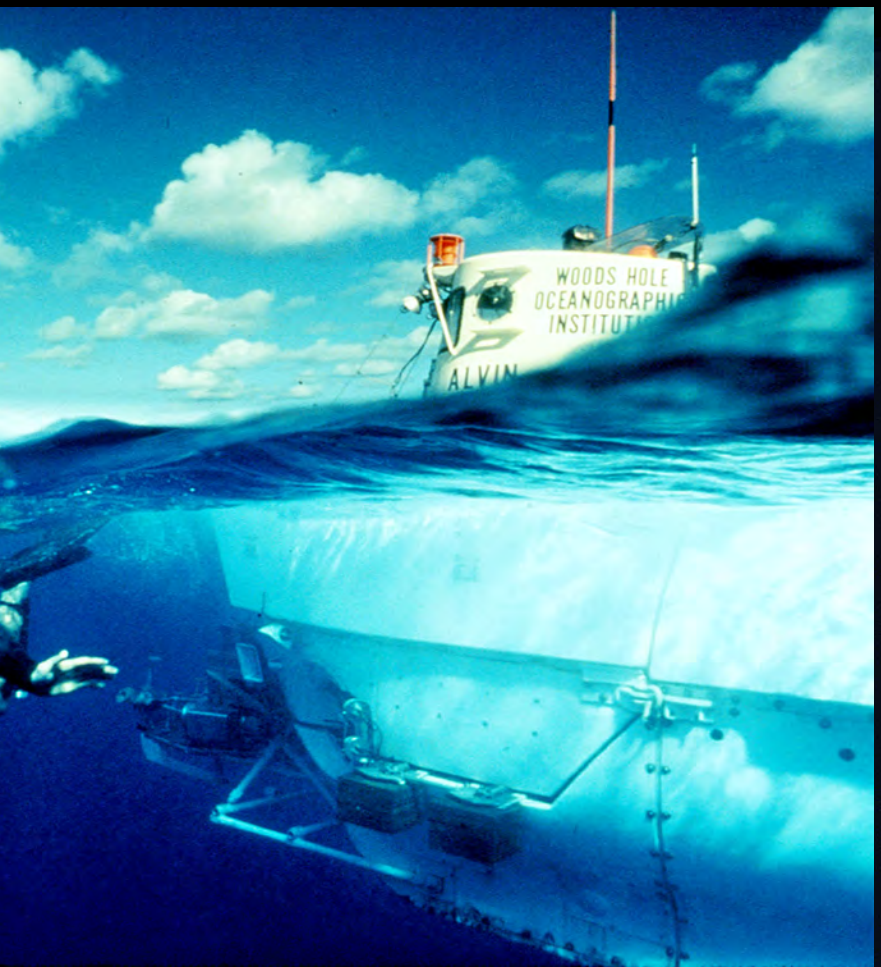
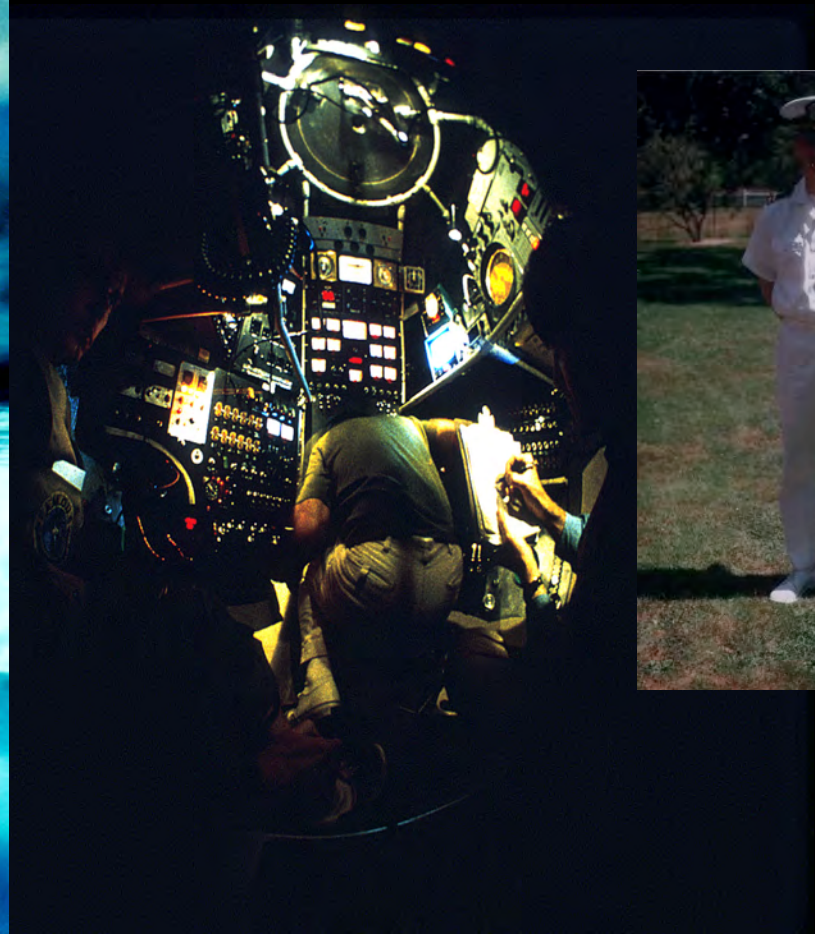
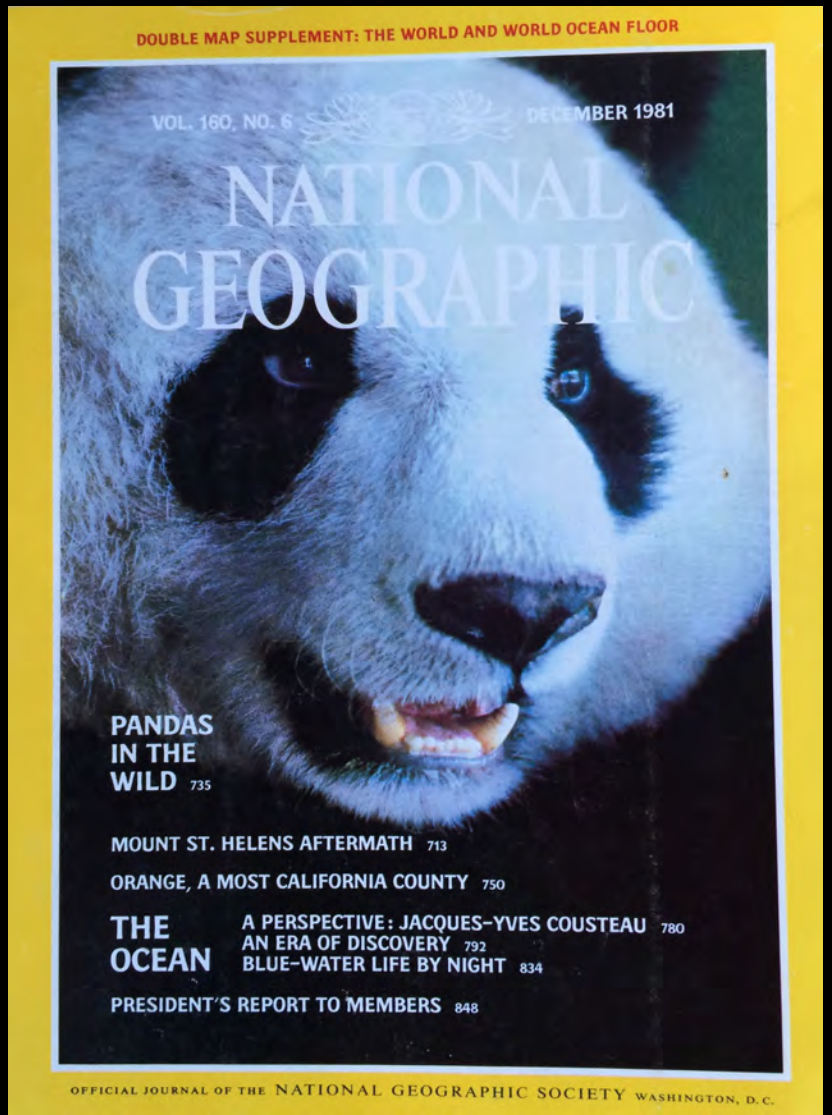
In 1967, while serving in the U.S. Navy which sponsored the development of the DSRV ALVIN, I was assigned to the Deep Submergence Group at WHOI by ONR. I then joined the ALVIN Group when I left active duty in the Navy and entered the reserve in 1970

