

THIS FILE IS MADE AVAILABLE THROUGH THE DECLASSIFICATION EFFORTS AND RESEARCH OF:

# THE BLACK VAULT

THE BLACK VAULT IS THE LARGEST ONLINE FREEDOM OF INFORMATION ACT / GOVERNMENT RECORD CLEARING HOUSE IN THE WORLD. THE RESEARCH EFFORTS HERE ARE RESPONSIBLE FOR THE DECLASSIFICATION OF THOUSANDS OF DOCUMENTS THROUGHOUT THE U.S. GOVERNMENT, AND ALL CAN BE DOWNLOADED BY VISITING:

[HTTP://WWW.BLACKVAULT.COM](http://www.blackvault.com)

YOU ARE ENCOURAGED TO FORWARD THIS DOCUMENT TO YOUR FRIENDS, BUT PLEASE KEEP THIS IDENTIFYING IMAGE AT THE TOP OF THE .PDF SO OTHERS CAN DOWNLOAD MORE!



**DEPARTMENT OF THE NAVY**  
NAVAL AIR WARFARE CENTER, AIRCRAFT DIVISION  
OFFICE OF COUNSEL  
47076 LILJENCRA NTZ ROAD, BLDG 435  
PATUXENT RIVER, MD 20670-1127

IN REPLY REFER TO

5720  
Ser NAVAIR-11.5C/FD09-0366  
28 June 2010

Mr. John Greenwald, Jr.



Dear Mr. Greenwald,

This letter is in final response to your 22 June 2010, Freedom of Information Act (FOIA) request for a copy of a document entitled "Further Comments on the Feasibility of Airlaunched Anti-Satellite Weapons Systems" dated March 1959, accession number AD311800. Your request and the responsive document was forwarded to Naval Air Warfare Center Weapons Division, China Lake, CA for coordination on the releasability.

We conducted a classification review of the "Further Comments on the Feasibility of Airlaunched Anti-Satellite Weapons Systems" dated March 1959, accession number AD311800 and determined it is no longer classified. The document has been formally declassified and is releasable in its entirety.

All cost associated with the processing of your request is waived because they do not exceed \$15.00.

Should you have any questions or concerns I can be reached at (301) 342-9564.

Sincerely,

*/s/ Ruth Yates*

RUTH B. YATES  
Freedom of Information Coordinator  
Naval Air Systems Command Headquarters  
47076 Liljencrantz Road, Bldg. 435  
Patuxent River, MD 20670  
Voice (301) 342-9564  
Fax (301) 342-1292  
ruth.yates@navy.mil

~~CONFIDENTIAL~~

AD311800

# FURTHER COMMENTS ON THE FEASIBILITY OF AIRLAUNCHED ANTI-SATELLITE WEAPON SYSTEMS (U)

BUREAU OF AERONAUTICS (NAVY) WASHINGTON DC

MAR 1959

Distribution authorized to U.S. Gov't. agencies only; Test and  
Evaluation; 01 JUN 1972. Other requests shall be referred to  
Commander, Naval Air Systems Command, Attn: AIR-503, Washington,  
DC 20360. Document partially illegible.

Declassified on June 28, 2010 in accordance with OPNAVINST 5513.16, enclosure (2)  
instructions derived from cited document by NAVAIR AIR-741 (Security).

Barbara J. Vaughan  
Security Specialist

~~CONFIDENTIAL~~

Enclosure (2)





## **Redistribution Of DTIC-Supplied Information Notice**

All information received from DTIC, not clearly marked "for public release" may be used only to bid on or to perform work under a U.S. Government contract or grant for purposes specifically authorized by the U.S. Government agency that is sponsoring access OR by U.S. Government employees in the performance of their duties.

Information not clearly marked "for public release" may not be distributed on the public/open Internet in any form, published for profit or offered for sale in any manner.

Non-compliance could result in termination of access.

## **Reproduction Quality Notice**

DTIC's Technical Reports collection spans documents from 1900 to the present. We employ 100 percent quality control at each stage of the scanning and reproduction process to ensure that our document reproduction is as true to the original as current scanning and reproduction technology allows. However, occasionally the original quality does not allow a better copy.

