torney who handled the issue for the Washington Research Project. Smith, who had not yet seen the panel's report, said the evidence sounded slim that there is really any "significant threat" that a scientist's ideas will be stolen. He also said the Washington project had obtained several hundred protocols in 1975 and 1976 and found that such information did, in fact, help protect the rights of subjects because it provided useful leads to projects that might "present interesting ethical issues" that would warrant further investigation. In those few cases where patentable ideas were involved, he said, the project did not challenge the right of the investigator to screen out patentable material before making the protocols public.

Clearly Smith, who is primarily concerned with the health of human subjects, is approaching the issue of disclosure from a different direction than the President's Biomedical Research Panel, which is dominated by medical researchers and is primarily concerned with the health of the biomedical research enterprise. Still to be heard from is the National Commission for the Protection of Human Subjects, whose name implies that it may approach the subject more from Smith's perspective.

—PHILIP M. BOFFEY

The B-1 and the Cruise Missile: To Have and Have Not

Observers of the country's hard fought battles over buying new weapons often marvel at the power of the armed services to win what they will. This year's controversy over whether to let the Air Force build the B-1, a new strategic bomber whose total program cost will be $22 billion, is a good example. The B-1 has been vigorously opposed for years by people inside and outside of government: an alternative has even been under development in the form of the air-launched cruise missile. Nevertheless, as of this writing, B-1 proponents will probably carry the day: the plane seems likely to be built after all. How the Air Force managed to outride these assailants in the Pentagon, in other parts of the Washington bureaucracy, and in Congress, is a story which illustrates the way national decisions on weapons procurement are really made.

The B-1 passed a key congressional landmark in mid-June, when a House-Senate conference committee voted to spend the $960.5 million in procurement funds for the first three B-1 planes sought in this year's defense authorization. The Senate had passed an amendment delaying spending of the money until after a new administration takes office. Senate foes of the plane will now focus on the appropriations process to delay spending. So, for the time being, the B-1 has the upper hand over its congressional foes.

The B-1 is a follow on to the present manned strategic bomber, the B-52, whose mission is to be able to strike Soviet cities and missile silos after U.S. land-based missiles have been attacked in a Soviet first strike. The B-1's radar signature is far smaller than the B-52's. The B-1 flies supersonically which the B-52 cannot (Mach 1.6 compared to Mach 0.8). Most important, the B-1 will be able to fly subsonically 200 feet from the ground; present-day B-52s' combat altitudes are from 500 to 30,000 feet; at high altitudes Soviet radar-guided surface-to-air missiles are deadly. Low-flying aircraft are far more difficult for radars to detect.

Foes of the B-1 have suggested delaying modernization of the force, or updating the unusually hardy B-52 aircraft fleet. But with increasing frequency they have proposed yet another alternative: a force of 1500 or more long-range, nuclear-armed cruise missiles. These could be carried aboard big, tanker-cargo aircraft, similar to Boeing 747's, and fired as these tankers approach Soviet shores. Launched in great quantity, flying only 200 feet above ground, and computer guided to targets 1500 to 2000 miles away, a force of cruise missiles could inflict "unacceptable damage" on the Soviet Union—that is, it could destroy one-third of the population and three-fourths of the industry. Since this alternative does not risk the lives of American pilots by flying them over Soviet territory, it has been called the "stand-off option."

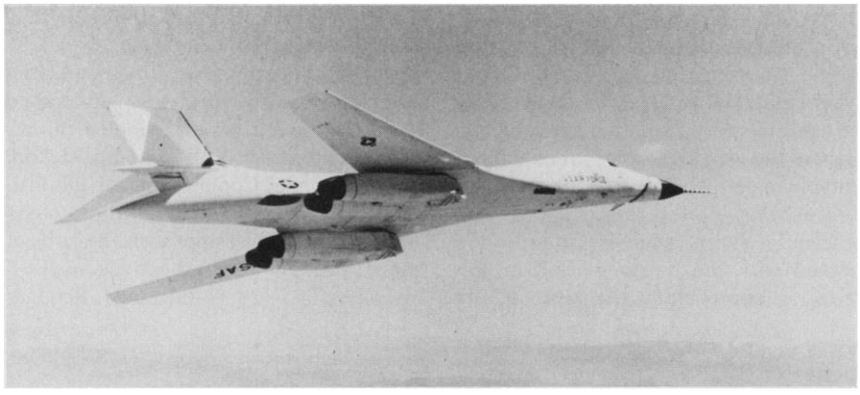
Ostensibly, the debate over these two alternatives has involved ascertaining which hardware can do the job better. Can the cruise missile carrier get off the runway fast enough to escape the initial Soviet attack? Can the B-1's electronic guidance and warning systems be fooled by "winking" Soviet radars? An outside observer of this discussion might conclude that the United States buys weapons on the basis of a debating match: whoever wins the most "if . . . then . . ." arguments wins the whole game.