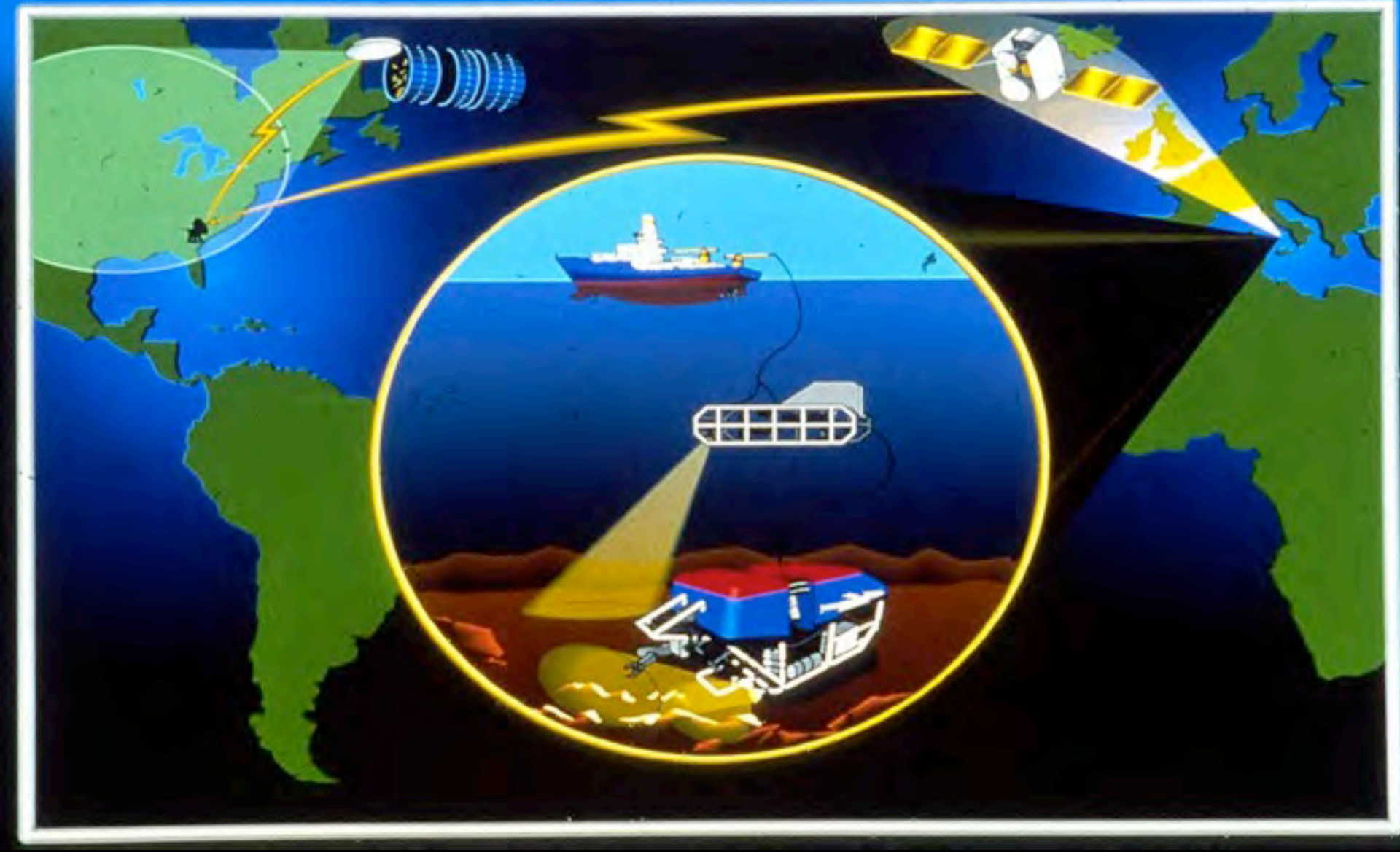


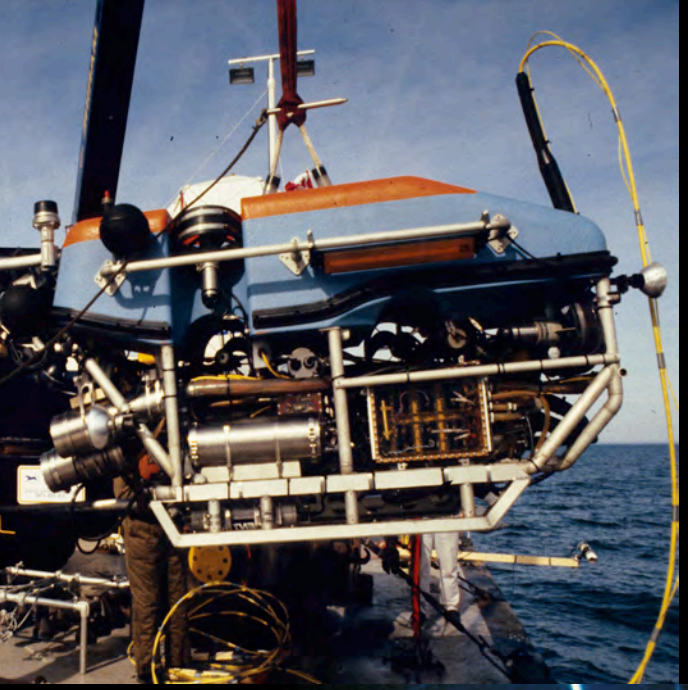
Over the next 14 years I spend a considerable amount of time beneath the sea in a broad range of U.S. Navy submarines, bathyscaphes, and submersibles.

