

DECLASSIFIED  
E.O. 12958, Sec. 3.6

NN 931087  
By hmm/hmm Date 5/8/96

SANITIZED COPY  
VISITIVE INFORMATION DELETED

~~SECRET~~  
Privileged

1057 file  
RG-359  
304521

October 29, 1965

Report  
on the  
**PROPOSED ARMY-BTL BALLISTIC MISSILE DEFENSE SYSTEM**  
by the  
Strategic Military Panel  
of the  
President's Science Advisory Committee

*Strategic Military Panel*

I. Introduction

The Panel has reviewed the current Army-BTL proposal to deploy a ballistic missile defense system capable of defending the United States against unsophisticated or light ballistic missile attacks. The Panel understands that the system, which consists of a high altitude, area defense for the entire country and a limited deployment of terminal Nike-X defense for high value targets, is primarily directed against a future Chinese nuclear capability and is intended to insure that the United States will be essentially invulnerable to Chinese nuclear attack for a considerable period of time. At the same time, the system is specifically designed to permit growth to meet more massive and more sophisticated forms of ballistic missile threat from any quarter.

Excluded from automatic down-  
grading and declassification.

S&T Control No. 1334  
This document consists of 18 pages.  
Copy 12 of 20 copies, Series A.

~~SECRET~~

~~SECRET~~

If the decision to deploy is made in FY-1967, the Army estimates that the proposed system would have an IOC in 1970 and would be completely deployed by 1973 at a cost of from \$8 to \$12 billion, depending on the number of locations defended by terminal defense.

In its deliberations, the Panel was deeply conscious of the fact that deploying a ballistic missile defense system is one of the most important military systems decisions that the United States has ever had to face. There is full agreement that the threat to American and world security posed by the emerging Chinese nuclear capability will be extremely serious.

There would clearly be considerable military and political advantages in a defense system that could insure that this country would not be subject to Chinese blackmail threats and, more important, that would give the government greater flexibility in its dealings with the Chinese Communists by denying them even a minimal nuclear deterrent for a great many years to come.

With regard to the magnitude of the commitment, the concept of a secure defensive shield against Chinese strategic attack could in the long run involve much greater expenditures for continental defense than those required simply for the proposed limited deployment. Future extensive deployment of Nike-X terminal defense (particularly since "growth potential" is a design requirement) would probably follow. Moreover, to achieve a tight defense, substantial additional expenditures

~~SECRET~~

~~SECRET~~

would be required for ASW and air defense to plug obvious loopholes in the proposed Army-BTL system. Finally, if as a consequence of deployment of the Army-BTL system we become interested in the possibility of defense against more massive threats, a substantial expansion of our civil defense program would surely have to be considered.

The Panel has examined on technical and military grounds whether the proposed Army-BTL system is designed correctly to match the evolution of the Chinese strategic nuclear threat.

At the same time, there appear to be far-reaching military, economic and political consequences of the decision to deploy ballistic missile defense that may be to the long-term net disadvantage of the United States. The proposed system would have considerable capability against the Soviet ICBM force in its present configuration. The Soviets must therefore react to U. S. deployment of such a system in order to maintain their deterrent (or their capacity for assured destruction) at the present level. This reaction would most logically involve the development and deployment of penetration aids in the Soviet ICBM force but might well also in the longer term push the Soviets to higher levels of strategic force deployment, to which we, in turn, might well react.

A decision to deploy could also have a significant effect on our allies in Europe and Asia. It is not clear whether it would increase their confidence in our resolve to defend them or their fear that we were abandoning them while constructing a Fortress America. The question

~~SECRET~~

[REDACTED]

would probably have to be faced as to whether we were prepared to assist our allies in obtaining a similar defense. Finally, a decision now to spend \$8 to \$12 billion to defend ourselves against a Chinese strategic threat would probably enhance China's military stature in the eyes of the world years before China could actually have a real nuclear strategic capability, and at a time when we have been attempting to minimize the significance of the Chinese threat. What effect this would have on the actions of our allies and neutrals in Asia requires careful examination.