But the major, perhaps a determining, factor in the B-1 battle has been the political clout of the program. Production of a new, manned bomber has been the preeminent goal of the Strategic Air Command (SAC) and Air Force headquarters since the early 1960's. Along the way, they have picked up some powerful allies, including two Republican presidents, several sympathetic secretaries of defense, and a major industrial contractor. Internal industry documents show that to boost the program, industry sought to enlist the active support of such groups as the American Legion and the National Council of Jewish Women. By contrast, the cruise missile alternative has been less potent. Its advocates are more scattered; their reasons for supporting it are more subtle.

Phase I

The story of the B-1 begins in 1960 with the shooting down of Francis Gary Powers' U-2 spy plane over the Soviet Union with a surface-to-air missile. Air Force spokesmen say the event brought home to the military the level of Soviet concern with improving their air defenses. The U-2 shootdown also put a hole in SAC's plans for the B-70, at that time the planned, high-flying successor to the B-52. An indication of the incredible longevity of SAC-backed bomber programs is the fact that, although the 1960 U-2 incident sounded the death knell for the B-70, the $1.4 billion program continued through the 1960's until Secretary of Defense Robert McNamara canceled it in 1967.

In any event, the U-2 incident sparked Air Force investigations of low-flying manned bombers: in 1961 there was SLAB (Subsonic Low Altitude Bomber); in 1963 there was LAMP (Low Altitude Manned Penetrator). By 1965, these converged in AMSA (Advanced Manned Strategic Aircraft), which studied several possibilities (including even supersonic flight at low altitude). Politically, AMSA became the cynosure of Air



B-1 bomber, with wings swung back for low altitude flight.

Force hopes for a follow-on bomber, particularly as the B-70 waned and died.

McNamara opposed the Air Force's push to turn AMSA into an active program, a "real" airplane. Says a former Pentagon official: "McNamara just fed them small amounts of research money; he'd let them do some engine work here, some avionics there, but he wouldn't give them the whole plane."

This attitude changed dramatically in 1969 when the Nixon Administration took office and the new Secretary of Defense, Melvin Laird, announced policies giving the services more say in weapons development. The AMSA studies were rapidly concluded; the final design, much as it is today, was decided on; and, in 1970, AMSA metamorphosed into the B-1. Rockwell International Corporation won the bid to be the prime contractor for the multimillion dollar R & D effort.

Phase II

In the meantime, however, technology was playing a trump card which was to evolve into the cruise missile standoff option. In the late 1960's, the Williams Research Corporation, a small company, successfully tested a miniature turbofan jet engine that had enormous thrust for its size. The work was done in connection with an Advanced Research Projects Agency contract to find ways that an individual soldier, propelled by an engine in his backpack, could fly above ground. At the same time, terrain matching guidance technology was advancing, making it possible to preprogram missiles that would "recognize" ground routes to their targets.

These developments coincided with new Air Force studies showing that major improvements in bomber effectiveness could be had if it carried large numbers of decoys. These could be made to look like bomb-bearing missiles to enemy radars. A further elaboration was to suggest disguising the decoy, electronically, as the bomber itself, making it nearly impossible for ground radars to detect which "bomber" was the real one. Thus, the Air Force, using the latest cruise missile technology, sponsored a decoy program. This was SCAD (Strategic Armed Cruise Decoy).

Glenn A. Kent, a retired Air Force Lieutenant General who headed the SCAD program in 1968, says that from its inception the tiny, $1.9-million-a-year effort became enmeshed in a jungle of controversy within the Pentagon. The Air Force insisted it wanted SCAD only to aid the manned bomber. But the systems analysis office of the Secretary of Defense, and some people working for the Director of Defense Research and Engineering (DDR & E) viewed SCAD as the basis for a cruise missile force which could replace manned bombers.