Based upon that experience I published the concept of using tele-presence technology to replace human-presence in the December 1981 Issue of National Geographic Magazine

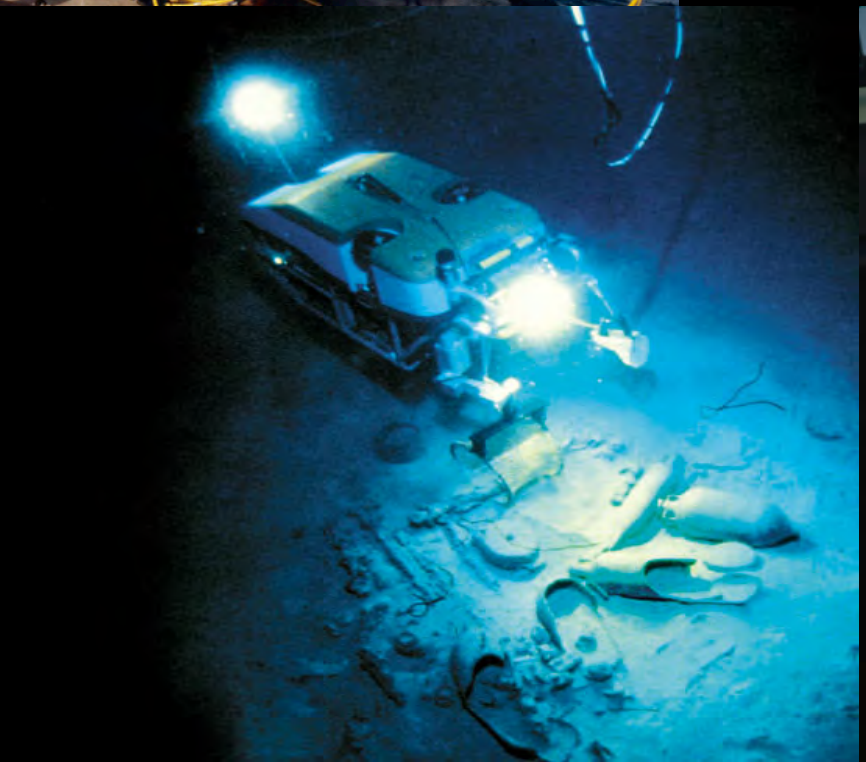


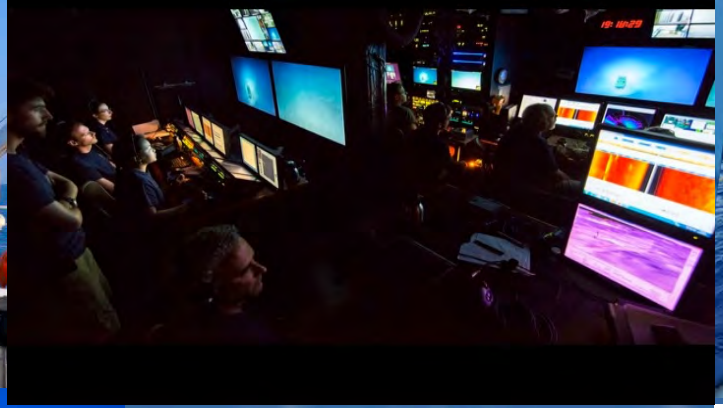
In 1982, with funding from ONR I founded the Deep Submergence Laboratory (DSL) in the Department of Applied Ocean Physics and Engineering (AOP&E) at the Woods Hole Oceanographic Institution (WHOI) to implement this tele-presence concept.



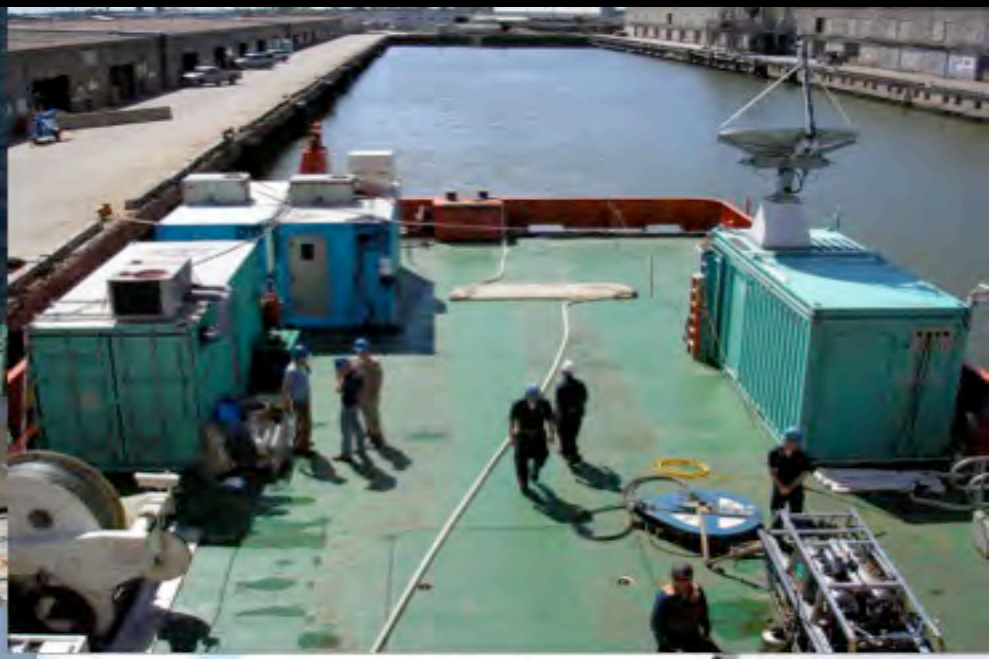
Two years later in 1984, brought the ARGO/JASON system on line with funding from the US Navy



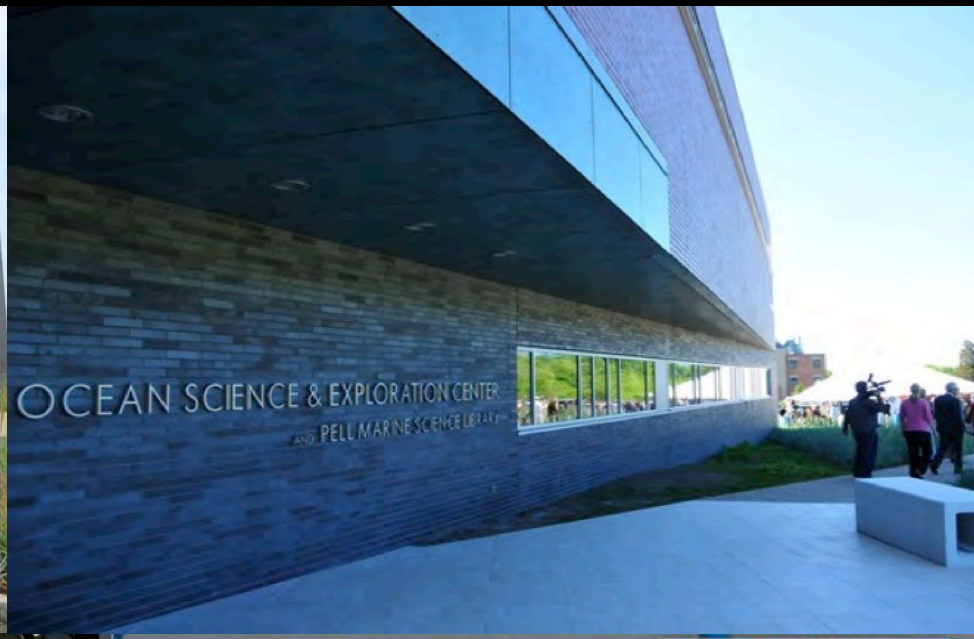
In 1997, after using the first phase of this development effort for 13 years transitioned the ARGO/JASON/MEDEA/DSL-120 vehicles to NSF/NDSF, and began developing the ARGUS, HERCULES, ECHO, and LITTLE HERC vehicle systems using ONR and private funding, which included a new tele-presence capability to this system which NSDF chose not to do.



