IS THERE A DEFENSE AGAINST THE ICBM?

By T. F. Walkowicz

Given enough time
and money, the answer could be yes—but do we have enough of either?

THE AGE-OLD problem of defense consists of: detection, interception, and kill. The current race between the United States and the Soviet Union for the Intercontinental Ballistic Missile has focused new attention on these three component parts of the defense problem, as they pertain to the possibility of stopping an ICBM attack against this country.

The ICBM defense problem is being discussed primarily from two points of view. The first is that of the present Administration, which has been charged with letting our ICBM program lag in a bureaucratic maze in Washington. The Administration is working hard to make up for lost time and, hopefully, to win the ICBM race. Simultaneously, research work on an ICBM defense system is apparently going forward, in the hope that even this seemingly impossible task will become "do-able" in the light of new discoveries.

An ICBM defense, if providentially it turned up in time, would help counter any adverse reaction accompanying public disclosure, e.g., by the Soviets themselves, that the USSR is ahead of us with the ICBM should this be so.

The other point of view, held by those who believe that "the strongest offense is the best defense," is that it is dangerous to pin too much hope on the premise that an effective ICBM defense system, covering the entire US, will ever become operational and economically practicable. Furthermore, say those who hold this point of view, although ICBM defense R&D programs should definitely be pursued, these also are lagging, along with defense R&D programs in general.

In an atmosphere of charge-and-countercharge, with the important facts highly classified, the American taxpayer stands hopelessly bewildered. Therefore, without recourse to classified information, and utilizing considerations that follow directly from basic physics, it might be well to take a look at the ICBM defense problem. This can be done by trying to erect a theoretical ICBM defense system that, theoretically at least, might have some chance of working successfully.

DETECTION

The best detection system would let us know where Soviet ICBM launching sites are located so that we could watch them. Whether these sites are fixed or mobile, constant surveillance of them would be the best "distant early warning" for alerting in time our theoretical ICBM defense system.

There are two possibilities for providing this kind of distant early warning.

First, if the Soviets should accept President Eisenhower’s mutual aerial surveillance proposal, coupled with limited ground inspection, constant observation of Soviet ICBM activities would become possible. Precisely for this reason, as recent disarmament talks in London seem to indicate, it is highly unlikely that the Reds will voluntarily accept mutual aerial surveillance until they have operational ICBM emplacements in adequate numbers well concealed in the Soviet heartland. This will be particularly true if, as many believe, the Soviets are now ahead of us in the ICBM race.

The second approach to constant aerial surveillance lies in our realization that such surveillance is rapidly becoming vital to our survival. Such realization would have to be (Continued on following page)
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followed by a National Policy decision to build and operate without Soviet permission, on a high-priority basis, aircraft and other vehicles which are able to do the surveillance job, and are also relatively invulnerable to enemy interception. Such aircraft might, for example, be nuclear-powered, so as to possess both the required endurance and the capability of out-running and out-fighting, if necessary, any Soviet interceptors which try to interfere with their mission.

With regard to the National Policy decision, the country has probably not been well-enough informed—authoritatively—to back the Administration in the kind of courageous action which the present Chief Executive is fully capable of taking. Regarding the air vehicles needed for the "unilateral" aerial surveillance job, it is highly improbable that their development is going forward at a pace consistent with the operational need, in the absence of the basic policy decisions and in the light of current limitations on the R&D budget.

Consider now the problem of last-ditch detection: i.e., in the ICBM combat zone—the air space over Continental North America. Present radar is not adequate, because its range of some 300 miles would give the defense system only some two minutes to react. Thus, high-power radar of much longer range is needed. But that is not all.

One can assume that a Soviet ICBM headed for the US would be accompanied by more than a few decoys. These decoys are extremely easy to provide, for example, by detonating the ICBM booster rocket motor in space and letting its fragments—scattered over thousands of square miles—fly along with the warhead toward the target. Then, too, very high-power radar might be "spoofed," by Soviet jamming, meteors, Aurora Borealis, sun spots, perhaps even by radar reflections from the moon.

Thus, after we first invent a last-ditch radar which can see out to a range of a thousand miles or more, this radar may well see thousands of "blips," rather than just one. Button, button, who's got the button? Which "blip," out of the thousands which can be seen, represents five to twenty megatons' worth of McCoy, headed for this country?