Kent also explains that it was impossible for the Air Force to favor both cruise missiles and a new manned bomber. "People were afraid that, if we went to Congress and said we wanted both the missile and the bomber, Congress would say 'O.K., here's the missile but you can't have the bomber.' "

The fight focused on the size of the SCAD and whether it should have a warhead. If given a warhead and sized to have ranges of a thousand miles or more, the SCAD could be considered a strategic weapon in its own right. The Air Force wanted SCAD as an empty decoy; systems analysis wanted it armed with warheads; the DDR & E took a middle position, arguing that some be empty and some be armed with warheads. The Air Force agreed to this compromise solution but limited SCAD's range to several hundred miles.

Phase III

In the early 1970's this controversy emerged from the halls of the Pentagon into the broader arena of Washington politics. The standoff option became known and championed by civilian policymakers, particularly Senator Thomas McIntyre (D–N.H.), chairman of a powerful R & D subcommittee of the Armed Services Committee. McIntyre began questioning Air Force witnesses each year about the rationale for SCAD.

The Navy, perhaps inadvertently, gave a boost to the standoff option. For reasons of its own, it was developing nuclear-armed and conventionally armed versions of the long-range cruise missile. Navy witnesses before Congress were unhampered by the sort of bureaucratic infighting that plagued the Air Force. They openly publicized the cruise missile's potential as a strategic weapon.

Public awareness of the potential of cruise missiles grew also as a result of the Strategic Arms Limitation Talks (SALT) in the early- and mid-1970's. For various reasons, U.S. strategic bombers are unaffected by the SALT negotiations; on the other hand, cruise missiles were not mentioned either in the May 1972 accords or in the later, Vladivostock limit on strategic arms. Thus, Henry Kissinger and other government officials involved in the SALT negotiations developed a stake in an Air Force strategic cruise missile program; to them it was useful both as a bargaining chip in future talks and as a way to build up strategic forces if the negotiations turned out badly.

Within the Air Force, however, the SCAD program, unpopular as ever, was becoming too expensive to justify as a decoy. Since there was no other official reason for the program, Secretary Laird canceled it in July 1973, at the urging of the Air Force. The gesture angered McIntyre, who, later the same year, ordered it reinstated.

Meanwhile, the B-1 was running into trouble, too. Annual appropriations for B-1 development passed the $400 million mark in 1973. But cost per plane rose from the 1970 estimate of $9.9 million to a 1973 estimate of some $30 million (it now stands at $87 million). The weight of the loaded plane grew by 10 percent, causing reductions in range. The B-1's top speed slowed from Mach 2.2 to 1.6.

Internal Rockwell documents leaked to the press show that, in 1973 and 1974, the company mounted an effort named "Operation Common Sense" to see to it that these problems were blamed on subcontractors and that the B-1 program continued. Minutes of a meeting of Operation Common Sense executives on 15 and 16 January 1974, show that they were concerned about "competitive threats in the form of the stand-off missile and the stand-off missile launch aircraft," which other companies might seek to build. They also discussed enlisting veterans' groups, the "National Jewish Women," and holding a special pro-B-1 parade in Palmdale, California.

It is a sign of the relative political strengths of the two programs that, when SCAD got into trouble, it was merely canceled; when the B-1 encountered problems, a massive corporate public relations campaign was mounted to protect it.

The Present

This year's fight over procuring the B-1 is the culmination of a 15-year effort by friends of the manned bomber. Administration officials, to say nothing of President Ford himself, are squarely behind the plane. The importance of this full-fledged Administration support was recently explained by a Senate staffer:

> The conditioned reflexes of Congress are against anyone trying to beat a proposed weapons system. It is stacked the worst in the House. In the Senate, there are 45 automatic votes for any system that the President and the Armed Services committee endorse, and only 30 votes against it. Even if you should beat these odds, when you go to conference, you are faced with some of the most inflexible members of the House. They're willing just to sit there all summer without changing a single comma just to get their way.