Began using this new mobile system on a variety of platforms from 2004 to 2009 funded by the Navy, NOAA, and private sponsors

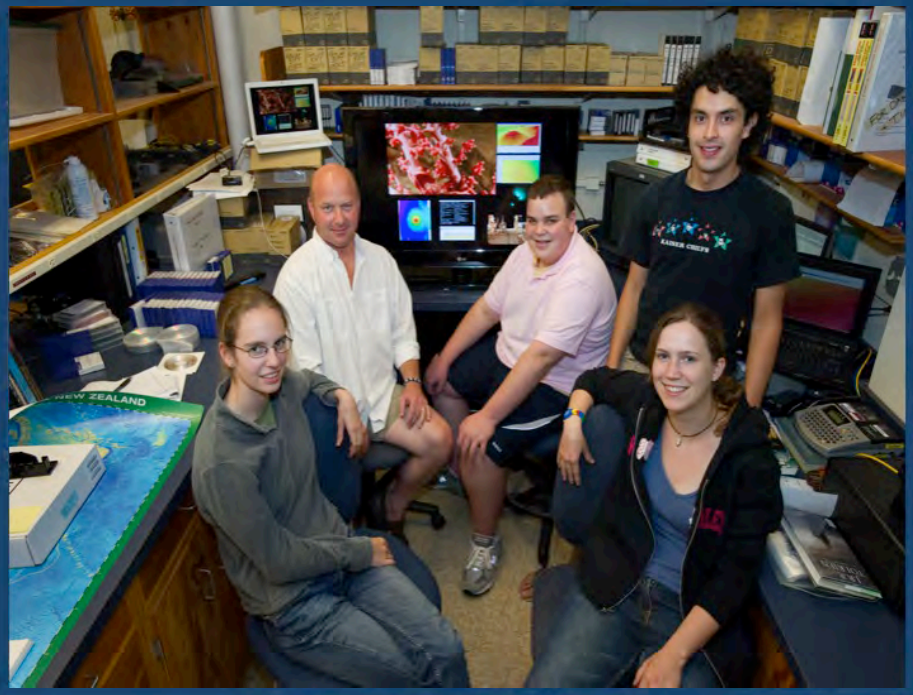


Brought the Center for Ocean Exploration and its Inner Space Center at GSO on-line in 2004 using State funding.





