

SECRET

DECLASSIFIED	
Authority	NLE 97-9 #1
By	MLK NLDDE Date 6/27/11

b

CHRONOLOGICAL HISTORIES
OF
ARMY SURFACE TO AIR MISSILES
AS OF
1 MARCH 1958



AIR DEFENSE DIVISION
OFFICE CHIEF OF RESEARCH AND DEVELOPMENT

RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET

~~SECRET~~

HAWK
CHRONOLOGICAL HISTORY

- 2 Jan Deputy ACoFS, G-3, DA, initiated preliminary investigations for a homing-all-the-way missile system.
51
(U)
- Jan ACoFS, G-4, requested that Chief of Ordnance initiate preliminary plans for a homing-all-the-way missile system.
51
(U)
- Mar Fairchild Engine and Airplane Corporation was awarded a contract for a feasibility study of a homing-all-the-way system.
51
(U)
- Apr R&D Board, DOD, stated that Army should proceed with R&D of a homing-all-the-way system.
51
(U)
- 14 Jun OCAFF forwarded to ACoFS, G-4, military characteristics for a low altitude surface-to-air guided missile and recommended that a project be initiated to develop a system to meet these requirements.
51
(U)
- 18 Jul Secretary of the Army forwarded specific recommendations regarding HAWK (Homing-all-the-way-Killer) to the Secretary of Defense.
51
(U)
- 18 Jul OSD recommended to Chairman, RDB, that Army proceed with HAWK project and that funding be approved.
51
(U)
- Sep Secretary of Defense notified Secretary of the Army of approval of HAWK project.
51
(U)
- Sep ACoFS, G-4 directed Chief of Ordnance to conduct HAWK development program.
51
(U)
- 15 Sep Final feasibility study report published by Fairchild Corporation.
51
(U)
- 11 Mar Redstone Arsenal recommended to CofOrd that action be deferred on Fairchild seeker proposal.
52
(U)



~~SECRET~~

HAWK HISTORY

- 20 Aug 57 (C) Based on tests of three methods of loading HAWK missiles, and a unanimous choice of the tracked loader by CONARC, Ordnance and Marine Corps representatives, the tracked loader was released to production.
- Jun-57 (S) Engineer model HAWK ground equipment was shipped to White Sands Proving Ground for the engineering model system demonstration to be conducted in December 1957 and January 1958.
- Sep 57 (S) The feasibility of providing a fractional KT special warhead compatible with the modified HAWK missile was concluded and a readiness date for an atomic missile of Spring of 1961 was established.
- 5 Sep 57 (S) With the concurrence of Chief of R&D, Chief of Ordnance initiated development of XM-90 AK to provide atomic capability for HAWK.
- 23 Sep 57 (C) Chief of Ordnance approved Redstone Arsenal recommendation that Sanders project DARE be terminated.
- 23 Sep 57 (U) Ordnance approved purchase of one Craig shelter to house Battery Control Center equipment. This shelter will replace XM153 and provide a control center that will be helicopter transportable.
- 7 Oct 57 (U) Phase II Feasibility Study forwarded to Chief of R&D by Chief of Ordnance.
- 14 Oct 57 (S) A release of aerajet single chamber motor, as an alternate design, was made to Industrial Division of Office, Chief of Ordnance. A transition from dual chamber to single chamber production was brought about by this release.
- 20 Nov 57 Chief of Ordnance authorized Redstone Arsenal to modify HAWK system to accommodate an atomic warhead.
- 25 Nov 57 (S) FY 58 HAWK procurement program approved by ASA (LOG). Included were 176 missiles and 10 battery sets. TOTAL \$41,000,000.
- 17 Dec 57 (C) First firing of system feasibility demonstration resulted in direct hit against QB-17 drone at 12 miles and 500 feet altitude.