Finally, the question arises why we should consider undertaking a massive expansion of our strategic defensive forces in the face of a relatively weak Chinese threat when we have not chosen to do so against our much stronger Soviet opponent. Our intent would presumably be to maintain a defensive military posture against the Chinese capable of denying them any deterrent capability whatever for at least a limited period of time. We never achieved this posture with respect to the Soviet Union; however, it may be possible to achieve it against the Chinese because of our great technological advantage.

In its deliberations, the Panel has attempted to focus on the technical aspects of the problem. The Panel recognizes, however, that some of the broader issues noted above must weigh heavily in any final decision on deployment of a ballistic missile defense system.

[REDACTED]

[REDACTED]

## II. Chinese Threat

At present, the Chinese clearly have no ICBMs and, for practical purposes, no intercontinental aircraft. They do have fission bombs; a Chinese copy of a Soviet ballistic missile type submarine (although it may not have any missiles); short-range cruise missiles; and an active ballistic missile development program, which includes a missile test range of about one thousand nautical mile range, static firing stands, and probably Chinese copies of the Soviet SS-4/MRBM. They also have a very strong motivation both to expand their ballistic missile submarine force and to develop an ICBM capability.

The general thinking in the intelligence community is that the Chinese may have a limited ballistic missile submarine capability in the latter part of this decade and that an initial Chinese ICBM capability might appear as early as in the 1970-1975 time period. However, there is also agreement that it is not possible to estimate with any accuracy at this time the evolution of the Chinese nuclear strategic threat during the next decade.

## III. Capabilities of the Army-BTL System against Chinese Threat

The proposed Army-BTL system, which basically consists of components originally designed to provide a full-scale defense against the Soviet ICBM threat, appears, on the one hand, inadequate to cope with an initial Chinese capability composed of submarine-launched

[REDACTED]

~~SECRET - Restricted Data~~

ballistic and air breathing missiles and, on the other hand, more effective than necessary for defense against the early Chinese ICBMs.

The concept of the proposed system is that the high altitude area defense would essentially defend the entire country against unsophisticated small attacks and that terminal Nike-X defense, deployed only at "high value" targets, would cover any leakage and would also provide additional defense against submarine-launched ballistic missiles in the case of coastal cities.

The area defense component of the system could provide a very effective defense against the initial Chinese ICBM capability which probably would not be equipped with adequate penetration aids. It is designed to acquire targets at 1600 n.m. and to launch interceptors when the target is 1000 n.m. away so that interception takes place at ranges up to about 300 n.m. from the defensive missile launching sites and at altitudes of 300,000 feet or higher. There is little or no discrimination in the area defense, and the proposed defense doctrine would be to fire a [REDACTED]

DOE/DNA  
(b)(3)

This should give relatively high confidence of kill against individual warheads with limited penetration aids.

The area defense component of the proposed system can be expected to cope with some 15 to 30 individual warheads directed against a given contiguous target area before exhaustion of its interceptors.

~~SECRET - Restricted Data~~

[REDACTED]

Thus, although the defense can always be overwhelmed in any one area by a large attack, the area component could provide a very high confidence defense against an initial small Chinese ICBM force with limited penetration aids. However, since there is no discrimination in the area component of the system, it can probably be exhausted by the use of light relatively unsophisticated, unhardened, exo-atmospheric decoys. Although there is considerable debate as to exactly how simple it is to develop such decoys, it seems unlikely that the earliest Chinese ICBMs would be so equipped. However, this would be the natural path of Chinese development to counter an area defense, and one probably could not count on a very extended effective life of such a system.

The terminal defense component, which uses atmospheric discrimination and rapid response Sprint missiles, also would have no difficulty at defended locations in handling the initial Chinese ICBM threat since it was originally designed to deal with relatively sophisticated missiles. However, against the initial Chinese ICBM threat, the terminal defense component appears somewhat redundant, when coupled with the area defense system. With the development of exo-atmospheric decoys, widely dispersed, the terminal defense component would become essential for the system to be effective. In that situation, it seems clear that the constraints imposed on the offense to penetrate both area and terminal defense would exact a heavy price in payload on target, and it would probably take the Chinese many years to acquire this

[REDACTED]

[REDACTED]

capability. It should be noted, however, that initially the Army-BTL system provides terminal defense for only a limited number of U. S. cities. Thus it must be recognized that, if the Chinese are able to penetrate our area defense, they can always damage us by attacking the "n + 1" city in any system designed to defend "n" cities. Therefore, only a deployment of terminal defense batteries much more extensive than that contemplated in the Army-BTL proposal can in the long term hope to accomplish the original objective of an essentially invulnerable defense of the U. S. against the Chinese; even such a defense can eventually be penetrated. Consequently, at some point in the future it would presumably be necessary to accept a "damage-limiting" and "assured destruction" posture with respect to the Chinese.