Began building a network of Doctors-on-Call remote console sites




Jakarta, Indonesia


NOAA HQ Silver Spring


NOAA PMEL, Seattle

# Added Live interactive studios linked to ships at sea

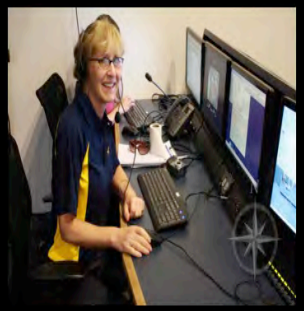





INNER SPACE CENTER PRODUCTION STUDIO


M2
PGM
M4
PV

# Began building network of remote sites for educational outreach

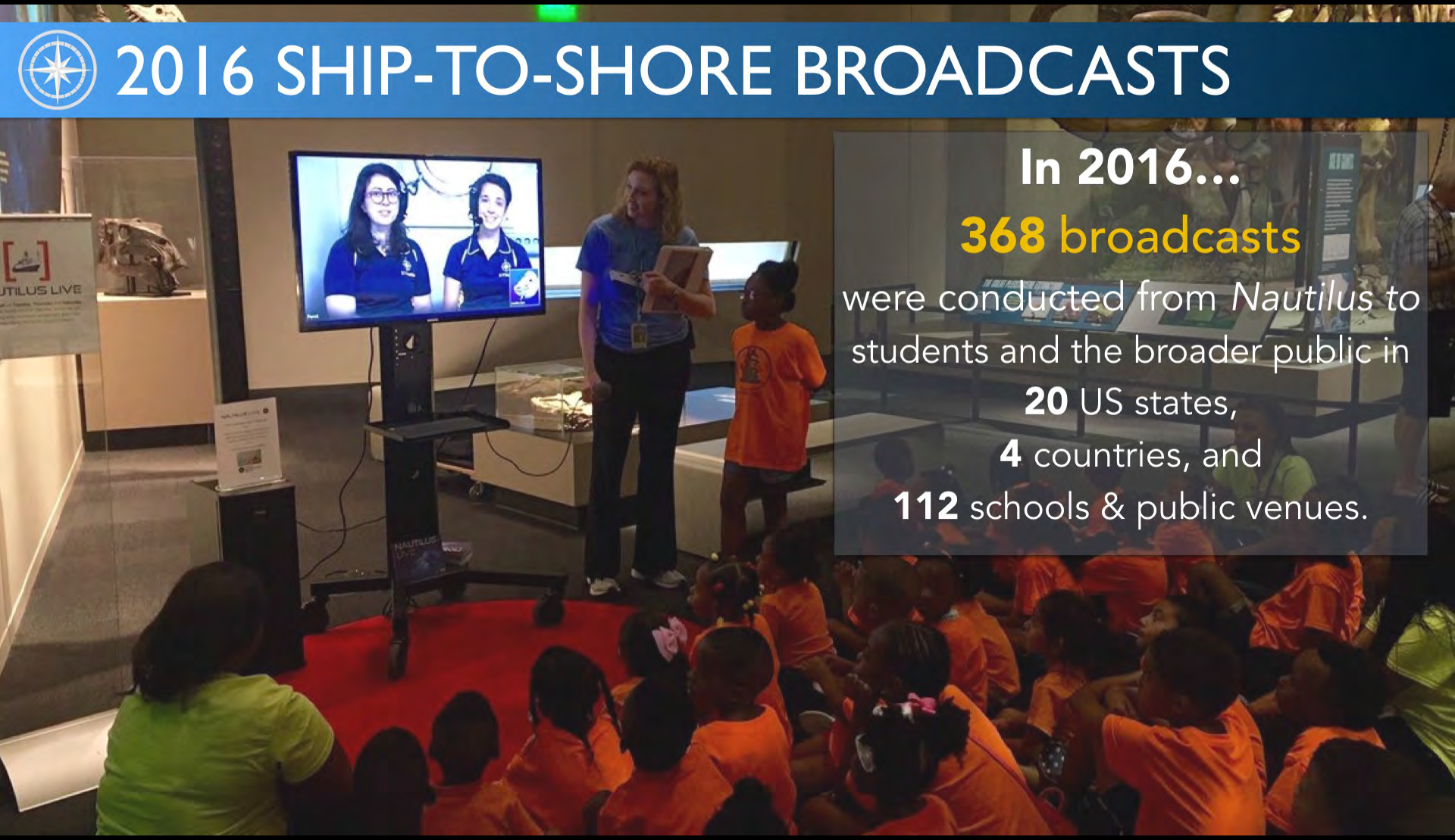



Scottsdale, AZ
Boys and Girls Club

**Smithfield, RI**
**Public Schools**


**Scottsdale, AZ**
**Boys and Girls Club**

# 2016 SHIP-TO-SHORE BROADCASTS



**In 2016…**

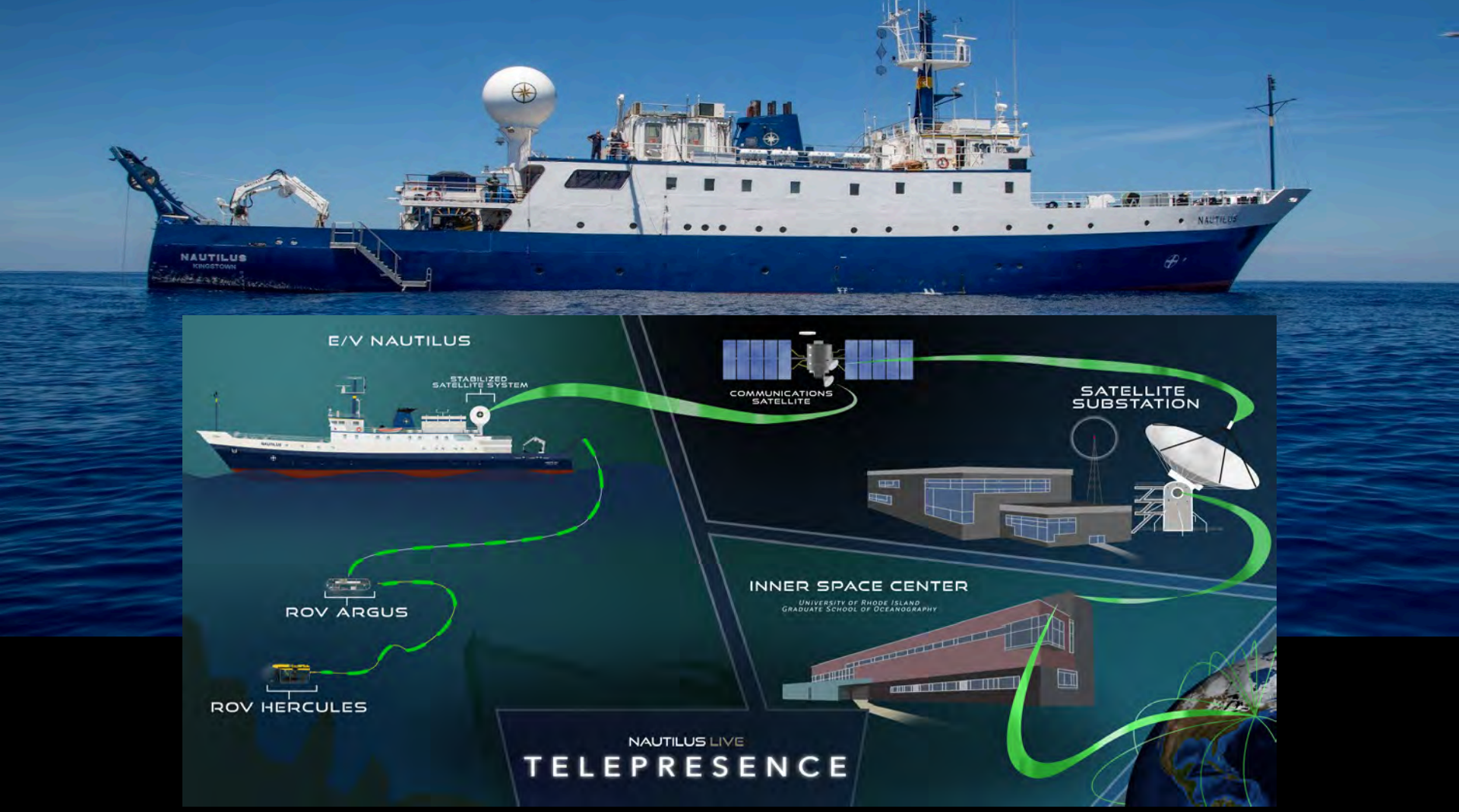
**368** broadcasts

were conducted from *Nautilus* to students and the broader public in

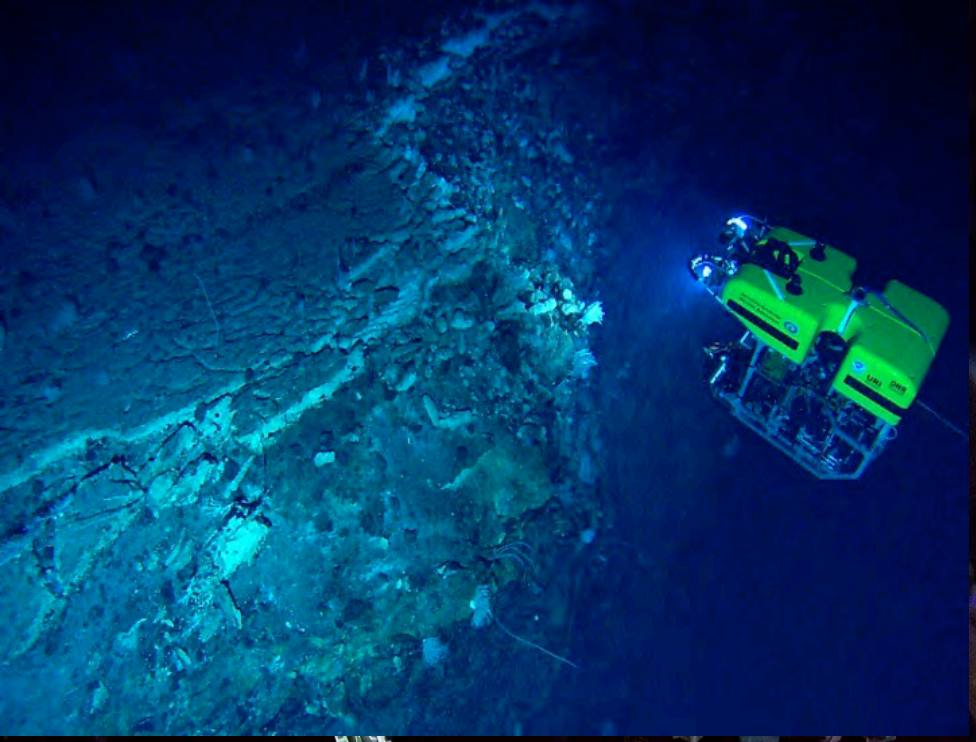
**20** US states,

**4** countries, and

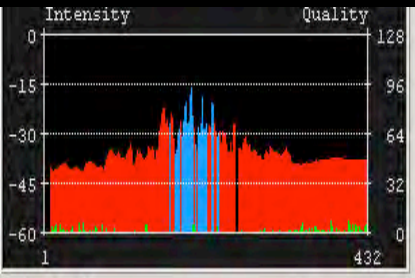
**112** schools & public venues.




In 2009, created the Ocean Exploration Trust (OET), acquired E/V NAUTILUS from private sponsors that also up-graded the ship and began to permanently install previous mobile ARGUS/HERCULES tele-presence  technology on the ship.