SECRET

HAWK HISTORY

- 20 Dec Phase III development of an atomic warhead installation
57 approved by CCAE.
(S)
- 31 Dec CCAE has forwarded DOD request for Phase III development
57 of an atomic warhead for HAWK to Atomic Energy Commission
(S) through Military Liaison Committee.
- 14 Feb HAWK facilities projects in amount of \$14,500,000 approved
58 by ASA (LOG).
(S)
- 1 Apr System demonstration tests scheduled for completion.
58
(C)



RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET

LAND-BASED TALOS HISTORY

- 25 Apr 57 (C) The Secretary of Defense: (1) Directed the Air Force to make available \$20.0 million as the final Air Force contribution, (2) directed the Army to adjust the program so that effort requiring Army FY 58 funds would be limited to about \$35.0 million to be reprogrammed from the NIKE program, (3) directed the Army to submit a statement outlining the scope of progress by fiscal year for obtaining approximately 25 TALOS defense units.
- 1 Jul 57 (U) Army assumes responsibility for funding TALOS land-based system.
- 3 Jul 57 (C) Army signs contract with Radio Corporation of America, Moorestown, N.J., for documentation of the performance of the land-based TALOS unit at White Sands Proving Ground. This is the first phase of the evaluation program and is scheduled for completion by 1 September 1958.
- 1 Oct 57 (U) TALOS unit at White Sands Proving Ground was completed and turned over to Army by Navy.
- 15 Oct 57 (U) Formal turnover of TALOS unit from Chief, Bureau of Ordnance, Navy, to Chief of Ordnance, Army. Evaluation of the system is now in progress.
- 13 Dec 57 (C) First missile fired from land-based TALOS unit. Firing was a success. B-17 drone destroyed by direct hit.
- 23 Dec 57 (C) The Chief of Research and Development instructed the Chief of Ordnance to terminate production order for 16 missiles intended for the improvement program, in order to recover approximately \$5,000,000 for use in continuing the evaluation program.



RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET

- Jan Planning and programming for engineering tests,
58 user tests, and other development, except for com-
(C) pletion of the evaluation tests, terminated.
- Jan Army proposed the use of TALOS together with NIKE-
58 ZEUS to provide an earlier anti-ICBM capability.
(S) TALOS was recommended for second priority behind
NIKE-ZEUS.
- Feb A TALOS 6 bw missile, fired from the land-based
58 system against a QF-80 drone at 95,000 yards and
(C) 20,000 feet altitude (MSL) with a 30-foot miss
distance.



RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET

NIKE-AJAX
HISTORY

- 4 Mar Troop test of NIKE-AJAX initiated to determine suitability of NIKE-AJAX for accomplishment of its tactical mission with a field Army, to determine adequacy of TO&E, and to determine validity of current operational and tactical doctrine.
57
(C)
- 4 Apr Chief of Ordnance instructed not to procure T48E3 frangible booster for operational use.
57
(C)
- 6 Apr Troop Test of NIKE-AJAX completed.
57
(C)
- 24 Apr DA publishes the plan that established the concept, organization and responsibilities for the support of atomic warheads employed with NIKE-HERCULES missiles in CONUS.
57
(S)
- 2 May CINCONAD approved three additional Missile Master sites at Detroit, Buffalo, and New York.
57
(S)
- Jun USARADCOM reorganization plan implemented, removing logistical and administrative activities from the battalion and consolidating these activities at the AA Group level. This action will reduce the NIKE manpower requirements in CONUS approximately 8 per cent.
57
(C)
- 24 Jun NIKE-AJAX cluster warhead program terminated. This action was due to lack of funds necessary to continue development and test of this new warhead.
57
(C)
- 30 Jun 61 NIKE-AJAX battalions on-site operational defending 24 US cities and key installations.
57
(S)
- 57 Air Defence School NATO training program begins. This program will provide for the activation of 10 HERCULES battalions by 7 different NATO countries.
(S)
- Sep 57 Final NIKE-AJAX tactical ground set rolled off production line. A total of 350 NIKE-AJAX ground sets were produced.
(S)
- 16 Oct NIKE-AJAX user test program terminated.
57
(C)



~~SECRET~~

NIKE-AJAX
HISTORY

- 1 Nov 57 (S) The first of six US NIKE battalions in Europe becomes operational in theater. The remaining five battalions will be operational on-site by 15 February 1958. These six battalions were obtained through conversion of existing 7th Army gun battalions.
- 2 Dec 57 (C) Missile Master Site Nr 1 at Fort George G. Meade, Maryland, becomes the first operational air defense center in the free world to use electronic data computing processing and display.
- Feb 58 (C) Initial phases of WSEG countermeasures. Tests of NIKE-AJAX conducted at White Sands Proving Ground and Fort Bliss.