Considering the submarine threat, the Panel believes that both the area and the terminal components of the system are vulnerable to such attacks. Neither component has any capability against air breathing cruise missiles flying at low altitudes. The area system would also be ineffective against submarine-based ballistic missiles launched on minimum energy trajectories of less than 100 n. m. More important is the fact that a 350 n. m. missile, which is the normal armament of the Soviet G-class submarine of which the Chinese have produced one copy, would be invisible to the area defense when launched at 100 n. m. The defense would thus have to rely on the terminal component, which in turn could not cope with missiles launched at distances of less than about 50 n. m.

[REDACTED]



[REDACTED]

If our ASW is as ineffective as some people fear, this means that there is a loophole to the proposed system that could probably be exploited by the Chinese with what might be their initial capability. If, on the other hand, our ASW forces are more able and can be made more effective to handle the Chinese submarine threat than is now apparent, then the need for a defense against submarine-launched missiles is decreased. However, even if ASW becomes relatively effective, it would appear that some form of advanced "air defense" such as SAM-D will probably also be required to plug the loophole in the proposed Army-BTL system posed by submarine-launched ballistic and air breathing missiles. This raises the question as to whether a SAM-D-type system alone or in combination with an improved ASW posture is not the correct answer to the submarine threat.

#### IV. Capabilities of Army-BTL System against Soviet Threat

The proposed Army-BTL system clearly also has considerable capability against the present Soviet threat. No matter how much we advertise the fact that the defense is directed at the Chinese, the Soviet Union and the rest of the world will probably consider that the principal significance of the system relates to its impact on the U. S. - Soviet strategic nuclear confrontation.

At the present time, the area defense component of the proposed Army-BTL system would be quite effective against Soviet re-entry vehicles since the Soviet Union has apparently not yet decided to deploy

[REDACTED]

[REDACTED]

penetration aids, nor is there even any evidence of a Soviet penetration aids development program. Rapid U. S. deployment of an area defense (in particular, the simplified system discussed below) might lead the Soviet deployment of penetration aids by a year or two if the Soviets were slow to react, and it might buy us a short but possibly significant strategic advantage. However, it seems extremely improbable that the Soviets would not soon be able to equip their force with the penetration aids required to overcome an area defense.

There do not appear to be any developments implicit in the proposed system that would in any way change the unfavorable exchange ratio with Soviet offensive forces previously estimated for the Nike-X terminal defense system although analysis of the combined area and terminal defense has not been carried out.

V. Impact of Ballistic Missile Defense Deployment on the U. S. - Soviet Strategic Confrontation

A decision to deploy the proposed Army-BTL system would probably not initially result in a major political reaction on the part of the Soviets since they seem to accept defensive systems as natural militarily. However, if they have either not decided to deploy a ballistic missile defense system of their own or have decided on only a limited deployment for the general Moscow-Leningrad area, our decision to deploy might well influence them to undertake a full-scale ballistic missile defense. More important, for the long term, it would appear that such a decision

[REDACTED]

[REDACTED]

on our part might well push the Soviets to higher strategic force levels, both qualitatively and quantitatively. Such an increase in Soviet force levels would probably again put pressure on the U. S. to expand its strategic forces.

The possibility that the Soviets may announce during the coming year that they are actually deploying a ballistic missile defense system is an added problem that must be weighed in deciding whether or not to deploy a system of our own. Despite the accumulation of information that may relate to this activity, it is still uncertain as to what the Soviets are actually doing. The Soviets may already actually be engaged in a limited deployment of a ballistic missile defense system. In any event, it is clear that the Soviet activities that may be related to ballistic missile defense and, in particular, to deployment have been substantially expanded throughout the last year.