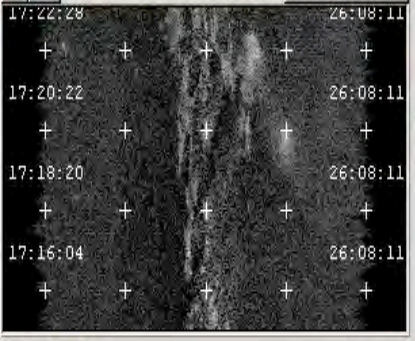


# Installed Kongsberg EM-302 Multi-beam sonar with private funding

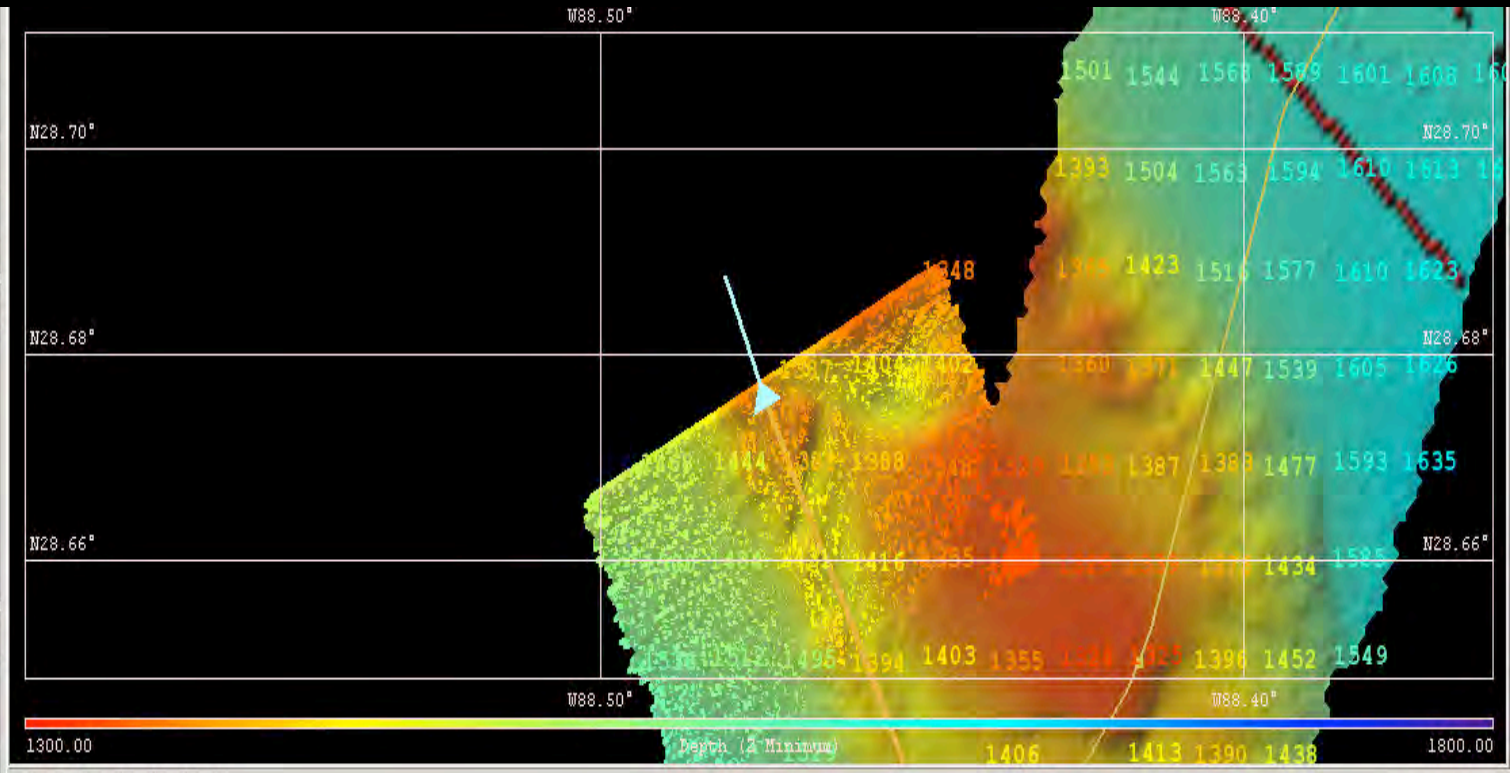



Cross track

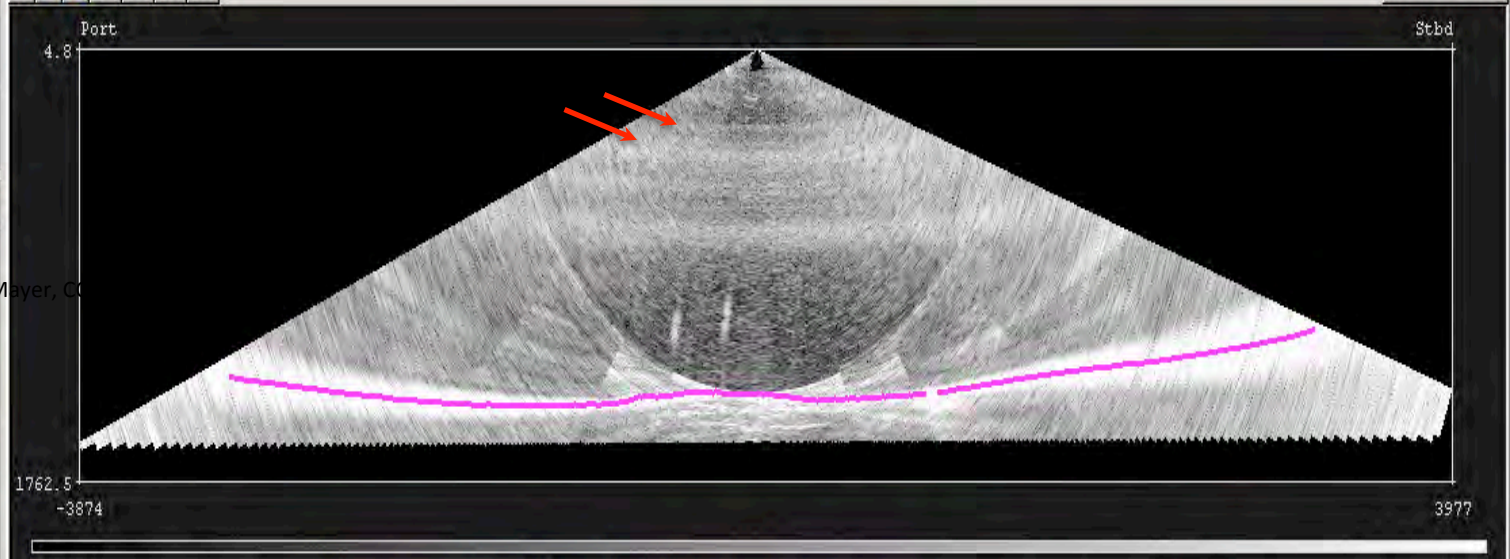

Seabed image

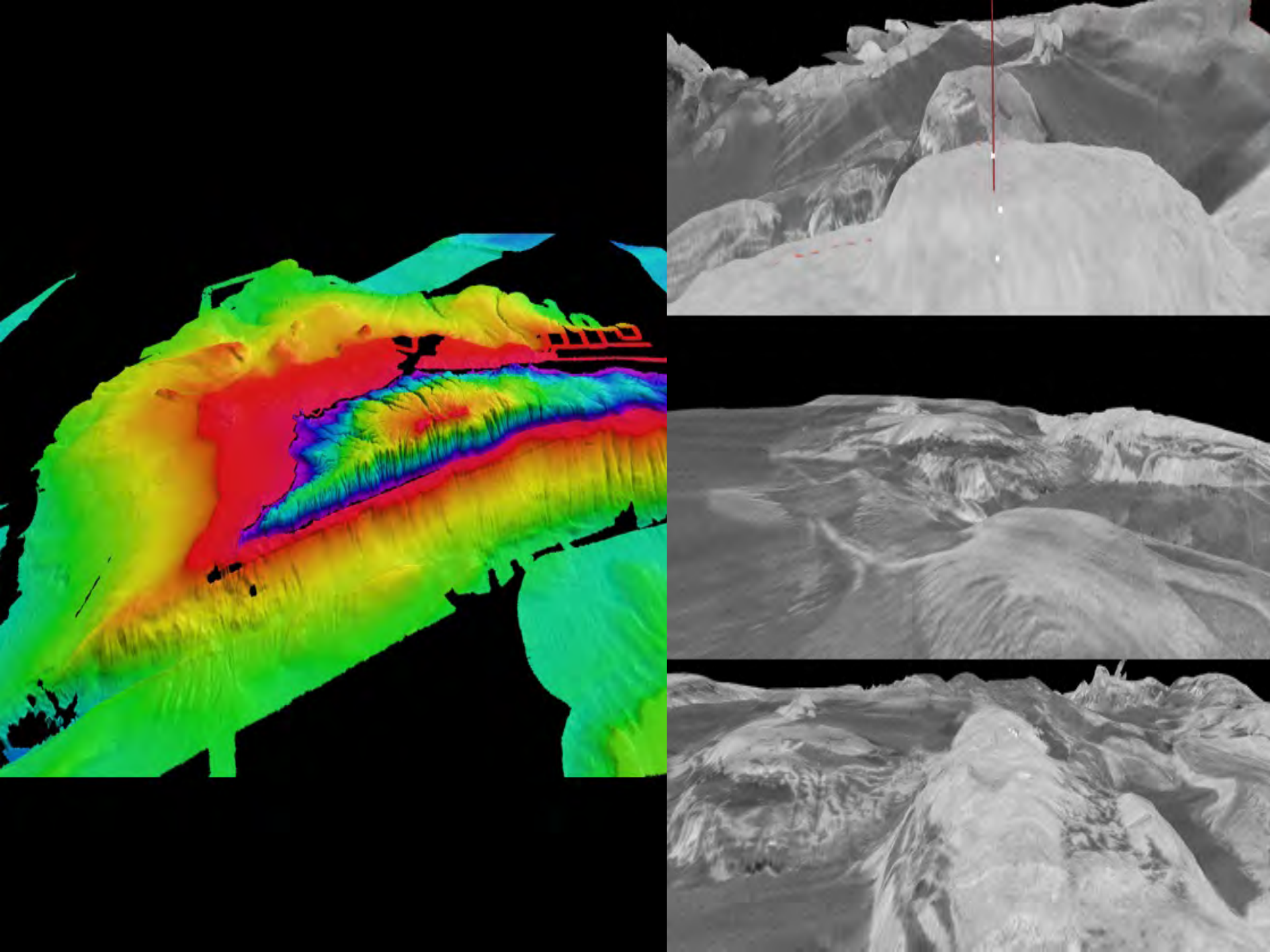



Time series

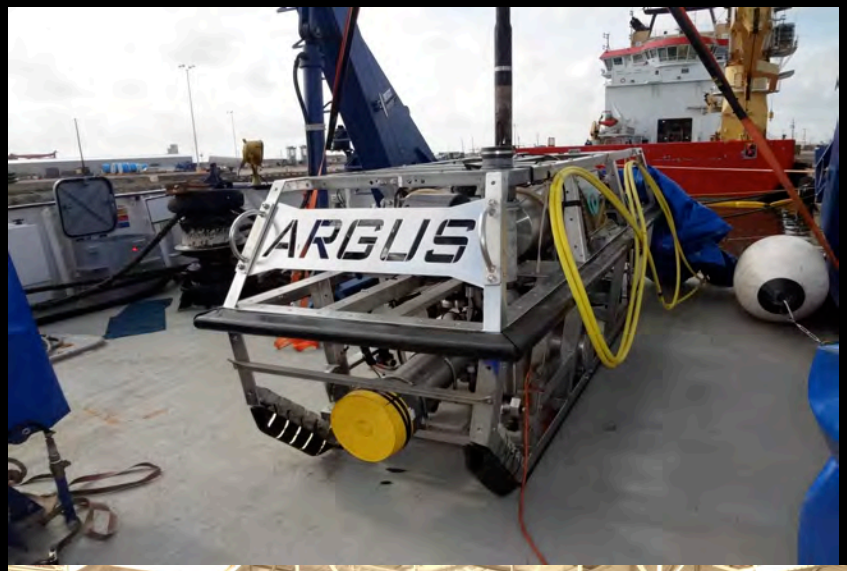



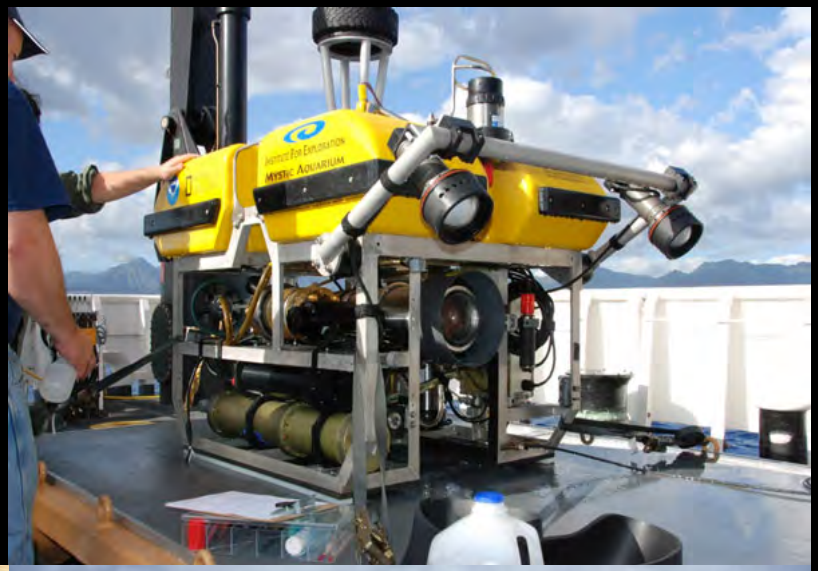

Water Column





In FY-16, using private funds, began developing a new 6,000-meter mobile system that was then supported in FY-17 by NOAA to expand the reach of their Ocean Exploration and Research (OER) Program. This effort was then further accelerated in FY-18 in cooperation with DSL/NDSF/NSF in response to an increase in funding to support a new joint program between NSF and NOAA OER. Phase I system will tested on the NAUTILUS in late 2018.



