

"Federalization of research" is seen as creating burdens for universities which only the federal government can ameliorate. Expansion of formula-type grants, which have been used in varying forms by both the National Science Foundation and the National Institutes of Health, is suggested. The federal government is faulted for treating the universities as just another supplier of services and thus encouraging the stratification process among institutions. What the report proposes is that the government recognize

that it has a more general responsibility for the well-being of the universities.

Although the authors offer no systematic plan, they argue that steps must be taken to mitigate the effects of retrenchment on graduate education and young faculty. They also point to the need to deal with what they call "changing authority relationships." Serious strains are viewed as developing between both federal and state governments and the universities, and also within the universities between administration and faculty,

and it is suggested that the ground rules developed during the growth period need to be recast.

The new report should serve as a consciousness-raising document for legislators and policy-makers. As advice to the universities the report is practical if not very palatable. Nowhere is its message put more succinctly than in the final section in a kind of obiter dictum: "the era of rapid growth is over. Innovation now must be by substitution rather than by expansion."—JOHN WALSH

## Missile Accuracies: Overlooked Program Could Undermine SALT

Last month, as the Carter Administration resumed the Strategic Arms Limitations Talks (SALT) in Geneva, Congress approved a pair of small, missile "improvement" programs which some people view as a first "big step" toward giving the United States a first strike capability against the Soviet Union's strategic forces. They are concerned that unless the program is delayed or halted by the President, or bargained away at SALT—and there is no sign that either of these things is likely—it will spur another escalation of the arms race.

The programs are small fish in the vast sea of the \$36 billion military procurement budget which the House and Senate conferees are about to approve for fiscal year 1978. One is \$29.9 million for software changes in the existing NS-20 guidance system now aboard the Minuteman III missiles—which, if nothing is

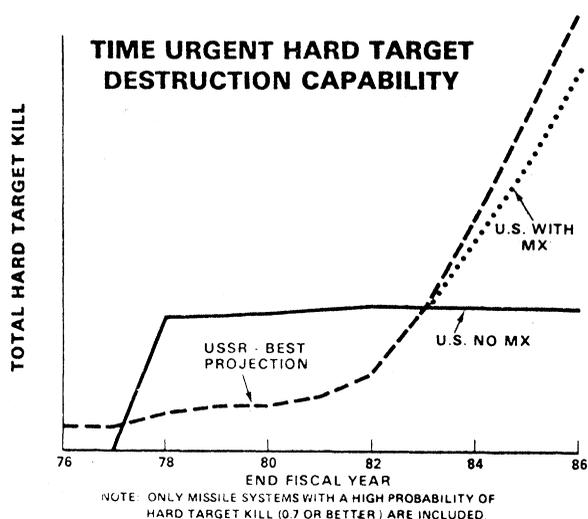
done to delay the program, will be deployed during October through December of this year. The other is \$67 million for the Mark 12A warhead, a more powerful version of the existing Mark 12 now aboard Minuteman III. Both programs were initiated as research items in 1974, as part of the Pentagon's attempt to move to a "counterforce" strategy. Although they were debated at the time, they have since slipped by with so little congressional ado that the Pentagon recently issued statements claiming confidently that each would have "no significant" arms control impact.

But a number of experts say otherwise. According to one set of unofficial calculations, the improvements will give Minuteman III warheads an 80 percent chance of destroying their targets in the Soviet Union, instead of the 20 percent probability now assigned to

the present Minuteman III warheads.

The increase will be caused by two things. First, the NS-20 guidance improvements will halve the "circular error probability" of each warhead. The current version has a 50:50 chance of falling within 1200 feet of its target; the new model would have the same chance of landing within 600 feet. Second, the new warhead will be double the yield of the old one, according to a Senate Armed Services Committee report. The 80 percent figure has been used by many people, including Representative Thomas J. Downey (D-N.Y.), writing in a recent *Foreign Policy* article, and by Jeremy J. Stone, executive director of the Federation of American Scientists (FAS), in congressional testimony.

The Air Force, which operates the land-based missile force, claims that the improvements are "a measured and reasonable response to developments on the other side." It also denies that the improvements will result in the "dramatic" increases in force accuracy that Stone and others are claiming. (However, informed sources outside the Air Force say that this could be a reference to the Mark 12A's poor test performance, which may mean that it will not quite be



Relative strengths of U.S. and Soviet missile forces, in warheads, or pairs of warheads, having a 70 per cent or better chance of destroying very hard (2500 psi) targets. Because of these criteria, the entire U.S. Minuteman force is excluded and a Soviet lead shown for 1976. But following software changes in the Minuteman III guidance scheduled for 1977, and deployment of Mark 12A warhead in 1982, the United States gains a substantial lead until 1983. [Source: Annual Defense Department Report, January 1977, pp. 125.]

double the 170-kiloton yield of the Mark 12. Or, the Air Force could be referring to the possibility that not every Minuteman will get the new warhead.)

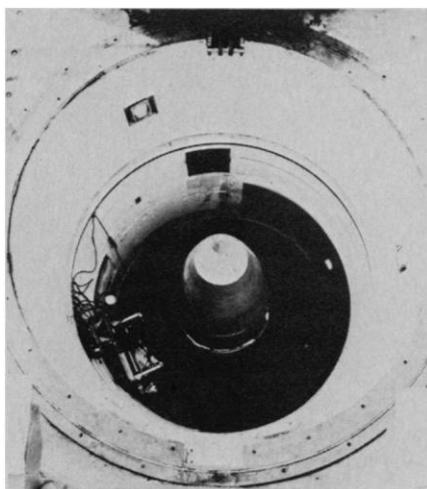
Nonetheless, the Pentagon admits that the improvements will be strategically important. It released an official chart in January showing that the improvements would give the United States a 5-year lead in "hard target kill" capabilities between 1978 and 1983. (see chart, p. 1185).