SECRET

SECRET

NIKE ZEUS
CHRONOLOGICAL HISTORY

- May
1946
(C) The Army recognized the need for defense against a ballistic missile carrying a nuclear warhead. Stillwell Board recommended development of such a defense system.
- Jan
1949
(C) A formal requirement for a surface-to-air missile system for ballistic missile defense was established.
- Feb
1955
(S) NIKE-ZEUS feasibility studies initiated at Bell Telephone Laboratories. The studies were to determine the feasibility of fulfilling the requirement for an advanced weapon system to combat the air threat in the 1960 to 1970 decade.
- 5 Jul
1955
(S) The Chief of Research and Development directed the Chief of Ordnance to modify the requirement of the feasibility study so as to consider the ICBM as the prime target of the NIKE-ZEUS.
- 27 Jan
1956
(C) As a result of the recommendations of the Killian Committee (Technological Capabilities Panel), Department of Defense approved release of \$4 million of FY 1956 appropriated R&D funds for component development and experimental work on anti-missile missiles. These funds were made available from a larger amount temporarily withheld by Bureau of Budget pending results of Killian Committee reports
- 2 Mar
1956
(S) The Chief of Research and Development directed the Chief of Ordnance to include in the NIKE-ZEUS studies a study of the feasibility of obtaining an early anti-ICBM capability, in 1960 or 1961, with a modified NIKE-HERCULES system.
- 13 Jun
1956
(C) The final report of the Skifter Committee (DOD Ad Hoc Group on Anti-ICBM) was published. This report concluded that an anti-ICBM system was feasible of development. The committee recommended that research and development on acquisition radars should be conducted and that quick fixes should not be further considered.
- 5 Jul
1956
(S) The Assistant Secretary of Defense, R&E, authorized the obligation of FY 1957 Army R&D funds in the amount of \$9 million for Project NIKE-ZEUS. The program execution was to be in accordance with recommendations of the Skifter Committee. The study on the feasibility of attaining an early capability with NIKE-HERCULES was to be conducted as a part of Project NIKE-ZEUS.



Restricted Data, Atomic Energy Act, 1954
Regraded SECRET NOT RESTRICTED DATA when
separated from Page 4 of NIKE-ZEUS History.

Regrading Data Cannot
be Predetermined.

SECRET

NIKE-ZEUS
HISTORY

30 Sep
1956
(S)

NIKE-ZEUS feasibility study completed. The study concluded it was feasible to provide an anti-ICBM defense with the NIKE-ZEUS system. If development of this system were funded at maximum rate the first operational capability could be obtained in late CY 1962 under a normal production program.

25 Oct
1956
(S)

The Department of Defense Anti-ICBM Committee was notified of the following possible schedules for NIKE-ZEUS.



<u>Operational Availability Date</u>	<u>Maximum Rate Funding</u>	<u>Budget Limited Funding</u>
1. Early anti-ICBM Capability (75nm range, 130,000 ft altitude)	4th Qtr CY 62	3rd Qtr CY 65
2. Full high altitude anti-ICBM capability. (75 nm range, 500,000 ft altitude)	4th Qtr CY 63	2nd Qtr CY 67
3. Extended range anti-aircraft (manned and unmanned capability)	4th Qtr CY 64	1st Qtr CY 69

1 Nov
1956
(S)

As a result of the successful completion of the feasibility studies and of the successful component and experimental work conducted on NIKE-ZEUS the decision was made to initiate system development. Accordingly, the Army directed full system development of NIKE-ZEUS in a phased program. This program was to have three objectives:

1. To develop an early ICBM capability to 130,000 feet altitude and 75 nautical miles range.
2. To develop a full anti-ICBM capability to 500,000 feet altitude and 75 nautical miles range, and
3. To develop an extended range capability against aircraft, manned or unmanned, to 200 nautical miles range.

