Reagan's MX 'Peacekeeper' Draws Fire

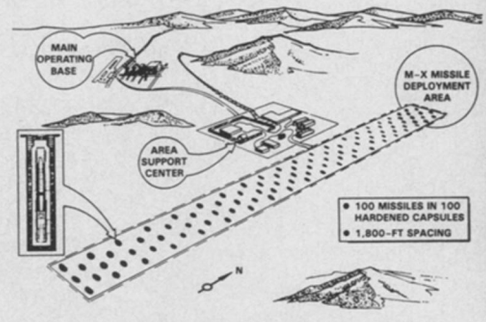
They stretch 70 feet in length, 92 inches in diameter, weigh roughly 90,000 pounds and pack 10 independently targeted warheads—each with a yield in the neighborhood of 335 kilotons: President Reagan has christened them his "peacekeepers." Reagan's predecessors referred to these powerful intercontinental ballistic missiles (ICBMs) as MX—for missile experimental. By any name they are massive, expensive, potent and controversial.

On Nov. 22, Reagan proposed a scheme for basing the weapons in a closely spaced array known as "dense pack." According to Defense Secretary Caspar Weinberger, dense-pack basing gives "us [ICBM] survivability well into the '90s, and it forces the Soviets to divert their efforts to develop counters to it." But there are a number who disagree on technical grounds, and who are becoming increasingly vocal in their criticism.

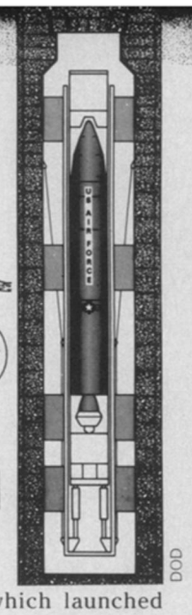
Chief among them right now is a team of researchers at the Massachusetts Institute of Technology headed by Kosta M. Tsipis, a senior research fellow in physics. Tsipis is also co-director of MIT's Program in Science and Technology for International Security. Together with graduate student Joseph Romm, Tsipis is about to publish a two-month study of dense pack's vulnerability. Its analyses challenge the administration's claim that dense pack is not only better protected than the nation's existing Minuteman ICBM force, but also capable of surviving a major Soviet first strike.

Reagan's basing scheme involves placing 100 MX missiles in 100 "superhardened" (massively protected) underground silos. The silos would be arranged in a configuration similar to that depicted in the diagram (at right). The whole 100 missile force would be sited in a plot of land roughly 14 miles long and 1.4 miles wide at the Francis E. Warren Air Force Base outside Cheyenne, Wyo. Individual silos would be spaced a mere 1,800 feet apart.

MX, the Air Force says, will be one of the most accurate, powerful and reliable weapons in the U.S. strategic arsenal. (The first test launch of an MX will occur at Vandenberg Air Force Base in California, probably in February 1983.) As such, it would pose one of the greatest threats to the Soviets. But its value as a deterrent to nuclear war depends on its relative invulnerability to a first-strike attack. Conceding that "there is no system that is 100 percent guaranteed invulnerable," Weinberger said the Soviets probably would not be able to take out more than 20 percent of the densely packed MXs in a first strike. And Defense Department analysts said agency studies indicate that even if the Soviets lobbed their entire 308-missile, highly accurate, SS-18 ICBM force against the MX, roughly "50 percent" of the U.S. missiles would survive.



Conceptual basing array for dense-pack scheme. Inset at right is missile and launch canister inside a superhardened silo. Missile is designed to push through tens of feet of overhead rubble during launch.



In contrast, Weinberger noted, "We know that a first strike of the Soviets could take out in excess of 90 percent of that Minuteman system as it is now deployed." And it's the administration's contention that MX is therefore essential if the land-based leg of the nation's "strategic triad" is not to be left hopelessly vulnerable. (Submarines and airborne bombers make up the two less vulnerable legs.)

But there are a number of weapons analysts like Tsipis and Romm who challenge Minuteman's relative vulnerability, compared with MX — particularly in the dense-pack basing. For example, Tsipis told SCIENCE NEWS, "It's a bit of a fantasy" to contend as the administration has that one can confidently increase the hardening of silos to withstand 5,000 pounds per square inch (psi) or greater overpressures with existing technology. "Superhardening to 5,000 psi is still questionable," he said. "Some people will tell you that this is impossible." But even if it weren't impossible, MX survivability would probably require at least heardening silos to withstand 20,000 psi, the MIT researchers claim.

That's true, DOD officials say. And it also presents no problem today to harden to such levels, one Air Force official told SCIENCE NEWS. Using a 1/8 scale mockup of an actual silo, he said, "We have demonstrated . . . a nondamage level 10 times that of our present [Minuteman silo's] design," via high-explosive simulation tests at Fort Polk, La., on Nov. 8. And before silos are designed for the field, he added, "We intend to go even three or four times harder than that." DOD's focus on "steel-contained concrete" silo structures is what makes such hardening "eminently practical," the Air Force official said. While explaining that the exact hardening level reached is classified, he noted that it today exceeded "by an incredible factor" the 5,000 psi to 10,000 psi talked about only a year ago.

Tsipis and Romm counter, saying that even if the silos could be hardened as DOD claims, the ultra-sensitive inertial-guidance system by which launched missiles navigate to their predetermined target would undoubtedly be thrown out of alignment if not destroyed by Soviet attack. Romm says a 25-megaton warhead detonated at low altitude within 2,600 feet of an MX silo would generate ground acceleration forces on the order of 300 to 500 times the force of gravity.

And referring to ground shakes from incoming weapons, J. Edward Anderson says, "It wouldn't take much to throw [a missile's guidance system] off a half second of arc." The University of Minnesota mechanical engineering professor invented some of the inertial-guidance systems now used in Air Force missiles. "The inertial alignment angles you need to make them a first-strike weapon are well under half a second of arc — incredibly precise alignment," he says.

DOD counters, however, saying actual MX missiles tested in the agency's "shake, rattle and roll laboratory" have successfully withstood shocks comparable to a war environment.

Key to the survivability of densely packed MXs is hardening. If the silos can't survive roughly 20,000 psi, the MIT researchers say, a single 25-megaton Soviet warhead could take out 7 or 8 MX missiles. DOD contends it will take a direct overhead air blast by one such warhead to take out each MX. And if the Soviets try to do that, DOD claims, the missiles will be forced to arrive too close together. "Fratricide" will occur, DOD says, whereby the ionizing radiation, electromagnetic pulse (SN: 5/9/81, p. 300), high winds, fireball and abrading dust clouds unleashed by a previous detonation will deflect, confuse or destroy any incoming missiles' shell and sensitive electronic-targeting mechanisms.

Development funding for the MX project is currently up for congressional debate. Passage of the funding, not likely in the lame-duck session, is expected to meet strong opposition in the new Congress. Whether Congress buys DOD's claims about MX survivability under dense-pack basing is expected to play a key role in the ultimate decision. —*J. Raloff*