The United States has 550 Minuteman III's each with three independently targeted warheads (as well as 450 of the older Minuteman II's not affected by the improvements program). Once improved, the Minuteman III force alone with its 1650 warheads, will have a vastly greater chance of destroying nearly all of the Soviet Union's 1450 land-based missiles, which is the bulk of that country's nuclear war-fighting capability. Stone is saying that the Air Force can issue all the disclaimers it wants—but that this arithmetic will be done anyway by Soviet military leaders, and should give them pause.

"This is not a decisive first strike capability," says a Senate expert on the program, "but it is a big step down that road."

To be sure, the Soviets have been engaged in a program of improving the accuracies of their missile force as well, which, by and large, has warheads of far greater megatonnage. U.S. military leaders see the Soviet program as a highly significant threat beginning in the mid-1980's (see chart). At present, however, the overall Soviet missile force is believed to be less accurate than the American force.

The major leap in U.S. missile capability has not come about accidentally or haphazardly. The Mark 12A and NS-20 guidance improvements were among a series of proposals made by former Defense Secretary James R. Schlesinger in 1974 as part of his plan to redirect American strategy towards fighting limited nuclear wars by building a very accurate missile force, capable of making "surgical" strikes against missile silos and other hard military targets in the Soviet Union. Since Schlesinger's thinking flew in the face of accepted policy to ensure the mutual destruction of both countries in the event of *any* nuclear exchange, it was sharply contested in the Congress. Some of Schlesinger's "counterforce" programs were defeated. The Mark 12A and the NS-20 improvements were perceived as less pernicious, however, and hence were approved. The program received an added boost last summer when



Minuteman III missile in its silo. [Source: U.S. Air Force.]

former President Ford—who was about to face Ronald Reagan in the Texas primary election—ordered the programs accelerated.

But this year, during consideration of the military authorization bill, both Senator George McGovern (D-S.D.) on the floor of the Senate, and the Senate Armed Services Committee, questioned the wisdom of going ahead with deployment while the next round of SALT talks was under way. The argument raised was that the Administration would be "spending" a bargaining chip which it should hold and play at the table in Geneva. If deployment proceeds negotiation, McGovern and others have argued, the Soviets will have more incentive to continue their own missile modernization program and the new arms race in missile accuracies will be difficult, if not impossible, to stop. McGovern offered an unsuccessful amendment, allowing the President to delay spending funds for the programs if, in the context of SALT, he thought it appropriate. A similar amendment, which did not specifically mention Mark 12A, was offered by Hubert Humphrey (D-Minn.).

Stone warns that the Carter Administration is about to repeat the "mistake" of the Nixon Administration in 1970, when it deployed MIRV—the technology for putting multiple, independently targeted reentry vehicles into a single missile—instead of proffering it for negotiation and hence possible restraint first. Stone testified to the Senate Armed Services Committee in March:

The situation is embarrassingly similar to that which occurred in 1970. The United States had a five year lead in the development of MIRV. We were ready to deploy and the Russians were far behind. We knew that deployment would make further negotiations over MIRV highly difficult and that Soviet MIRV

would imperil our land-base forces as it now increasingly threatens to do. But we failed to take the advice . . . to negotiate.

Stone noted, as McGovern and others have too, that no less a figure than Henry Kissinger apparently regrets this lost opportunity for restraint on MIRV. He is reported to have said at a 1974 background briefing

I would say, in retrospect, that I wish I had thought through the implications of a MIRV'd world more thoughtfully in 1969 and 1970 than I did.

Around Washington, a number of informed people are wondering why the Carter Administration—which has asked the Soviet Union for "deep cuts" in their missile forces, and bargained with other, possible U.S. programs—has been silent on the Mark 12A and NS-20. Nor has it been confirmed whether the U.S. "deep cuts" proposal, which the Soviets rejected in Moscow in March, included these programs or not. And, while people in Washington wonder about this, so, apparently, do some of the Russians. The chief of Russia's Institute for the U.S.A., Georgy Arbatov, said before a State Department seminar in Washington in April, "I find it interesting that no one speaks of the Mark 12A warhead, which constitutes a major threat now, not in several years."

The arms control problems posed by "minor" things like the guidance improvements and more compact warheads will not go away easily, even if the Administration does something about these programs before October. Propelled largely by advances in electronics, mapping, and miniaturization in warhead design, both the Soviets and the Americans are moving in the direction of ever more accurate land-based missiles. This evolution, at each major juncture such as with Mark 12A and NS-20, jeopardizes the other side's force even more. "This problem," says one Administration official "is at the heart of the problems being addressed at SALT."

The paradox, however, is that the kinds of problems at the heart of the negotiations also happen to be those that are most difficult to verify. For example, the NS-20 guidance modifications will be merely a question of reprogramming some computers. Similarly, the Mark 12A will be the same size and shape as the Mark 12. Whereas previous SALT discussions were centered on things that could easily be viewed by reconnaissance satellite—such as numbers of land- and submarine-based missiles—these changes, inside the nose cones of the missiles, will be a different kettle of fish.

—DEBORAH SHAPLEY

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