A system for distant early warning of approaching ICBMs would be of some importance. If our radar net reached beyond the North Pole, perhaps half-way to the Soviet ICBM launching sites, we might have as much as twenty minutes' warning. This would give our retaliatory air forces time to fire their ICBMs, and to send all bombers that were airborne, and carrying H-bombs at the time, on route to the Soviet Union; it would also give all Americans time for a final prayer.

Such a warning system conceivably could be invented and built. However, with the "DEW line" against conventional bombers just going in now, it is only realistic to expect that a similar line against ICBMs will not be ready until long after the Soviets have the ICBMs.

Conclusion, for the time being, on Detection—STRIKE ONE!

INTERCEPTION

For purposes of argument, assume now that several technological break-throughs have been made, that substantially more money for R&D has been budgeted, and that a suitable anti-ICBM detection system has been discovered and developed. We must now try to intercept the ICBM warhead, hurling toward us at roughly 10,000 miles per hour.

Note that, like all man-made devices, the detection equipment is not perfect. If it should detect the missile at about 1,000 miles range, it does so with an error, let us say, of perhaps one percent, or about ten miles. This detection information is rapidly fed into a quick-acting electronic computing and data processing system similar to SAGE (still to be operationally-proven for use in the "simple" case of air defense against manned bombers). We assume that the computer doesn't burn out a tube or make a single false computation, and that it quickly lights the fuse of an anti-ICBM missile (still to be invented).

The anti-ICBM missile accelerates rapidly and heads off to intercept the trajectory which the radar thinks it "sees" the attacking ICBM following. Here the anti-ICBM weapon designer encounters a real dilemma: if he can only get well within ten miles or so of the approaching ICBM warhead, his own warhead must have a tremendously big radius of destruction. This means a hydrogen warhead. However, since anti-ICBM missiles may have to be fired in large numbers—somewhat like artillery—if the defense system is to be really effective, the designer must strive to minimize the "bang" required in his defensive missile warhead. This he must do in his own self-interest; to minimize expenditure of fusion materials, and to minimize the world-wide deleterious effects of the radioactive particles produced by H-bomb "bangs" in really large numbers.

If the defense designer wants to use a "baby" H-bomb, i.e., something just big enough to knock out only Manhattan, instead of Greater New York City, he has somehow got to get his anti-ICBM missile much closer to its target. He might try to do so by installing a radar, guidance, and rocket propulsion system in the very warhead of the anti-ICBM missile itself. This may eventually be done, but it will be no mean feat.

Or, the designer might solve the accuracy problem by letting the attacking ICBM come much closer, giving his radar longer to "look" at it and locate it more accurately—and, incidentally, moving the battle zone from the polar wastes of northern Canada to, say, twenty to fifty miles above US cities. This, in turn, raises the question of what happens to those areas of the US over which an anti-ICBM missile explodes its warhead or makes its "kill" at too low an altitude.

Conclusion, for the time being, on Interception—STRIKE TWO!

KILL

Let us now assume that all inventions heretofore required have been made, and the required "defense system hardware" perfected: every attacking ICBM can now be detected and intercepted. There remains only the relatively minor problem of "killing" a few tons of metal, which is capable of taking the several "Gs" of acceleration it undergoes during launching, and built to withstand the thousands of degrees of heat which it experiences during re-entry into the atmosphere.

"Kill" may, in fact, prove to be the simplest part of the problem.

First, the good Lord may provide a shower of meteors at just the right place and the right time. Second, by firing very many anti-ICBM missiles which carry warheads that detonate into large numbers of very small fragments, we can literally suspend a large quantity
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of such fragments in the pathway of the approaching ICBMs.

Either the good Lord’s meteors or our defensive fragments might well pith the ICBM warheads, spoil the carefully designed airflow over them, and cause them to burn up as they re-enter our still-free atmosphere.

Third, by using anti-ICBMs with H-bomb warheads in large numbers, we might stop even a few hundred attacking ICBMs, and then undergo the rather new experience of seeing our enemy as well as ourselves very slowly becoming something else—ostiches would be most appropriate—as the mutations induced by radioactive particles begin to take place among the generations to follow us.

Conclusion, for the time being, on “Kill”—STRIKE THREE!

Should we give up seeking an anti-ICBM defense? Certainly not! For the pessimism which characterizes the outlook for finding a practicable solution to this problem today, as portrayed above, springs only from the state of today’s knowledge. Who knows what tomorrow’s discoveries may bring, even in these austere days when the country so obviously cannot afford to spend the R&D dollars which constitute its survival insurance?

However, even though a solution to the anti-ICBM defense problem may eventually be found, let’s take a brief look at two additional aspects of the problem: the economics and probable timing of ICBM defense.