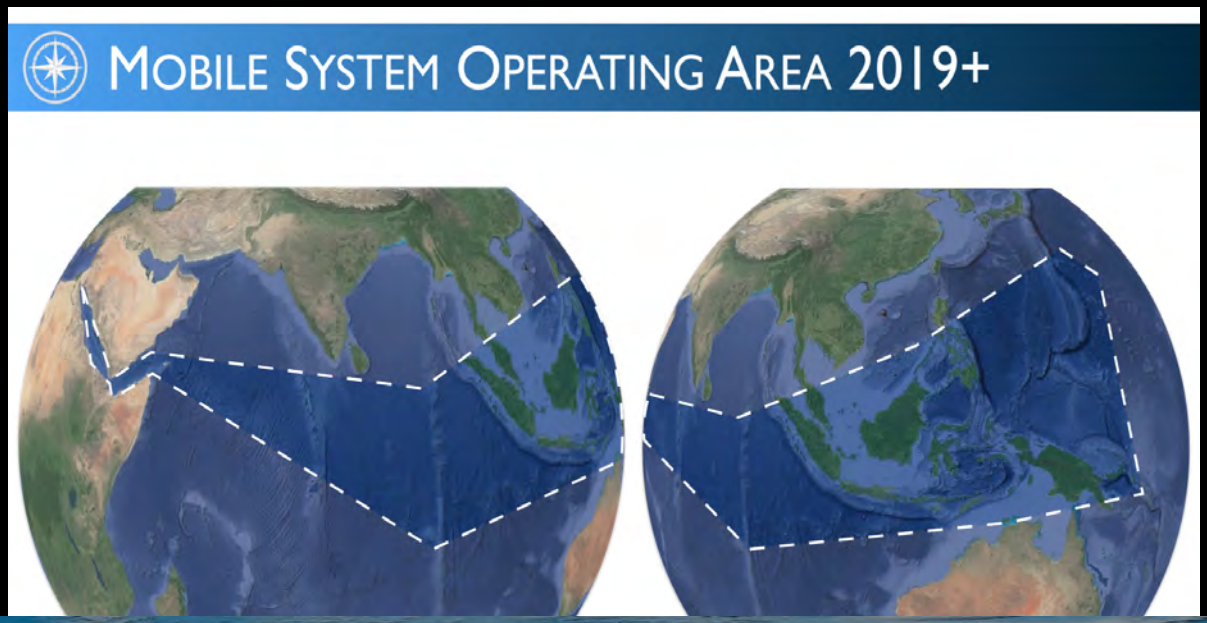



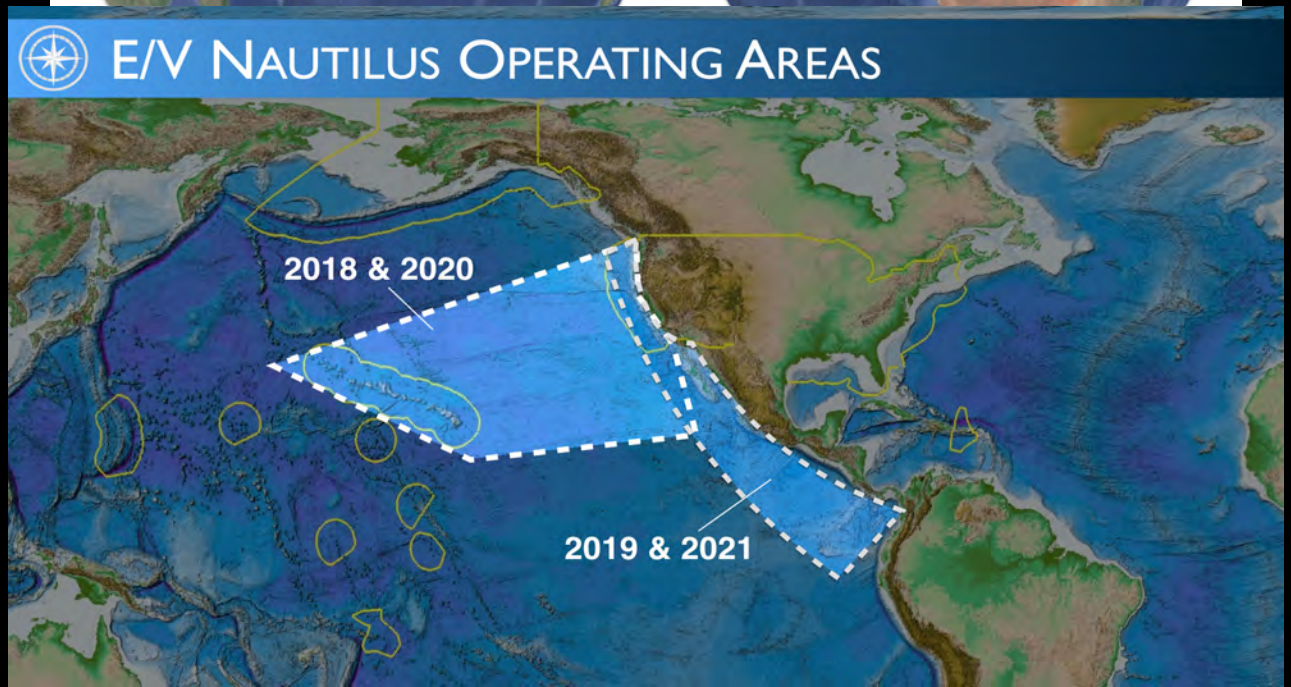
Phase II of the mobile system, which will be fully independent of the system on the E/V NAUTILUS, is scheduled to come on line in 2019 and will have a 6,000-meter ARGUS II and HERCULES II vehicle system and 2-van command control center similar to the one just acquired by DSL/NDSF but capable of supporting “live” interactivity between ship and shore and will be jointly operated by DSL/NDSF and OET.

This new mobile capability will have various configurations to deploy from different classes of research and private platforms

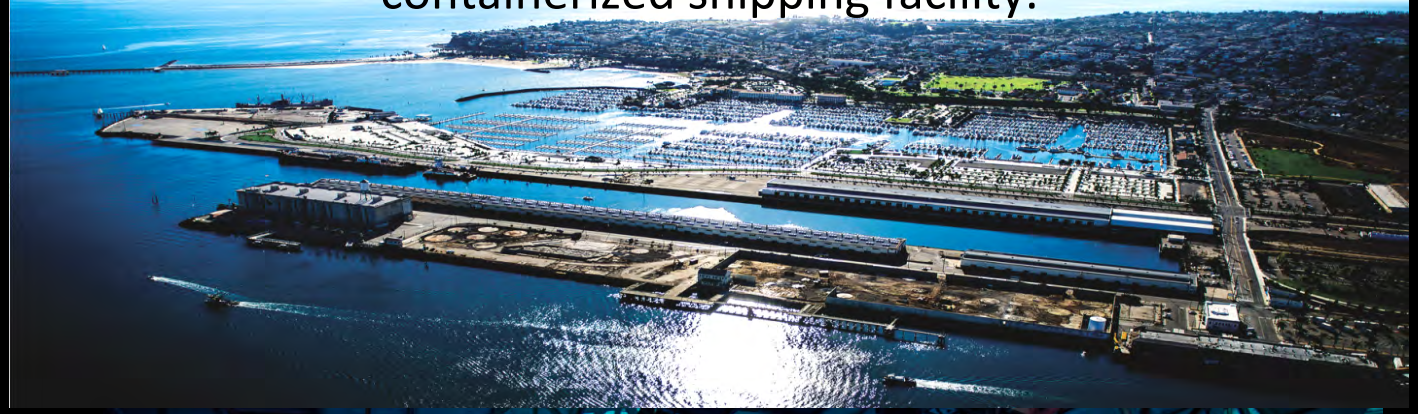



Both systems will be supported by a Joint NOAA OER and NSF Program beginning in FY-19 but is dependent upon scientists submitting exploratory proposals to NSF. OET plans to operate both the E/V NAUTILUS and the new 6,000-meter mobile system in the follow regions but DSL will also operate the mobile system as a part of the NDSF.



This program will be showcased at a new Marine Campus in San Pedro called AltaSea where the E/V NAUTILUS and the new mobile systems will be based next to Port of Los Angeles containerized shipping facility.




Gensler


PORT OF LOS ANGELES
Gensler | DKa


NAUTILUS

To learn more about our total capabilities go to www.tos.org and download (free) any or all of seven issues of the March Supplements in "New Frontiers in Ocean Exploration" with eight version coming out in March, 2018 covering our 2017 Field Season