Deep Set Eyes: COVIS

Narrator: New scientific eyes that use sound to see descend more than one mile to the Pacific Ocean floor off the coast of Washington for a better look at hydrothermal vent plumes.

COVIS, for Cabled Observatory Vent Imaging Sonar, was designed and built by the Applied Physics Laboratory and deployed with the help of a robot from Canada called ROPOS (Remotely-Operated Platform for Ocean Sciences).

Russ Light: This kind of car-size robotic vehicle was deployed first and COVIS was swung underneath it on a line.

Narrator: ROPOS is connected to COVIS during the descent. Then, once on the bottom, disconnected.

Light: ROPOS, then free of COVIS, was able to grab the ROV with its arm and then it was able to do a final positioning.

Narrator: COVIS uses sound to see where no sunlight penetrates, using sonar acoustic imaging.

Light: What this instrument will do is use an acoustic technique to image the shape of hydrothermal vent plumes.

Narrator: Vent plumes, some known as "black smokers," spew hot volcanic gasses from the ocean floor.

Light: We'll also use this acoustic technique to measure the flow rate of these plumes using a sonar processing technology called Doppler processing.

The sonar that we see on top of this large tripod – the black transducer elements – produces a fan beam sonar. Imagine a flat one-degree-thin beam 128 degrees wide that's mechanically scanned in one degree increments to image the entire plume.

Narrator: COVIS sonar produces 3D renderings of plume activity. Dense data streams are transmitted to researchers via the NEPTUNE Canada observatory system. The goal is to measure…

Light: … how much heat is coming out of that whole area.

Narrator: Scientists hope COVIS will help them learn how heat energy venting into the ocean deep below the surface relates to tides, earthquakes, and volcanic activity on the Juan de Fuca plate.