The study on the feasibility of attaining an early anti-ICBM capability with NIKE-HERCULES was terminated, since under contemplated budgets the attainment of a NIKE-HERCULES capability would interfere with the attainment of a much greater capability in nearly the same time with NIKE-ZEUS.

SECRET

NIKE-ZEUS HISTORY

- 4 Feb 1957 (S) The Army requested the apportionment of \$10.7 million dollars FY 1957, DOD emergency funds to raise the FY 1957 NIKE-ZEUS effort to maximum rate. This level of funding was required to assure a 4th quarter CY 1962 operational availability date, provided maximum rate funding could be provided in the following years. The request for emergency funds was not honored.
- 7 Feb 1957 (S) First successful firing of spherical thrust vectoring motor.
- 19 Feb 1957 (S) The Department of Defense Anti-ICBM Committee was notified that planned funding for NIKE-ZEUS would provide for operational availability in 1965. Planned FY 1958 funding, as of this date, was \$26 million (\$12 million R&D, and \$14 million R&P,A.) (NOTE: Although \$14 million R&P,A. in support of ZEUS was planned at the time of the briefing, the DCSLOG on 1 February had unilaterally programmed \$25 million of R&P,A. funds for procurement of ZEUS items. The \$25 million is the money now in the FY 1958 ZEUS program.)
- 20 Feb 1957 (S) First successful firing of large scale sustainer motor.
- 6 Apr 1957 (S) The Assistant Secretary of Defense (R&D) requested the Atomic Energy Commission to cooperate with the Army and Armed Forces Special Weapons Project in a Phase II feasibility study on the NIKE-ZEUS warhead.
- 25 Apr 1957 (S) The Department of Defense Anti-ICBM Committee recommended, with Secretary of Defense approval, that the Army continue anti-ICBM missile system development at a level about that planned. Secretary of Defense approval of this Committee action required that the Secretary of the Army specifically approve the planned FY 1958 program. In addition this committee report provided that:
- a. The Air Force develop the anti-ICBM early warning.
 - b. The Air Force carry out research and development on the advanced acquisition radars required by the active anti-ICBM system and study the communications between these radars and the active portion of the system.



NIKE-ZEUS
HISTORY

c. That the Army develop the local acquisition and target tracking radars required by the active portion of the anti-ICBM defense system and the defensive missile itself, and

d. That an anti-ICBM Coordinating Agency be established to coordinate Army and Air Force efforts in this field.

16 Aug
1957
(S)

The Secretary of the Army approved the planned FY 1958 NIKE-ZEUS program. This program required the obligation of \$12 million FY 58 R&D and \$25 million FY 58 P&P, A funds. This FY 58 program was consistent with fourth quarter CY 1963 operational availability of NIKE-ZEUS.



5 Sep
1957
(S)

The Secretary of the Army recommended that the Secretary of Defense support a national priority for the anti-ICBM development program equivalent to the priority accorded the ICBM development, and that additional funds be made available to the Army to accelerate research and development of NIKE-ZEUS.

16 Sep
1957
(SRD)

The joint AEC-DOD study of the NIKE-ZEUS warhead completed. The study concluded that it was feasible to develop a warhead for ZEUS capable of killing ICBM warheads and that the warhead could be available by 1961.

1 Oct
1957
(S)

First successful test of scale Luneberg lens for acquisition radar.

4 Oct
1957
(S)

Office, Chief of Ordnance directed Picatinny Arsenal to begin development of an adaption kit for the NIKE-ZEUS warhead.