If the Soviet Union were to announce to the world the deployment of a ballistic missile defense, which it claimed was very effective, the domestic political pressures for a similar action on our part would certainly be increased. Moreover, if such announcement by the Soviets were to occur during a major confrontation with this country, it might have a significant impact on world opinion. On the other hand, the Soviet Union has frequently claimed successful development, if not deployment, of an effective ballistic missile defense and has, in fact, intensified through recent pronouncements and a much-publicized

[REDACTED]

[REDACTED]

film that they have a ballistic missile defense capability. World reaction to all these claims has been minimal.

There is little question but that the proper military counter to a Soviet ballistic missile defense system would be to improve the capability of the U. S. strategic forces to penetrate, in particular by the incorporation of improved penetration aids in our existing missile force. This would have the effect of assuring that we maintain the same basic deterrence posture relative to the Soviet Union that exists at present.

The Panel believes the probability is sufficiently great that either the Soviets will announce, or we will discover, the existence of a deployed Soviet ballistic missile defense system in the next year or two so that there should be a greatly increased effort to assure that we are in a position to incorporate appropriate penetration aids in our strategic missile systems as rapidly as necessary. In the past, the Services, particularly the Air Force, have been slow in developing programs for the incorporation of penetration aids despite continued pressure from OSD. Programs for penetration aids, specifically aimed at countering potential Soviet ballistic missile defense systems have now been evolved by the Services and we hope that rapid progress will be made.

VI. What Is the Proper Response to the Chinese Threat?

There is considerable uncertainty about the time schedule of the emerging Chinese strategic nuclear threat. One may imagine that it will appear late (i. e., after 1973, the time of complete deployment

[REDACTED]

[REDACTED]

of the Army-BTL system, were the go-ahead given now) or it might appear early, say in 1970. This uncertainty in the threat raises serious questions regarding the deployment of the Army-BTL system, and we discuss these questions below.

Because of the possible early threat, the Panel is concerned with the length of time required for deployment of the proposed system. In fact, the time to achieve the performance as predicted in the proposed Army-BTL system may be considerably longer than assumed, considering the advanced technology involved.

The Panel believes that it may be technically feasible to obtain a useful area defense against the plausible initial Chinese ICBM capability with shorter deployment time and at much lower cost than that of the proposed Army-BTL system. The high cost of the Army-BTL system is largely a consequence of overdesign in the attempt to build a growth capability into the system by means of a terminal component that is not really required initially. For example, the use of the very expensive MSRs at the Zeus missile farms is closely coupled to the requirements for terminal defense.

The Panel considered a simplified area defense in which the Minimar and MSR radars were omitted from the system. Acquisition could be achieved by VHF (~ 150 megacycles) or UHF (~ 400 megacycles) radars such as those used in SPADATS; and the defensive Zeus missiles could be controlled by MTRs, or by inertial guidance. The effects of

[REDACTED]

[REDACTED]

blackout, including self blackout, particularly on the VHF radars, as well as the feasibility of using light decoys to penetrate the defense, would have to be considered in detail in evaluating such a system. A system of this variety would cost substantially less than the proposed Army-BTL system, perhaps as little as \$1 billion, and could involve only "off-the-shelf" hardware. It could surely be deployed more quickly than the proposed Army-BTL defense.

Although the over-all capabilities of such a simplified system would clearly be less than the Army-BTL system, it would probably be as effective as the Army-BTL system in dealing with the early Chinese ICBM threat. The Panel believes that more detailed study will probably show that such a simplified system is feasible and that it can in fact be rapidly deployed. The ability to deploy such a system would provide an effective hedge against an early Chinese ICBM deployment. With this hedge, we would have more time to resolve the uncertainties in our intelligence on the Chinese nuclear strategic threat and in the technology of ballistic missile defense.

It is also important to recognize that our massive strategic offensive forces provide additional safeguards against the early Chinese ICBM threat. In the face of these U.S. forces, a few unhardened and easily located Chinese ICBMs would not constitute a very plausible

[REDACTED]

[REDACTED]

blackmail threat or deterrent capability. Provided our defenses against the Chinese submarine missile threat are effective, the U.S. by taking preemptive action could be protected with a high level of confidence against the initial Chinese ICBM force. The level of confidence in such a preemptive disarming attack would of course decrease as the level of the Chinese ICBM force increases.

