Pentagon's R&D chief blasts science critics of DOD policies

As a physicist who worked for Northrop Aviation for 24 years before coming to Washington to be the Defense Department's head of R&D, Donald A. Hicks should know about the phenomenon of turbulence—even of his own making.

At his confirmation hearing before the Senate Armed Services Committee last 25 July, Hicks, DOD's undersecretary for research and engineering, offered a startling opinion. "I am not particularly interested in seeing department money going someplace where an individual is outspoken in his rejection of department aims, even for basic research," he said in response to a question about campus critics of defense programs. Though the Strategic Defense Initiative didn't come up during the Senate exchange, Hicks's remark was widely interpreted as a warning that only advocates of "Star Wars" need apply for research grants from the Pentagon.

He elaborated on his views during an interview with *Science* magazine's R. Jeffrey Smith, when he was asked if he really meant that only those who agreed with DOD policies and programs should receive its funds. "Absolutely," Hicks replied. "What I'm saying is that the Department of Defense is giving money for defense. Those who want to accept money to help us with the programs we need, we want to have. But I don't particularly view it as appropriate when somebody says, 'We don't like the way you're running the department but we sure like your money.'"

Free choices. According to Smith's account of the interview, published in the 25 April issue, Hicks professed that he would not necessarily prevent funds from going to places where critics are employed. Hicks went on to observe that the Pentagon supports a large amount of research at MIT, despite opposition by its officials and faculty to DOD programs and policies. He was mainly upset, he said, about computer scientists who depend on Pentagon funds but express skepticism about the feasibility of developing software for SDI. "If they want to get out and use their roles as professors to make statements, that's fine. It's a free country," Hicks continued. But "freedom works both ways. They're free to keep their mouths shut . . . and I'm also free not to give the money."

He had scarcely warmed to his subject, it seems. "I have a tough time with disloyalty," he continued. "We're in a situation where we're trying to protect the position of the United States against a power that would like to soak us up. A lot of people don't believe that, but I know it's true. Now, if someone doesn't believe that, that's his perfect right as an American citizen. . . . If he wants to get his money someplace else, that suits me fine. My money is overall specified to be given to people who feel the same kind of urgency I feel."

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HICKS

Was Hicks enunciating a new DOD policy? Would the Pentagon give litmus tests to determine the loyalty level of scientists in future? "There's no edict," he is quoted in *Science* as saying. "There's no regulation." In fact, he declared, "if somebody comes to me and says it is vital we give [a critic] some money, this is something we have to have, I probably would not stand in the way, because I want the best for the Department of Defense in the overall situation. I'm just saying that for someone who is not vital, who is showing that he is not really a supporter, I don't see why I should make his life easier. He's made ours tougher."

'Loose cannon.' Indeed, life quickly became tougher for Hicks himself. From across the river at the White House and the Capitol came rebukes. "He had been warned after his appearance at his confirmation hearing to stick to the text of his prepared statement," a White House official said. "He's a loose cannon in the Pentagon." In a two-page letter to Defense Secretary Caspar W. Weinberger calling for Hicks's resignation, Senator William Proxmire, a Democrat from Wisconsin, wrote that the undersecretary's position "represents a form of government repression of academic freedom and scientific inquiry that has no place in this country."

Reproaches also came from scientists. Wrote Sidney Drell of SLAC, president of The American Physical Society: "I read Hicks's remarks with dismay, and I found chilling the suggestion that political loyalty to Defense Department programs would be used as a criterion for support of basic research by the same department. After all, the department controls about three-fourths of this year's Federally supported R&D work." From Philip Anderson of Princeton University came a letter to *The Wall Street Journal* expressing his "incredulity" at Hicks's statements.

Pressed repeatedly by news organizations for further comment, Hicks explained through a Pentagon spokesman that he was quoted accurately, but that his statements represented a "hypothetical opinion, not department policy." In a letter to *Science*, published in the 6 June issue, Hicks sought to calm the maelstrom with more candor. "The support of basic research is one of the ways the Department of Defense uses resources to accomplish its mission. In our support of this research we try to identify the best talent with the best ideas. We also try to foster an environment that encourages controversy and diverse viewpoints. Intellectual ferment breeds scientific and technical progress. We do not apply political 'litmus tests' to individuals or institutions," he wrote.

"Having said that, I should add that I am not enthusiastic about the idea of using defense resources to subsidize the work of people who are outspoken critics of our national defense goals or policies. That is a personal view. The criteria which govern the award of grants have been, and continue to be, as stated in the preceding paragraph."

A similar approach was taken by Defense Secretary Weinberger in his response to Senator Proxmire. "Dr. Hicks has characterized the views which you quote . . . as his personal views. I know you feel strongly about freedom of expression and I am sure you would agree that even Defense officials are entitled to exercise such freedom from time to time," he wrote. Weinberger went on to express his personal view "that there are some significant ethical considerations involved" for those grant holders and contractors who bite the hand that feeds them.

Turf battle. That wasn't the end of the affair, however. At a Pentagon senior-staff meeting after writing the letter, Hicks announced he planned to resign from DOD later this summer. While the resignation appears to coincide with the dispute over his attitude toward dissenting scientists, there are other factors involved. Among these: Hicks was so embroiled last year in a turf battle with James P. Wade Jr, assistant secretary for Defense acquisition and logistics, that it required Deputy Secretary William Howard Taft IV to resolve the fracas by assum-

ing some of the responsibilities each man had argued should be his. When Hicks proposed last May that he take over a new position of "Undersecretary for Acquisition," recommended by a Presidential commission on DOD headed by David Packard of Hewlett-Packard, he was told by Weinberger that the job would go to someone else.

