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AICBM

23 October 1961
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Mr. Spurgeon M. Keeny, Jr.
Office of the Special Assistant
for Science and Technology
Executive Office Building
Washington 25, D. C.

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By NCC NARA, Date 11/19/96

Dear Spurgeon:

I am enclosing two copies of a memorandum addressed to Jerry which summarizes what I believe to be the consensus of the AICBM Panel. I suggest you give one copy to Jerry in case he needs it for reference in his discussions with McNamara. I suggest you edit the other copy in any way you see fit and then circulate it to the Panel members for comment.

I believe the paper contains all the points discussed but is somewhat redundant in places. I believe that the conclusions on page three including the somewhat provocative Item 2 should probably stand.

As soon as you receive this I would appreciate it if you could call me to let me know whether there is any objection for me to discuss the paper with Jack Ruina when he gets here for the meetings at SRI.

I am returning the documents you gave me with this paper.

Sincerely,

W. K. H. Panofsky
W. K. H. Panofsky

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This document consists of 7 pages
No 1 of 3 copies, Series A

Memorandum
21 October 1961

To: J. B. Wiesner
From: PSAC - AICBM Panel
Subject: "Limited Deployment, NIKE-ZEUS"

During past studies of this group the conclusion had been reached that large-scale production of NIKE-ZEUS, such as the 70-battery plan of NORAD, could not be justified on technical or military grounds. Specifically, it cannot be concluded that the NIKE-ZEUS system, including improved versions compatible with the system by 1970, can provide an effective city defense. Moreover, if ZEUS deployment to any extent is contemplated, two salient factors must be considered:

- a) Even the limited utility of NIKE-ZEUS in city-defense can be circumvented unless an effective system of civilian fallout shelters exists;
- b) The existence of NIKE-ZEUS must not be permitted to introduce dangerously misleading assumptions concerning the ability of the U. S. to protect its cities in case of nuclear missile attack.

The weakness of NIKE-ZEUS is due to the fact that it can deal only with certain limited classes of attack. Since the lead-time to achieve deployment for as little as 12 batteries to contribute to the defense of 6 cities is estimated to be 6 years, and since our deployment plans, once adopted, will not remain secret, the USSR can fully adapt its missile force to circumvent any effective active defense by NIKE-ZEUS. We note here that the present weight-carrying capacity of Russian ICBM is ample to permit incorporation of penetration aids to fully defeat NIKE-ZEUS. Although we have no intelligence information concerning the USSR penetration aids program, we have no doubt that the long

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lead-time in NIKE-ZEUS deployment would make such a development feasible and extremely likely.

Due to lack of specific information on the penetration aids available for USSR missiles, it is customary, although not fully relevant, to describe the effectiveness of NIKE-ZEUS against the present and planned U.S. missile force. The generally agreed conclusions are that NIKE-ZEUS is:

(a) effective against missiles not equipped with penetration aids. In such a class are operational ATLAS, TITAN I, MINUTEMAN (Wing 1) and POLARIS A1 and A2. However, the degree of effectiveness depends even within this class of missiles on the number of missiles and the degree of synchronism in an AICBM attack vs. the number of NIKE-ZEUS deployed and the reliability of the defensive system. E.g., a city defense of two batteries of 12 missiles--each of overall reliability as high as 80%--would still have a 40% probability of being penetrated by a 12-missile synchronized salvo.

(b) marginal against ATLAS E and F retrofitted with penetration aids weighing 250 lbs as is planned by the U.S. Such an attack might require as many as 12 NIKE-ZEUS missiles per attacking missile; or even a larger number if tank fragments cannot be identified. Effectiveness would also be marginal against the MINUTEMAN MARK II nose cone if the present program of radar cross section reduction is successful.

(c) ineffective against any ICBM which can make at least 500 lbs or so of its payload available for electronic countermeasure devices and decoys. TITAN II clearly offers such an option. NIKE-ZEUS is also ineffective against very high megaton warheads if only elementary penetration aids are used.

As the result of these considerations this Panel believes that large-scale production of NIKE-ZEUS is not now justified nor do we believe that it is likely to be justified in the foreseeable future. The Panel has examined the limited

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deployment plan as proposed by DOD and wishes to make the following general comments; specific comments concerning the reasons for limited deployment are appended.

1. Although the Panel is not necessarily opposed to a limited deployment plan as such, it concludes that neither the size of the proposed plan (12 batteries of twice the strength of each of the 70 batteries proposed by NORAD as full deployment) nor its slow time scale (6 years) is supported by the stated reasons for partial deployment.
2. Discussions indicate that the size of the plan as presented is simply related to an arbitrary level of funding which might be considered reasonable at this time (3 billion dollars + 1 billion dollars for fissionable materials through FY 1967--R&D not included).
3. Some of the reasons for limited deployment (protection of the seat of government against attack by accident and response toward the psychological impact of Soviet claims of having an effective AICBM) would support a much shorter time scale program of procuring NIKE-ZEUS protection for one or two cities (Washington D.C. or possibly New York).
4. A possible objective to initiate production, site selection and training activities now would be to retain an "option to buy" deployment of NIKE-ZEUS at a later time with smaller lead time. Although the Panel has not had the opportunity to examine this question in detail, it has the impression that the program as proposed is in excess of the minimum requirements to establish such lead-time shortening activities.
5. The Panel urges that, whatever decisions are taken on the question of limited procurement of an operational NIKE-ZEUS, the plans should permit maximum effort for further research and development. Such work should include both projects compatible with the present NIKE-ZEUS as well as systems which are in effect a new system.