In this context and with a rapidly-deployable simplified system as a hedge, the Panel believes that we will have sufficient time to react to the Chinese ICBM threat as it becomes more apparent. In addition, there is an actual danger that a premature decision to deploy a defensive system would permit the Chinese to build around it if they are not already firmly committed to their future strategic systems. They might, for example, give additional emphasis to submarine or ship-launched missiles instead of undertaking an ICBM program. Moreover, the sooner the Chinese are clearly faced with the problem of having to penetrate a high altitude area defense the sooner we can expect them to introduce exo-atmospheric penetration aids into their evolving ICBM force.

For all of the reasons discussed above, the Panel does not believe that there should be a decision this year to deploy the proposed Army-BTL system.

#### VII. Possible Alternative Courses of Action

The Panel is aware that a number of alternatives to an actual decision in connection with the FY-1967 budget to deploy the Army-BTL system are being considered in DOD.

[REDACTED]

[REDACTED]

One such proposal is to make a firm decision to deploy the Army-BTL system at a time dictated by the future evolution of the Chinese strategic nuclear threat. On this basis the actual funding of the deployment decision would be delayed for at least one year. This proposal is presumably based on the idea that the announcement of such a decision would be of some domestic value in allaying criticism that the Administration was not reacting to the Chinese threat and to undercut the impact of any Soviet announcement that they were deploying such a system. The Panel believes that this proposal would present us with all of the problems inherent in the decision to deploy a ballistic missile system without doing anything to advance the day when a defensive system would be available. Moreover, it would tend to tie us unnecessarily to a specific system at a time when technology is changing very rapidly. The Panel finds very little to recommend this proposal.

A second proposal that is being considered is to postpone the formal deployment decision but to spend some \$200 million in FY-1967 for long lead time items. It is argued that this action would, in essence, save one year in both the IOC and full deployment times if it is subsequently decided to deploy the Army-BTL system. On examination, it appears that the \$200 million in question is essentially equivalent to the full first-year expenditures for the deployment of the system.

This expenditure really amounts to building up in FY-1967 the organization that would be necessary in FY-1968 to spend \$1.2 billion. This

[REDACTED]



[REDACTED]


type of operation would make it more difficult next year to decide against deployment. This action would also tie us very closely to the specifics of the proposed Army-BTL system and would make it much more difficult to continue objective study of the problem since efforts would of necessity be focused on the very difficult management problem of building an organization capable of directing the single most complex military system ever undertaken. Although it is argued that this action would defer the political repercussions that may be involved in a formal deployment decision, the world at large would probably interpret this action as a decision on our part to deploy the Army-BTL system.

On balance, the Panel does not believe it would be wise to initiate the program for the procurement of long lead time items in the absence of a decision to deploy.

#### VIII. Recommendations

On the basis of the above considerations, the Panel recommends that:

1. A decision should not be made this year to deploy the proposed Army-BTL system.
  2. A commitment should not be made this year to deploy the proposed Army-BTL system at a future date to be determined by the evolution of the Chinese strategic nuclear threat.
  3. The proposed \$200 million in pre-production funds for the proposed Army-BTL system should not be spent in FY-1967.
- [REDACTED]



4. The DOD should intensify its study of the problem of counter-  
ing short-range, submarine-launched, ballistic and air-breathing  
missiles which may well be the initial Chinese nuclear strategic threat.

5. The DOD should design and evaluate a simplified area defense  
system which would be relatively inexpensive, use off-the-shelf com-  
ponents, and be rapidly deployable.

6. The DOD should continue the R&D program in support of the  
proposed Army-BTL program and should carry out any necessary test  
and evaluation of components for a simplified area defense system. The  
DOD should also continue support of general technology relating to ballistic  
missile defense, in particular in the field of re-entry phenomena.

7. The DOD should vigorously continue its efforts on penetration  
aids against either a potential Soviet area or terminal defense system.

\* \* \*

Dr. Marvin Goldberger, Chmn.  
Dr. Hans A. Bethe  
Dr. Lewis McA. Branscomb  
Dr. Sidney D. Drell  
Dr. Richard L. Garwin  
Dr. Richard Latter

Dr. Wolfgang K. H. Panofsky  
Dr. Jack P. Ruina  
Dr. Kenneth M. Watson  
Dr. Jerome B. Wiesner  
Mr. Spurgeon M. Keeny, Jr.