The ruckus Hicks has kicked up does not amuse the Pentagon, but many there, including Deputy Secretary Taft, agree with his right to talk tough to those who scold while seeking funds.

—Irwin Goodwin

For Wisconsin's synchrotron ring, the future is bright

Time was running out on the 1-GeV storage ring at the University of Wisconsin. Ever since the National Science Foundation issued what appeared to be a death sentence a year ago for the chronically feeble light source at the Synchrotron Radiation Center near Stoughton, Wisconsin, by canceling all support for the Aladdin project (PHYSICS TODAY, August, page 45), the machine has been running on NSF's reduced funding and the university's own research funds. The university made it clear that it would continue to pay the bills to improve the machine only until this June. On campus the dire situation was characterized by a melodramatic metaphor: "the perils of Pauline."

Then, just in the nick of time, NSF rescued the 1-GeV ring. NSF Director Erich Bloch presented convincing evidence to the National Science Board on 16 May that Aladdin's remains had been resurrected for a machine that could now return to the land of the living. He was pleased to report that an agency review team had found the light source to be performing beyond all expectations in the spectral range from vacuum ultraviolet to soft x rays.

Though the Wisconsin center had asked for nearly $11 million to operate for the next three years, Bloch recommended that the Science Board approve a total of $8.75 million through fiscal 1989. As soon as the board agreed to support the 1-GeV project, the decision was relayed to Stoughton, where one scientist broke open a case of André champagne to celebrate. "We're jubilant," said the center's director, David L. Huber. "It had been something of a cliffhanger."

Topping Tantalus. The troubles with Aladdin go back nearly ten years. Its original design in 1976 called for 1 ampere at 750 MeV. At that time Aladdin had two straight sections. This was changed to three and then to four straight sections in 1977, when the goals were modified to 500 milliamps at 1 GeV. Even so, by Christmas 1984, more than two years after Aladdin began operating, its circulating beam current had not surpassed 2.5 milliamps with an energy of 0.75 GeV—not much better than the center's smaller, 0.24-GeV light source, named Tantalus.

It was then that NSF began a series of site vists and expert reviews of Aladdin. To improve the machine, the experts concluded, would require a virtual transformation, costing as much as $30 million. This was too much for Bloch. He had no difficulty convincing the Science Board to pull the plug on Aladdin.

Concurrent with these events, Wisconsin scientists identified the machine's main problem as trapped ions that disrupt the electron beams. Once additional clearing electrodes were inserted to prevent ion trapping, the electron-beam currents increased impressively. Three months after NSF's decision to kill Aladdin, the ring accelerated beams of 40 milliamps to an energy of 800 MeV (PHYSICS TODAY, November, page 58).

By last January, currents had reached 120 milliamps at 800 MeV—the electron energy that many users of synchrotron light find to their liking for running experiments (PHYSICS TODAY, March, page 19). Now, maximum currents of 154 milliamps at 800 MeV have been attained—a sixfold increase in stored electron-beam currents over the past year. Huber has "reasonable expectations," moreover, that the machine can eventually run reliably at 200–250 milliamps without enountering problems of overheating. Notwithstanding such success, NSF refuses to call the 1-GeV machine Aladdin because it never lived up to the original specifications under its given name.

Backed by users. What convinced the agency to back the modified machine was the enthusiasm of the user community, which increasingly demands more electron-beam machines as possibly the most promising way of making the next generation of electronic devices. The shortage of ultraviolet and soft-x-ray synchrotron light sources in the US was clearly significant in the decision to support the 1-GeV machine. Its present and proposed user programs were seen by the NSF panel as "fully competitive with the best research done at any facility of this type in the world." Indeed, the proposal submitted to NSF last October for renewing and increasing the level of funding for the Wisconsin center included a batch of endorsements from users, many specifying exactly what kind of experiments they expect to perform on the 1-GeV machine. High among the reasons users gave for backing the light source was the urgent need for more beam time to supplement the already overcrowded conditions at Brookhaven's National Synchrotron Light Source (which achieved its design current of 1 ampere at 750 MeV, with a one-hour lifetime, in the vacuum-ultraviolet ring for the first time on 6 June, though not without struggles, studies and shutdowns for improvements) and the Stanford Synchrotron Radiation Lab.

In their testimonials favoring the 1-GeV light source, many users express enthusiasm for the new extended-range "grasshopper" monochromators and for the seven beam lines already in place. The beam lines came from Tantalus, which will be shut down in October after its two remaining beam lines are shifted to the 1-GeV ring.

The new ring offers promising research opportunities because of its extended spectral range and the possibility that many more beam lines could be installed at 36 bending-magnet ports and three long straight sections. It is possible that the machine would have 17 operating lines and then could be outfitted with 18 additional beam lines as well as special devices called wigglers and undulators to provide extra brightness. One effort to improve the machine involves a collaboration of Wisconsin, the University of Minnesota and the Xerox Corp to construct a special-purpose beam line to handle the light generated by an insertion device currently on loan from SSRL.

Mini-synchrotrons. Demand for synchrotron radiation centers is increasing rapidly in advanced industrialized countries. In consequence, national facilities are being built or planned in Britain, France, West Germany and Japan. Another development is expected to bring down the cost, size and complexity of such machines: That is the production of compact "tabletop" synchrotrons by commercial firms for such industrial applications as x-ray lithography and for manufacturing submicron integrated circuits. Among the companies that are developing such miniature light sources are West Germany's COSY-MicroTec, Britain's Oxford Instruments and Japan's Hitachi. All the machines would dispense with the large and expensive electron-injection systems and use microtrons, which are smaller and cheaper. The goal is to produce x rays just as intense as those from bigger machines.

—Irwin Goodwin □