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APPENDIX: Discussion of Limited Deployment Objectives

Reasons for proposing limited deployment of NIKE-ZEUS proposed by DOD are the following:

1) The Possibility of Enemy Weakness and Error

This argument seems to us to be a weak one for partial or full deployment of NIKE-ZEUS since the long procurement time makes it relatively straightforward for the USSR to adjust its force level and penetration aids program to defeat NIKE-ZEUS. The most likely inadvertent weakness of Soviet ICBM would result in large kill radii of AICBM vs. ICBM (as has been discovered in the case of the U.S. ICBM force). However, NIKE-ZEUS is not designed to capitalize on large kill radii; rather its limitations are related to its traffic handling ability and anti-missile performance.

2) The Confidence Level of Decision Makers

Although the effect of six-city limited deployment of NIKE-ZEUS will complicate attack strategy somewhat, this effect is not a very large one considering the long production lead-time and the large flexibility available to the Soviets to defeat NIKE-ZEUS.

3) Diversion of Offensive Forces

Limited deployment of NIKE-ZEUS would force the Soviet Union to re-program a fraction of its strategic missile force. However, repeated studies have indicated that this can be accomplished at considerably less cost to the Soviets than the cost to the U.S. to deploy NIKE-ZEUS. The net result of deployment of NIKE-ZEUS is thus a higher level of the USSR strategic ICBM force.

4) Defense against Secondary Threats

a. Blackmail by small powers

It appears to us that blackmail by secondary powers, using simple ICBM forces, can only be resisted by full deployment of AICBM or by threat of retaliation, but not by limited deployment of NIKE-ZEUS. If six cities are protected,

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the threat can be directed against the seventh. A single warhead of moderate yield would inflict comparable casualties within a large city as within a smaller one; hence, the limited deployment would not reduce casualties under a small attack.

b. Accidental attack

If an accidental attack of a Soviet ICBM occurs targeted against a U.S. city, then limited deployment might offer some measure of protection for the particular cities. However, this possibility seems to us to call in particular for protection of Washington, D. C., at the earliest possible date in order to protect the seat of government and thus assure a more rational response.

5) A Counter to Soviet Anti-Missile Development

This motive for limited deployment of NIKE-ZEUS is one of psychological counter-attack to Soviet demonstrations of an AICBM. However, this purpose seems to us to be better served by successful R&D demonstrations (such as the Kwajalein tests) or by fast deployment plans to protect our largest city (New York) or the seat of government (Washington, D.C.) rather than replying: "We are going to protect six particular cities six years from now."

Other reasons for proposing limited deployment of NIKE-ZEUS not specifically discussed in the DOD proposal:

6) Field Experience with an Operational AICBM

Clearly an AICBM system deployed to protect a city and manned by regular troops will give valuable operational experience. However, this objective seems to call for deployment of one or two batteries at the earliest possible date rather than the indicated plan.

7) Denial to the USSR of a Highly Mobile Second-Strike ICBM Force

If, by reason of improved U.S. intelligence activity (e.g., SAMOS), the Soviets are led to adopting a lightweight second strike force (such as MINUTEMAN or POLARIS), then the corresponding re-entry vehicles would be vulnerable to

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AICBM attacks from large miss-distances. However, NIKE-ZEUS is not the appropriate system to capitalize on such a possibility since it is basically a high-accuracy intercept system.

8) The Use of AICBM (NIKE-ZEUS) in an Arms Control Environment

If arms-control measures were agreed upon, then the role played by AICBM would depend on the nature of the proposed measures.

Specifically, if (as has been the prevalent U.S. opinion) initial arms control steps would involve reduction of strategic forces to a level of minimum deterrence, then deployment of AICBM would be de-stabilizing--i.e., it would force the level for such minimum deterrence up.

If an arms limitation agreement would involve complete elimination of ICBM forces, then deployed AICBM would offer some degree of protection against small clandestine ICBM retained by the parties. However, as in other problems involving limited attack as discussed under (4) above, this possibility is difficult to relate to the specific limited deployment plan.

9) Reduction of lead-time for Future more Complete AICBM Deployment

Although the Panel has not examined this question in detail, it has the impression that the program proposed is in excess of the minimum requirements for this purpose.

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DISTRIBUTION:

1A: S. Keeny
2A: J. Wiesner
3A: W. Panofsky

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SUMMARY TABLE

#	Deployment related to:	Argument for 6-city deployment (DOD plan)	Argument for 1-2-city deployment on fast time scale	Remarks
1	Enemy error	poor	poor	
2	Enemy decreased confidence	poor	poor	May be argument for full deployment
3	Diversion of forces	poor	poor	
4a	Blackmail by secondary power	poor	poor	
b	Accident	poor	fair	May be an argument for full deployment
5	Propaganda response to Soviet AICBM	poor(?)	fair (?)	May be argument for full deployment
6	Field experience	poor(?)	fair	
7	Denial of Soviet Light warhead ICBM	poor	poor	Calls for simpler type of AICBM system
8	Arms Control	poor	fair under special circumstances	
9	"Option to buy" full deployment	Depends on detailed production plan; lower prod. rate may be sufficient	poor	

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