10 Oct
1957
(S)

The Army studies indicated that under an accelerated program wherein the production of tactical ZEUS equipment would be undertaken concurrently with the manufacture and test of the prototype that an operational on-site defense of CONUS could be provided on the following schedule:

NIKE-ZEUS
HISTORY

Estimate Cumulative
Cost

<u>Early Capability</u>	3 batteries by end CY 1961 30 batteries by end CY 1962	\$2.0 billion
<u>Full Capability</u>	100 batteries by end CY 1965	4.0 billion
<u>Extended Range Capability</u>	100 batteries by mid-CY 1966	6.0 billion

- 28 Oct 1957 (S) The Department of Defense apportioned to the Army \$660 million of FY 1958 P&P,A funds. \$25 million of these funds were for support of the NIKE-ZEUS development; however, obligation of these funds was subject to the specific approval of the Special Assistant for Guided Missiles.
- 6 Nov 1957 (S) The Army requested that the Special Assistant for Guided Missiles authorize the obligation of \$25 million FY 58 P&P,A funds for the support of the NIKE-ZEUS development.
- 15 Nov 1957 (S) The Special Assistant for Guided Missiles authorized the obligation of \$25 million P&P,A funds. At this time the Army was able to obligate the total \$37 million required for the FY 58 NIKE-ZEUS program.
- 26 Nov 1957 (C) Dr. H. B. Skifter, Chairman of the DOD anti-ICBM Coordinating Agency, was notified of the schedules and costs of the accelerated NIKE-ZEUS program.
- 27 Nov 1957 (S) The Chief of Research and Development informed the Assistant Secretary of Defense (R&D) of Army FY 59 funding requirements for Research and Development. Included was a statement of FY 58 and 59 required Research and Development funding for the NIKE-ZEUS accelerated program.
- 29 Nov 1957 (S) The Chief of Research and Development informed Dr. Killian, Special Assistant to the President for Science and Technology, of the Army FY 59 funding requirements. This included a statement of the FY 58 and FY 59 required research and development funding for the NIKE-ZEUS accelerated program.



NIKE-ZEUS
HISTORY

- 15 Dec 1957 (S) The Army informed the WSEG of the accelerated ZEUS program schedule and costs for use by WSEG in their study of the Continental Air Defense objectives plan. These schedules and costs were later published in WSEG Report No. 33.
- 16 Jan 1958 (U) The Secretary of Defense directed the Army to continue the current development of NIKE-ZEUS as a matter of urgency. By separate memorandum the Air Force was directed to continue that portion of its NIKE-ZEUS program pertaining to early warning and acquisition and tracking radars and was also further directed not to continue its effort on the missile system proper.
- 22 Jan 1958 (S) The National Security Council assigned a national priority to the anti-ICBM effort equivalent to the priority assigned to the ICBM and IRBM effort.
- 27 Jan 1958 (S) By letter, the Chairman of the House of Representatives Armed Services Committee, was informed of the fund requirements for the NIKE-ZEUS accelerated program. The funds included \$136 million additional FY 58 funds required and a total of \$613 million FY 59 funds.
- 28 Jan 1958 (S) The Director of R&D, Army, informed the Director of Guided Missiles of Army recommendations for the attainment of an early defense against ballistic missiles. These recommendations were:
 - a. As first priority, fund for the NIKE-ZEUS accelerated program.
 - b. As second priority, if funds over requirements for both the NIKE-ZEUS accelerated program and the NIKE-HERCULES program are available, fund for the procurement of 25 TALOS detachments and initiate development and tests of the TALOS AICBM modifications.
- 29 Jan 1958 (U) The Chairman of the House Armed Services Committee, Repr. Carl Vinson, recommended to the Secretary of Defense that he:
 - a. Assign to the Army operational responsibility for NIKE-ZEUS, and



NIKE-ZEUS
HISTORY

b. Make available to the Army \$136 million FY 58 funds for the accelerated deployment of NIKE-ZEUS.