Regarding economics, suppose the Reds have built some 500 operational ICBMs. Probable cost, excluding R&D: $250 million, much less in terms of rubles paid to slave labor.

Let us now try to construct and operate an anti-ICBM defense system, keeping in mind that it must maintain the most merciless twenty-four-hour alert that has ever been seen. Let us also note that every part of this defense system must be capable of handling the greater part of those 500 Red ICBMs on their way to this country, in one big volley.

Remember, for example, that the Soviets might explode many of their ICBMs over the Western part of the US, when the winds would carry the fallout over much of the country. Another large volley might be aimed just off the Atlantic Coast, and the soothing waters of the ocean, now radio-actively hot and churned into monstrous waves, might be sent on their way to caress the relaxed swimmers at Coney Island, Atlantic City, Sea Island, and Miami.

So, the anti-ICBM system must be capable of taking a hell-making volley aimed at any one area, rather than being designed just to cope with the relatively easy job of several dozen “ICBM buckshot” heading individually for various parts of the country.

The probable cost of a still-to-be-invented anti-ICBM system which could take on this defensive job will surely run in the tens of billions of dollars. In other words, modern weapons, such as the ICBM with H-bomb warhead, are drastically reducing the cost of strategic attack and, simultaneously, raising the cost of defense to astronomical proportions.

Regarding timing, one can simply gather from various official statements that an ICBM defense system will certainly not be available until some considerable time—perhaps several years—after the Soviets possess an ICBM capability.

In the light of the above, we must squarely face up to the implications of the following major conclusions:

- Distant Early Warning of impending or on-coming ICBM attack would be of great importance, and should be actively pursued. By giving us time to retaliate, such warning of itself becomes a very important deterrent.
- ICBM defense of great areas, if it ever becomes technically feasible, may well prove economically impracticable.
- ICBM defense of “strong points” of major importance, e.g., our own retaliatory capability, if it ever becomes technically and economically practicable, may not be available until some time after the Soviets possess an ICBM capability.

Thus, we face the advent of an era of great instability in world affairs. Should one nation achieve an appreciable operational ICBM capability first, the temptation will become extremely great to “seek a showdown,” i.e., to strike first.

Therefore, unless we stay unquestionably ahead of the Soviets in “conventional” deterrent-retaliatory airpower and achieve the ICBM first, this will be an era of great danger for the free world. For it appears certain that US retaliatory strength will never be used “to retaliate first.” But who can say with firm assurance that international Communism, a form of amoral insanity ruled by a volatile dictatorship, shall never commit an insane act of aggression?

Unfortunately, this appears to be an unpopular time to expect people to face up to unpleasant eventualities. On the one hand, we are seriously asked to accept the “terrible finality” of the Communist enslavement of millions of once-free people—but we seem unable to comprehend that, historically, a nation which condones injustice for others, eventually meets injustice itself.

On the other hand, we are told, in effect, that balancing the budget is more important than maintaining that wide margin of strength required to deter war without any question, i.e., without running the risk of Soviet miscalculation. The Administration is certainly not saying this in so many words—but how else can one interpret the dangerous notion being subtly put forward that we can deter World War III with less airpower than would be required to gain air ascendency rapidly in that war, if it should be visited upon us?

It must take tremendous courage to take the kind of calculated risks with national security which our current airpower programs represent. No matter how strongly some have taken issue with the judgment of the Administration on this score, nobody has questioned the high motives of its officials, or brushed these officials aside as “dedicated specialists” in balancing the budget. Yet, those who would prefer to be “free men in the poor house,” rather than the “richest men in the graveyard,” have been labelled “fear-mongers,” and the judgment of professionals in the art of survival through deterrence is being lightly brushed aside.

Somehow, as a Nation, we seem to be losing sight of the fact that freedom is a priceless commodity, which will be lost if we are not fully prepared to fight for it. The word “Concord,” once synonymous with the embattled farmers’ fight for freedom, is rapidly becoming a symbol only of grapes, i.e., the election year sour grapes of those who are annoyed because some Americans refuse to rely on the mere hope that the Soviets won’t strike us, but prefer instead to rely on the deterrence of our formerly clear-cut air superiority.

Unfortunately, history will not stand still for an election year. And, as that history is one day being written, may it find it possible to be kind to those who brushed aside a realistic assessment of mounting peril, and embraced instead the purveying of the kind of unjustifiably hopeful complacency which is the first hallmark of a great Nation on the way to its grave.—End

AIR FORCE Magazine • June 1956