

Some Physicists Urge Changes in DOE Science

When former Secretary of Energy Bill Richardson released a plan a year ago detailing ways to better connect the many programs within his vast agency, he wrote somewhat poetically that “the Department of Energy has many missions, but at its heart is science.”

Perhaps, but it is at best a neglected heart, according to 11 leaders in the US physics community. In December, these scientists released an unusual “discussion paper” citing structural problems within DOE that they believe have kept the physical sciences from receiving proper funding from Congress. In their six-page paper, sent to President-elect George W. Bush’s transition team as well as senators and representatives on science and appropriations committees, they note that DOE may be reorganized under the new administration, and they offer recommendations based on what the scientists think will, and won’t, work. These leaders say federal funding of DOE science programs, particularly in the agency’s Office of Science, “has reached crisis proportions, and that future US leadership in many essential areas of science is in jeopardy.”

The DOE’s Office of Science is the federal government’s largest sponsor of physical science research. In addition to being the prime supporter of basic research in physics, DOE is responsible for the oversight of both the national security and multipurpose national laboratories. In addition, the scientists note, DOE is the main sponsor of expensive, large-scale “user facilities” for researchers.

“The Department of Energy doesn’t seem to be faring very well relative to other agencies in receiving funding for science,” said APS president George Trilling, a professor emeritus at the University of California, Berkeley, and a faculty physicist at the Lawrence Berkeley National Laboratory. “What we are looking for are ways to improve the visibility of the DOE Office of Science and the support it might get on Capitol Hill, and in the executive branch, that is more commensurate with what we view as its importance.”

The need for the discussion paper, titled “DOE Science for the Future,” was raised last spring at a meeting of the physics policy committee of the American Physical Society. Past APS president James Langer, of the University of California, Santa Barbara, said it is “important to emphasize that this [document] is not something that has gone through the standard APS

 A group of leading physicists say physical sciences aren’t properly recognized or supported by federal government policy-makers.

council approval.” The paper, he said, reflects only the views of those who signed it.

The introduction to the paper says that with science and technology growing and changing so rapidly, “it is essential to reexamine the ways in which support for scientific research is organized within the US government.” The paper notes that DOE science money has been declining for about a decade and that the funding problem has “been exacerbated by weakness in overall federal support for the physical sciences and by the perception of management and security problems throughout [DOE].”

The decline in support, according to the paper, “implies that our nation has seriously under-invested in the research that it will need to sustain its health, security, and economic prosperity in the 21st century.”

The scientists offer several alternatives for alleviating science funding problems at DOE. The simplest would be to elevate the director of DOE’s Office of Science to the rank of undersecretary for science and energy. “A primary objective would be to have a widely respected and influential scientist in a position where he or she can be an effective leader and spokesperson for DOE science and energy,” the paper says.

David Heyman, senior adviser to the secretary of energy for science and technology policy, said that the DOE has already made a high-profile scientist an undersecretary. Former energy undersecretary Ernest Moniz oversaw science, energy, and environment, Heyman said, “and he is a top-ranked scientist.” Heyman agreed that the

In addition to James Langer, George Trilling, and Robert Richardson, the paper was signed by: Martin Blume, editor-in-chief for the American Physical Society; Sidney Drell, of SLAC; John Gibbons, former director of OSTP; William Happer, Princeton University, former director of DOE’s Office of Energy Research; Martha Krebs, former DOE director of science; W. Carl Lineberger, the University of Colorado; Albert Narath, a former director of Sandia National Laboratory; and Burton Richter, a director emeritus of SLAC.

director of the Office of Science should also be a world-class scientist, and noted that the current director, Mildred Dresselhaus, is just that.

An alternative recommendation put forward in the discussion paper calls for converting DOE into an independent agency along the lines of NASA and NSF. Such a change would mean there would no longer be a cabinet-level secretary of energy, but the director of the new agency “would be chosen for scientific and technical leadership and would have clear responsibility for guiding the agency,” the paper says.

In a smaller, more narrowly focused agency, science should have a higher profile and would not be hidden behind the more visible nuclear security and environmental cleanup missions of DOE, several of the scientists said.

DOE’s Heyman didn’t like the independent agency proposal because the four basic missions of DOE—national security, environmental restoration, science and technology, and energy—are interrelated and their sum is greater than their parts.

Still another alternative calls for combining DOE science and energy programs with NIST, the National Oceanic and Atmospheric Administration (NOAA), and perhaps the US Geological Survey, as part of a new “21st-century Department of Commerce.” The idea, the paper says, is to “create a National Institutes of Science and Advanced Technology within a cabinet-level department in analogy to the National Institutes of Health within Health and Human Services.” This new Commerce science agency, “would be a visible recognition by the US government that long-term research drives economic progress,” the paper says.

One long-time congressional staff member found the proposal to move DOE science into Commerce ironic because in the early 1980s there was a strong effort to get science programs like NOAA out of Commerce. Trying to read how former Sen. Spencer Abraham, Bush’s nominee for secretary of energy, will view a restructuring of science programs in DOE is difficult because he twice cosponsored legislation to abolish the entire department—the last time in 1999.

Moving DOE’s science into Commerce also would require committees on the hill to give up jurisdiction over major DOE programs, and voluntarily giving up power is rare in Congress. “You can talk about this as sort of a pie-in-the-sky, ivory-tower reorgani-

zational scheme, but in the real world it ain't gonna fly," a congressional staff member said.

The paper concludes by raising two alternatives the scientists consider "highly undesirable"—moving DOE science into NSF, or putting all federal science programs under a massive Department of Science.

