

U.N. task force says new ocean telecom cables should be 'green'

October 28 2014, by Talia Ogliore



Map of the distribution of global undersea communications cable infrastructure. Credit: Tyco Electronics Subsea Communications LLC.

The global system of submarine telecommunications cables that supports our connected world is deaf, dumb and blind to the external ocean environment – and represents a major missed opportunity for tsunami warning and global climate monitoring, according to UH scientists and a United Nations task force.

"For an additional 5-10 percent of the total cost of any new [cable system](#) deployment, we could be saving lives from tsunamis and effectively monitoring global change," said UH Mānoa's Rhett Butler, Director of the Hawai'i Institute of Geophysics and Planetology and chair of an international committee tasked to evaluate the cable opportunity.

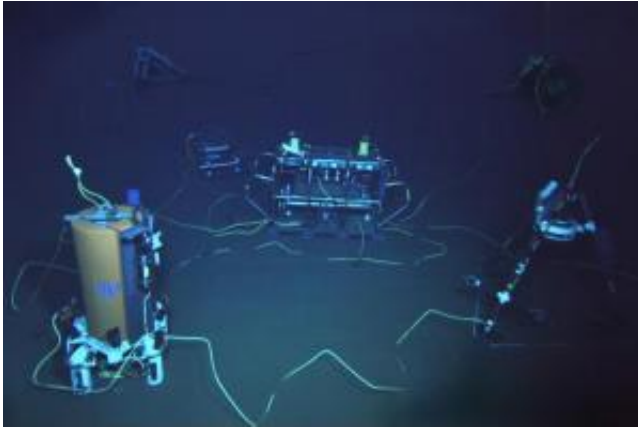
Submarine telecommunication cables are the backbone of the Internet. More than half a million miles of this remarkable fiber-optic cable already criss-cross the deep ocean, linking more than 2.7 billion users and supporting global business, finance, social media, entertainment and political expression.

Now researchers are making a scientific and societal case for "greening" any new cables proposed to be built in the future.

The new report, published in October 2014 by a joint [task force](#) of three U.N. agencies, parallels an engineering feasibility study and analyses of strategy and legal challenges.

By adding a relatively straightforward set of instrumentation – accelerometers, high-resolution pressure gauges, and thermometers integrated into the cables' optical repeaters – the enhanced telecom cables could answer many basic science needs, as well as help monitor of the physical state-of-health of the cable system itself, researchers say.

For example, a cable-based worldwide network of seafloor sensors could enable the monitoring of the pressure of a tsunami as it passes over the sea floor, allowing the measurement in real-time of the actual tsunami generated to assess its potential coastal threat and corroborate the necessity of a warning.



The United Nations initiative is focused on integrating sensors into new submarine cables. Nonetheless, retired submarine cables are valuable for science, as witnessed by the University of Hawai'i Aloha Cabled Observatory near O'ahu, which reuses the Hawai'i-4 telecom cable to create the deepest ocean observatory on Earth.

Likewise, global earthquake monitoring is hamstrung by the fact that nearly all of the world's seismic stations are located on land. A smarter undersea cable system could significantly improve the resolution at which researchers can describe the earthquake process itself – including how, where and how much the earthquake moves over its fault surface, details that are fundamental to understanding its tsunami-generating potential.

On the climate side, readily available sensor technology could be deployed to improve our understanding of ocean circulation, sea level rise, and the exchange of heat through the ocean depths and with the atmosphere – essential elements for global monitoring.

All this new data could be transmitted at a negligible data rate (1,000,000,000 kb/s).

"The undersea communication cable is an untapped platform for oceanographic sensors, one that could outstrip all other systems attempting to observe the deep oceans," said Doug Luther, UH Mānoa professor of oceanography and another contributor to the report.

Although there are satellites, ships, airplanes and floats sampling the top of the ocean, there are almost no measurements from the ocean bottom thousands of feet below for monitoring the global ocean and climate change.

With the right motivation, green cables could be coming sooner rather than later.

"There is a current discussion among several cable companies to include sensors," Butler said. "There was an effort announced by Pacific Fiber a year ago, and SubPartners is also making plans for its APX-East lines that run from Australia to California."

At the Submarine Networks World telecommunications conference in Singapore earlier this month, nine new cable systems were being discussed, including an Arctic fiber system proposed to run from Tokyo to London.

"In the coming quarter century, all of the world's cable systems will be replaced," Butler said. "Missing this opportunity to begin integrating sensors would be an irreparable loss to our descendents."

Currently the greatest challenges to the green cable effort remain the coordination, collaboration and funding for a universal solution that is tailored to specific [cable](#) deployments led by private companies.

Once the network is built out, the concept is for open sharing of the data that is collected.

"If you look at all of the basic science monitoring of the planet right now, everything is being funded by governments," Butler said. "This is a new situation wherein the submarine cables are commercially owned. So there will need to be an accommodation between governments and business to make this a reality."

More information: White paper: The scientific and societal case for the integration of environmental sensors into new submarine telecommunication cables. www.itu.int/dms_pub/itu-t/opb/...CT-2014-03-PDF-E.pdf

Provided by University of Hawaii at Manoa

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