- 3 Feb 1958 (S) The Deputy Secretary of Defense and the Director of Guided Missiles, OSD, were briefed on the FY 58 fund requirements for the accelerated program. A recommendation that \$136 million of FY 58 funds be made available to the Army for the acceleration of NIKE-ZEUS was made to the Deputy Secretary of Defense.
- 7 Feb 1958 (U) The Secretary of Defense established the Department of Defense Advanced Research Projects Agency for the direction and performance of certain advanced research and development projects. Mr. Roy W. Johnson, a vice president of General Electric Company, was appointed as Director. The agency is to be effective 1 Apr 58.
- 12 Feb 1958 (U) The Director of Guided Missiles dissolved the anti-ICBM Coordinating Agency since the Army, by the 16 January Sec/Def memorandum, had been given development responsibility for the active portion of the anti-ICBM defense system.
- 14 Feb 1958 (U) The Secretary of Defense; the Director of Guided Missiles, OSD; the Secretary of the Army; and the Vice Chief of Staff of the Army had a conference with the Chairman of the House of Representatives Armed Services Committee with respect to his recommendation for the accelerated deployment of NIKE-ZEUS. At this conference the Secretary of Defense promised Chairman Vinson that he would give an answer to his recommendation by 15 Apr 58.
- 20 Feb 1958 (S) The Director of Guided Missiles constituted an Ad Hoc Anti-ICBM Study Group under the chairmanship of Dr. H. R. Skifter, Special Assistant to the Assistant Secretary of Defense, R&E. This group was to study means to attain an early defense against ballistic missiles. The Army briefed this group on the accelerated NIKE-ZEUS program and on the TALOS Anti-ICBM program. The Army recommended that as first priority the NIKE-ZEUS deployment should be accelerated, and as second priority, an early limited capability with TALOS should be provided.
- 26 Feb 1958 (S) Army Ordnance and contractor personnel briefed the DOD Decoy Discrimination Group on the anti-decoy capability of NIKE-ZEUS and on Army supporting research projects in the decoy discrimination field.



SECRET

NIKE-HERCULES HISTORY

- 28 Oct 57 (C) The DOD comptroller released to the Army an FY 58 P&P, A apportionment increment which included funds applicable to the NIKE-HERCULES program, and directed that NIKE-HERCULES funds should not be obligated pending resolution of (1) the point versus area defense problem, and (2) the problem of supporting the TALOS industrial program.
- 13 Nov 57 (S) As of this date 91 HERCULES missiles have been fired in system evaluation program at White Sands Proving Ground. Of this, 20 have been solid propellant missile type with no failures attributed to the propulsion system itself. Percent of successes to date is approximately 62%. The NIKE-HERCULES R&D evaluation program should be completed in June 1958.
- 15 Nov 57 (S) ASD (Compt) deferred 48 of the 96 NIKE-HERCULES battery sets and \$11.6 million of ORD-6 test equipment, pending determination of the scope of this program by Secretary of Defense.
- 22 Nov 57 (C) T-46 cluster warhead released for limited procurement.
- Late 57 (S) Joint Chiefs of Staff approved new NIKE-HERCULES deployments for Dallas, Fort Worth, Kansas City, St. Louis, Cleveland, Minneapolis, and St. Paul.
- 27-29 Nov 57 (S) Dr. Foote, ASD (R&E) and Dr. Killian, Special Assistant to the President, informed of need for an additional \$2.5 million R&D funds in FY 59 for NIKE-HERCULES program.
- 29 Nov 57 (S) ASA (LOG) approved first partial FY 58 NIKE-HERCULES program (\$175 million) to provide 1000 missiles, 48 battery sets, and ORD-6 test equipment.
- 6 Dec 57 (C) Chief of Ordnance was directed to initiate development of frangible booster for NIKE-HERCULES contingent upon availability of funds. Funds are to be made available by Deputy Chief of Staff for Logistics to permit development of this item.



RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET

SECRET

- 30 Dec Funds made available by Deputy Chief of Staff for
57 Logistics to permit initiation of development of
(C) new frangible booster for NIKE-HERCULES.
- 30 Jan ASD (Compt) removed deferrals placed on the NIKE-
58 HERCULES program 15 Nov 57.
(S)
- Jan ASA (LOG) approved second partial FY 58 program in
58 amount \$45.26 million, providing 541 additional
(S) missiles.
- Feb Initial phases of WSEG countermeasure tests of the
58 NIKE-HERCULES system conducted at White Sands Prov-
(C) ing Ground and Fort Bliss.
- 15 Feb 111 HERCULES missiles fired to date. 44 were solid
58 propellant version. 61% considered successful.
(S)
- Feb ASA (LOG) approved the third partial FY 58 program
58 for remaining 48 battery sets and remainder of ORD-6
(S) test equipment.



RESTRICTED DATA
ATOMIC ENERGY ACT - 1954

SECRET