The DOE/NSF merger is objectionable because it would reduce the diversity of funding sources for research. In addition, the paper says, "there would be a serious mismatch between the science and management activities [of the two agencies], and it might be difficult to establish a culture that would maintain the strength of the national laboratories. . . ." Such a merger could also create tension between NSF's "small

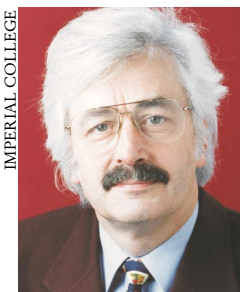
science" approach and DOE's "big science" programs.

An all-encompassing Department of Science is an idea that occasionally surfaces on the hill because it seems less messy than having science programs spread through several agencies, but the discussion paper says such a consolidation would completely eliminate the diversity of funding sources and destroy the unique nature of NSF.

How seriously politicians will take the discussion paper is unclear, but at least when policy-makers in the White House and the new Congress look at how the physical sciences are funded, they will already have the concerns and recommendations of a group of top scientists in hand. **JIM DAWSON**

ESA Taps Southwood as Science Chief, Sets Missions

The European Space Agency has named planetary scientist David Southwood to be its next director of science. He will begin a four-year term on 1 May, succeeding Roger Bonnet, who held the post for 18 years. Southwood's main role will be to oversee the implementation of ESA's long-term science strategy, Horizons 2000, for which the agency recently ranked missions for 2008–13.



SOUTHWOOD

Topping the list of ESA's new commitments is BepiColombo, a cornerstone mission to Mercury to be launched in 2009 jointly with Japan. Two additional cornerstones—ESA's most expensive and ambitious missions at 550 million euros each (about \$500 million)—are GAIA, which will measure the positions and compositions of some billion stars, and LISA, a gravitational wave observatory that

ESA plans to do in partnership with NASA. Another proposed cornerstone, Darwin, a mission to hunt for Earthlike planets, didn't make this cut. "It's far beyond the current budget," says Bonnet. "It's much too early, but technical work to prepare for it will continue." (See PHYSICS TODAY, September 1999, page 53.)

ESA also selected two "flexible" missions, which have price caps of 175 million euros: Solar Orbiter will probe the Sun up close and at high latitudes, and ESA will go in with NASA on the Next Generation Space Telescope (NGST), the planned successor to the Hubble Space Telescope.

And, if any of those missions is postponed or cancelled, or if the agency's pockets deepen, ESA will fly Eddington, which would study star interiors and hunt for habitable planets. The schedules for the joint NASA–ESA missions are not fixed, says Bonnet. "We had to find a solution in case NGST or LISA sleeps, so we selected a reserve mission."

Creating a long-term

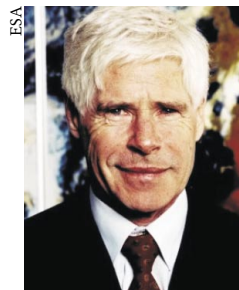
strategy at ESA was originally "a little revolution. Very few people believed in it, but everyone followed," Bonnet recalls. He is proud, he adds, never to have abandoned a mission. "We have always rescued them—like Cluster," he says, referring to the spacecraft that was destroyed in 1996 when its launch rocket, the Ariane 5, exploded. This past summer, ESA sent up the rebuilt Cluster II to probe Earth's magnetosphere.

The biggest challenge facing Southwood, says Bonnet, "will be to keep ESA Number 2, and keep it competitive. When I started, Europe was Number 4, behind NASA, Russia, and Japan. We will never be Number 1, because of money"—ESA's annual space exploration budget of about 365 million euros is less than a quarter of NASA's. What's more, Bonnet says, "space station activities and potential applications could swallow up resources—science could run the risk of being marginalized."

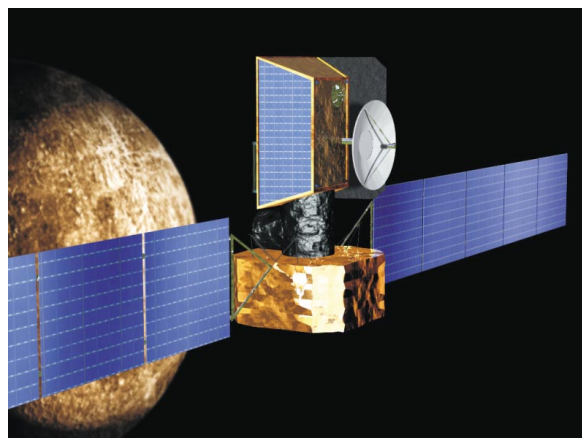
Southwood says he's "over the moon" to have landed the science directorship. He has spent most of his career at Imperial College in London, earning his PhD in physics there and in 1971 joining the physics faculty. Southwood recently led the team that built the magnetometer for Cassini, a joint NASA–ESA mission now en route to Saturn. From 1997 to 2000, he oversaw strategy development for ESA's Earth observations programs. In addition to overseeing the Horizons 2000 missions, Southwood plans to increase cooperation between ESA and Europe's national space agencies, and to work with politicians and the public to ensure continued funding for ESA's science programs.

For his part, Bonnet will return to science because "it would be hard to find a management position as exciting as the one I had for 18 years." He plans to focus on astrobiology and teaching students the importance of communicating science to the public, splitting his time between the Institut d'Astrophysique de Paris and the Institut d'Astrophysique Spatiale at the University of Paris–South in Orsay. "Things are stable in the science program," Bonnet says. "And I trust David Southwood will do an excellent job."

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BEPICOLOMBO is scheduled to set off for Mercury in 2009. (Artist's rendition courtesy of ESA.)