Another question mark hanging over the new program is the command and control system that is supposed to tie it all together. Each DIVAD was to have been a self-contained unit, with its own radar to locate incoming targets and direct the guns. In contrast, the antiaircraft units in the new plan will have passive sights, such as forward-looking infrared (FLIR) sensors, for precise aiming once a target is in view, but will not be able to scan a wide area to locate targets on their own. The command and control system is supposed to fill that gap by "cueing" the air defenders—warning them of incoming aircraft and giving them a general idea of their location.

In theory, data from Airborne Warning and Control System aircraft, supplemented by smaller localized radars carried on helicopters or perhaps mounted on tall poles, would be relayed to ground stations and distributed to the air defense units. The Army estimates that the software to control the system will require 375,000 lines of code—by no means the most complicated computer program ever written, but far from trivial. The entire system is supposed to be operating by 1992. The cost will be perhaps $2.5 billion, according to the Army. But many believe that to be a serious underestimate, particularly if new helicopter-borne radars are acquired.

Although trading the $4-billion self-contained DIVAD for a $4-billion vehicle that can't work without a $3-billion C^2I network might seem like a bad bargain, in fact the DIVAD's on-board radar would probably have had to have been supplemented by a similar C^2I system as well. Ground-based radars are of only limited value in locating hovering helicopters, which tend to be obscured in the electronic "clutter" produced by radar reflections from trees, ground, and buildings. Although radars do have a longer theoretical range than FLIR sensors, the effective line of sight to a low-flying fighter or helicopter in the hilly terrain of central Europe renders that difference meaningless in most cases. Finally, radars have a major disadvantage as compared to passive sensors: they give off radiation that gives away their location. Both the United States and the Soviets have guided air-to-ground missiles that home in on radar signals.

The air defense C^2I system is one element in a larger, and older, plan called Sigma Star to replace all battlefield communications with a digital network. If Sigma Star doesn't work, says MacNab, "the fact that FAAD doesn't work is the least of our concerns."

■ **Stephen Budiansky**

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Will NTIS Go Private?

A Reagan Administration push to have a contractor operate the National Technical Information Service (NTIS), a self-supporting federal agency, is encountering resistance on Capitol Hill. Critics of the plan claim that a private contractor cannot distribute information more cheaply than the 42-year-old organization currently can. Instead, they say that the proposal will drive up prices and reduce public access to U.S. and foreign technical documents.

The idea of converting NTIS to a private enterprise has been mentioned since 1981 when Joseph Wright, deputy director of the Office of Management and Budget (OMB), was deputy secretary of the Department of Commerce. The Administration, however, did not pursue the matter until December 1985, when OMB asked Commerce to study the potential options for transforming NTIS into a privately run operation.

The department now appears to have narrowed its choices to two approaches—having a contractor operate the facility, or having the service administered by an employee-owned company. Under either of these options, the government would retain the right to set mission goals for NTIS. But librarians and researchers are skeptical about the proposal, as are some members of Congress.

Representative Doug Walgren (D–PA), chairman of the House subcommittee on science, research and technology, has drafted language in the Commerce Department's fiscal year 1988 authorization bill that would establish NTIS as an independent government corporation. This proposal is in line with a recommendation made by the National Academy of Public Administration. The Senate Commerce, Science, and Transportation Committee is expected to take similar action. This legal status would allow the NTIS to operate as it does now, but also would give it the freedom to meet staffing and capital equipment needs.

The organization was first created under President Truman to distribute to American industry and research institutions the scientific and technical data captured from Germany. Originally called the Publications Board, the organization was later renamed the Clearinghouse for Federal Scientific and Technical Information. In 1970 it became known as NTIS, and it is now regarded as the single most important source of technical and scientific literature in the United States.

Since 1950, NTIS has priced its services just high enough to cover operating costs. The agency runs a small surplus or deficit in any given year, depending on product demand and pricing decisions. In 1986, NTIS sold 452,000 copies of paper documents and another 1.9 million documents on microfiche. Gross revenues were just $22.4 million. Commerce's proposals almost certainly would require NTIS to raise prices on its 1.7 million holdings, contends James F. Wyatt of the Association of Research Libraries. This would occur because companies such as Burroughs Corporation, which has expressed interest in the NTIS contract, would seek to wring substantial profits from the operation.

Reduced access to certain scientific and technical literature for which there is low demand is another worry cited by opponents of privatization. Officials of the American Library Association, for example, have in recent congressional testimony expressed fear that a privately operated NTIS would not maintain the breadth of material that the agency now does. There is also a question about whether a private entity could impose copyright claims over information it provides, even though much NTIS information originates from other federal departments.

Access to foreign scientific and technical data could be crimped, too. Japan and West Germany have indicated they may cease providing NTIS with technical information if a contractor takes over the operation. These countries are more comfortable with government-to-government exchanges, rather than dealing with a private party, NTIS officials say.

While upholding Commerce's position on privatization, agency officials say there is no clear economic rationale to support it. In fact, OMB has yet to respond to an NTIS staff request for a justification that can be used in testimony before Congress. OMB also was unable to provide *Science* with an economic case to back claims that a privately run NTIS would be more efficient. Agency officials simply say that moving NTIS is consistent with the Administration's policy of having the private sector take over federal activities whenever possible. ■ **Mark Crawford**