lion benchmark used by industry to decide whether to invest in research in a particular area, according to the OTA report.

Hoping to boost those incentives, the OTA report outlined several possible strategies to encourage drug companies to focus their research. Among the proposals: federal funding of cooperative research between universities and drug firms, and extending the life of patents to make antibiotic research more profitable by extending the profit-making lifetime of the drugs.

Just encouraging the development of narrowly targeted antibiotics, however, won't necessarily encourage their use. "If we're going to have narrowly targeted drugs, we're going to have to see a lot of advances in diagnostics so exactly the right drug can be used in the right situation," says Lilly microbiologist Thalia Nicas. Without it, adds Fernandes, "doctors must essentially treat blind." And in such cases they typically choose broad-spectrum antibiotics. Like combating resistant microbes, concludes Fernandes, "slowing the development of resistance is a very complicated thing."

–Robert F. Service

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Sea-Floor Data Flow From Postwar Era

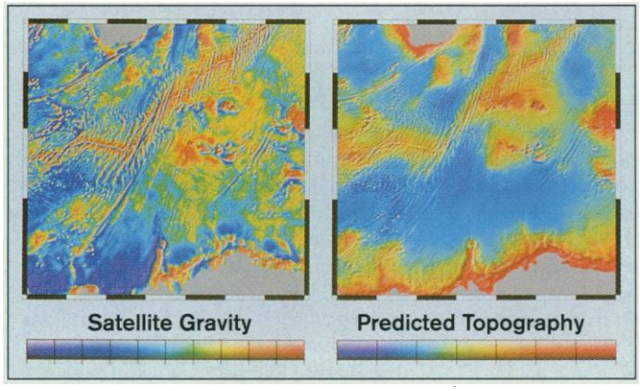
The Berlin Wall crumbled 6 years ago, and the Soviet Union dissolved in 1991. But it took the U.S. Navy until this summer to decide that the Cold War was history and scientists should have full access to a treasure-trove of satellite data on the world's oceans. The Navy's decision to declassify top-secret topographical maps of the sea floor, used by U.S. submarines to navigate the depths, represents the biggest victory to date for a government task force created in 1992 to look at the potential scientific utility of classified data—and more releases are on the way. The Navy also got a nudge from a civilian European satellite that has been spewing out similar, publicly available data for the past 4 years.

"This is a day of celebration, a data feast," says David Sandwell, a marine geophysicist at the Scripps Institution of Oceanography in California and one of the leaders in the lengthy campaign to declassify data collected by the Navy during the Cold War. But last week, as Sandwell and other scientists from the National Oceanic and Atmospheric Administration (NOAA) unveiled the detailed maps of the ocean floor at a press briefing, they reminded the audience that their real work was just beginning. "I'd really prefer to be back in my office feasting" than talking to the media, Sandwell quipped.

The feast comes after years of eating crumbs from a banquet of information that has been off-limits to oceanographers. From 1985 to 1990, for example, a classified Navy Geosat mission, using radar altimeters, beamed back detailed information on the presence of deep-ocean trenches and mountains by charting the bumps and depressions they make on the ocean surface. A 1500-meter underwater mountain, for example, produces a bump at the surface about 1.5 meters high. The method provides much greater coverage of the ocean floor than the oceanographer's standard tool, acoustic pulses sent out by ships. (The National Aeronautics and Space Administration had tried a similar approach in 1978 with its Seasat spacecraft, but it failed after only 3 months.)

The Navy kept a tight rein on the data because they revealed information on seafloor terrain and its effect on subsurface currents that helped submariners playing hide-and-seek with their Soviet counterparts. Although Sandwell and a group of researchers from NOAA did get a peek at some Geosat data in 1985, it wasn't until 1990 that the Navy agreed to release information from the Antarctic region—where few military submarines stray. The civilian researchers kept up their campaign, and in 1992 all data below 30 degrees south were declassified.

That same year, then-Senator Al Gore (D–TN) asked the Central Intelligence Agency to establish the Environmental Task Force to look at the potential scientific value of some classified data. This spring, the task force recommended that the Navy release all Geosat data, and on 19 July the Navy did so. Within a week, NOAA scientists had the tapes. Those data produced the maps presented last week.



Well-grounded. Geosat's gravity readings of southwest Indian Ocean ridge *(left)* will improve models of sea-floor topography.

And more data will be on the way. A report completed in June by a team of ocean scientists led by Otis Brown of the University of Miami in Coral Gables, Florida, urged the Navy to promptly declassify nine additional sets of data ranging from measures of ice thickness in polar waters to levels of salinity around the world. The data were gathered by a flotilla of Navy ships, aircraft, and satellites over the past 30 years, and the report concludes that "it is highly unlikely such an effort will ever be repeated."

The task force and the report weren't the only factors in the Navy's decision on Geosat, says NOAA marine geophysicist Walter Smith. The success of the European Space Agency's European Remote Sensing–1 (ERS-1) satellite, launched in 1991, provided data that closely matched the Geosat findings and made classification less relevant. The combined Geosat and ERS-1 data sets will "further the study of the ocean basins in the same way that the Hubble [Space] Telescope has promoted the study of the cosmos," says Marcia McNutt, an earth sciences professor at the Massachusetts Institute of Technology.

The ramifications of detailed maps of the ocean floor extend beyond oceanography. "The release of these new satellite gravity data will almost certainly change our thinking about the active geological processes in the world's deep ocean basins," says Jian Lin, an associate professor in the geology and geophysics department at Woods Hole Oceanographic Institution in Massachusetts. Tectonic plate theory will benefit from the increased level of detail of old fracture zones, says Sandwell, and more precise data will also improve sea circulation models used to predict global climate change.

For oil companies, data on sedimentation gathered by the Geosat and ERS-1 programs can provide clues to fossil fuel deposits. And more precise measurements of ocean depth could help the fishing industry by pinpointing shallow areas that harbor greater amounts of plant and animal life.

The fact that the Geosat data set is now flowing freely on the Internet (**http://www.ngdc.noaa.gov/mgg/announcements/**) offers another stark example of how much the world has changed since the United States and the Soviet Union were locked in underwater cat-and-mouse games. Although those military maneuvers may be a thing of the past, they are being replaced with competition of another kind. The new race, says Smith, is among scientists eager to digest the declassified data and publish their results.

–Andrew Lawler