical-chemical reaction (electrolysis) reduces its diameter until it can no longer hold down the floats and camera. They rise to the surface and are located by radio signals from the transmitter, or by radar or visual contact.

Scripps engineers plan to modify the camera system by attaching to it an electric motor propulsion unit to serve as a lifting device. This will enable the camera to "hop" across the ocean floor so that each series of photos will cover a wider area than is now possible.

"Development of the free instrument vehicle technique began in 1958," said Schick, It with a simple free vehicle fish trap. Improvements and accessory components such as release mechanisms, timers, radio and radar acquisition devices and various instruments are developed through the years. More recently, a free vehicle current meter has become operational and now the photographic system has been added, confirming once again the utility and versatility of this free vehicle instrument system approach."

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