VISIONS'13 Preparations

Narrator: Cable. Miles of high capacity fiber-optic and power cable destined for installation deep in the Pacific Ocean. Engineers from the UW's Applied Physics Laboratory prepare to plug into primary cables laid at sea off the coast of Washington and Oregon in 2011.

The cables will provide electrical power and telecommunications to scientific instruments and HD video cameras and return streaming data and images back to shore and onto the Internet.

Gary Harkins: To the University, it means 239 million dollars. And it's the biggest project that APL has ever gotten.

Narrator: The return on investment? New insights into the science of climate change, earthquakes, undersea volcanoes, ocean acidification and much more — insights waiting to be discovered in the coming avalanche of new data.

Harkins: It's almost unbelievable the amount of data we can carry. Seventy to eighty gigabits of real time data that will come back. We provide in the area of 200 kilowatts spread over this network at the bottom of the ocean.

Narrator: This "network" when complete will be the world's largest underwater observatory: the REGIONAL SCALE NODES component of the National Science Foundation's Ocean Observatories Initiative.

John Delaney: At the ends of these cables, we're going to have robots, we're going to have sensors. We're going to have instruments. We're going to have entire laboratories set up where people on land, you could actually have live streaming video or information from the sea floor. So when events take place, we can actually be there, without being there.

Narrator: The ocean observatory will generate a continual flow of data from instruments allowing real time studies of the Juan de Fuca tectonic plate — home of black smokers and underwater volcanic activity.

Harkins: It's a Cadillac system. It has to be to survive this very rugged environment, because not only are you putting things on the bottom but next to underwater volcanoes and black smokers where the normal temperature is about half a degree centigrade. If you put it next to a black smoker, it can be over 300 degrees centigrade.

Dana Manalang: This is a mass spectrometer. It's one of about a hundred scientific instruments that are going to be connected to our cable. This particular one was built for long-term seafloor deployment.

There's a turbo pump inside the titanium cylinder. There's a residual gas analyzer. This is the kind of instrument that the cable makes possible bringing high power and high bandwidth to the sea floor.

Larry Nielson: This is the main cable that goes between everything. Without this, we don't have any network.

Harkins: We think we've done a great job in designing a reliable system.

Narrator: The challenge facing APL Chief Engineer Gary Harkins:

Geoff Cram: …far more corrosion-resistant. Titanium is one of the best things you can make an undersea housing out of…

Narrator: All of the "wet" engineering needed to make the power and data connections to instruments on the ocean floor at depths of up to two miles –pressures exceeding two tons per square inch.

Harkins: By providing all of this power and bandwidth and instantaneous connection to the Internet, will provide a whole new scope for scientists to put their instruments down. They will no longer have to wait for many months to see what the results are. As soon as we turn on power, data will be coming back.