Advocates of the standoff option have been helped by the publication, early this year, of a Brookings Institution report which concluded that the standoff cruise missile, aided by air-launched ballistic missiles, was the most cost-effective option and that the B-1 program should be canceled. Nonetheless, the foes of the B-1 are still not unified on this option.

Cruise missile advocates are also not helped by having to skirmish with the Air Force over other problems. For example, the Air Force is studying an advanced tanker-cargo aircraft which Richard Garwin, of the IBM Corporation, an influential defense consultant and long-term champion of the standoff option, has testified should be designed also to be the cruise missile carrier. The Air Force denies, however, that the plane should be planned to do this since "there is no operational requirement" for a cruise missile carrier. Discussion of the design for this tanker has absorbed hours of congressional testimony and has become a controversy in its own right.

There are finally some signs that the either-or terms of this long-standing debate are shifting toward some sort of compromise: the Air Force may end up building the B-1 and a standoff cruise missile force too. The Pentagon is just releasing portions of the largest study it has ever undertaken of what actually can happen in a bomber attack on the Soviet Union; called the Joint Strategic Bomber Study (JSBS) it was managed by the DDR & E with Air Force and other groups participating.

"I think it has redefined the issues" says John B. Walsh, deputy director of DDR & E for strategic systems, whose office ran the massive computerized war games. "It concludes that you need both bombers and cruise missiles; the bombers to attack heavily defended targets and the cruise missiles to attack targets which are not heavily defended, that is, the majority of targets. And, among the different kinds of bombers needed to do the job, the one which can do it most cost-effectively is the B-1 bomber."

(The JSBS has many critics, but most admit it is DOD's first major cost-effectiveness study of various bomber forces—something not done before the green light given the B-1 in 1970.)

The JSBS says on the elevated plane of strategic analysis what some observers have been saying on the earthier level of Pentagon realpolitik. According to this view, a limited number of B-1's will be built, but, ultimately, the program will become too costly and be canceled. Then, long-range cruise missiles will be developed instead. The B-1 will have won, but the cruise missile will also have its day.

Observers of the Pentagon often offer a single interpretation of the controversy, which was expressed most colorfully by Marvin Goldberger, the Princeton physicist who has long been an adviser on weapons, as he remembered the pilots of World War I and the movies and books which glorify them. "I once testified, albeit facetiously, that the Air Force doesn't want the B-1. They don't want the windshield. They want to have the wind blowing past them, their helmets and goggles on, and long, white scarves around their necks and flowing out behind."

A high Pentagon official who has been intimately involved in the B-1 debate laughed when this statement was read to him, then added: "Let's just say that the Air Force *knew* there was going to be a new manned bomber. They analyzed the need for it afterwards."

—DEBORAH SHAPLEY

Nuclear Power: France Forges Ahead on Ambitious Plan Despite Critics

Paris. The oil shortage of the winter of 1973–74 had greater overt influence on energy policy in France then in any other industrial country. A few months after the Arab oil-producing countries imposed a partial embargo and a stiff price increase, the French decided to increase the share of electricity produced by nuclear plants from 8 percent to over 70 percent by 1985.* Despite the emergence of an antinuclear opposition in France, marked notably by a protest by 400 scientists last year, and the dire warnings voiced in the so-called nuclear debate in the United States, the French government shows little sign of having serious second thoughts about their nuclear decision.

For France the prima facie case for going nuclear is obvious. In respect to fossil fuels, France was virtually a have-not nation. French coal production was declining. Exploration for oil and natural oil offshore in the North Sea and the Atlantic has so far proved disappointing and future prospects are at best uncertain.

This, in practical terms, leaves nuclear power. France has domestic reserves and access to uranium in the former colonial territories of Niger and Gabon that give them an estimated 10 percent of world reserves. The French have built a strong base of nuclear technology, starting with their decision in the 1950's to seek a nuclear arms capacity independent of the United States and Britain. The Commissariat à l'Energie Atomique (CEA), the French Atomic Energy Commission, has operated an active civilian nuclear R & D program, and the government has fostered the growth of private nuclear industry. France in 1973 was the first country to put a breeder reactor (the Phenix) into service and have it produce power on a reliable basis. The French

*The French plan called for the ordering of some 50 nuclear plants by 1981, increasing nuclear capacity from less than 3000 MW in 1973 to between 40,000 and 45,000 in 1985.