If you are dissatisfied with the reproduction quality of any document that we provide, please free to contact our Directorate of User Services at (703) 767-9066/9068 or DSN 427-9066/9068 for refund or replacement.

**Do Not Return This Document To DTIC**



~~CONFIDENTIAL~~

AD. 3 1 1 8 0 0

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



~~CONFIDENTIAL~~

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

NOTICE:

THIS DOCUMENT CONTAINS INFORMATION  
AFFECTING THE NATIONAL DEFENSE OF  
THE UNITED STATES WITHIN THE MEAN-  
ING OF THE ESPIONAGE LAWS, TITLE 18,  
U.S.C., SECTIONS 793 and 794. THE  
TRANSMISSION OR THE REVELATION OF  
ITS CONTENTS IN ANY MANNER TO AN  
UNAUTHORIZED PERSON IS PROHIBITED  
BY LAW.

UNANNOUNCED

# NAVY DEPARTMENT

## BUREAU OF AERONAUTICS

WASHINGTON, D. C.



311800

RESEARCH DIVISION REPORT NO. DR-1971

STANDARDIZATION OF AERONAUTICAL TERMINOLOGY

DOWNGRADING TO UNCLASSIFIED  
NOT AUTOMATICALLY DECLASSIFIED  
DOD DIR 5200.10

Qualified requesters may obtain  
copies of this report direct from  
DDC. Foreign annexes and the  
dissemination of this report by  
DDC is not authorized.

March 1959

DDC  
RECEIVED  
SEP 4 1964

### WARNING

This material contains information affecting the  
national defense of the United States within the meaning of the  
espionage laws, Title 18, U.S.C., Sections 793 and 794, the  
transmission or revelation of which in any manner to an  
unauthorized person is prohibited by law.

DDC-IRA A

~~CONFIDENTIAL~~

DR-1971

## INTRODUCTION

In the never ending military game of achieving and maintaining operational superiority, the advent of the space age and its by-product, the earth satellite, has created the necessity for determining requirements for the development of anti-satellite weapon systems. Studies relating to this subject are being strongly prosecuted by the military establishment. This report will discuss in very broad terms the concept of one type of satellite defense, namely an airlaunched version employing both carrier and water-based aircraft as manned, recoverable stages. The feasibility of such a system will be examined in broad context, more with the idea of stimulating thought than with the preliminary design of a weapon system.

~~CONFIDENTIAL~~



~~CONFIDENTIAL~~

DR-1971

SUMMARY AND CONCLUSIONS

A brief investigation has been made of two modes of airlaunching anti-satellite missiles, one utilizing carrier-based concepts, the other utilizing a seaplane platform.

The scope of the investigation was not intended to be detailed enough to draw technically sound conclusions. It appears however, that in broad context, and in the sense of current related analyses, that the requirements of satellite interceptor systems make the use of sea basing combined with air-launching most attractive. Additional study is indicated to more properly ascertain the framework in which a Naval application can function.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

DR-1971

RECOMMENDATION

It is strongly recommended that a study program be expeditiously undertaken to examine in greater detail the basic systems outlined herein. The additional work is absolutely essential to establish, with a high level of technical confidence, the feasibility of the weapon system to support future planning or programming. Prompt action is predicated by the need to keep abreast of the development of the systems to be countered. The consequence of delay is significantly indicated by the status of the current anti-ICBM effort, now barely underway, whereas its target objective, the ICBM, is practically operational.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

DR-1971

## DISCUSSION

The development of an anti-satellite weapon system presents itself as a most formidable problem fraught with technical complexities of the highest degree. Current studies (funded and unfunded) by leading industry and government agencies arrive at several conclusions common to the basic anti-satellite concept, independent of the detailed nature in which the particular study was conducted, namely:

(a) It is highly unlikely that a point intercept can be accomplished. By point intercept is meant the destruction of a satellite the first time it appears over defended territory. Present and near future estimates of satellite tracking capabilities strongly preclude attainment of accuracies necessary to perform the above mission. Current thinking suggests that at least four to five passes of the satellite are required to establish its position and velocity with sufficient accuracy to permit interception techniques to operate.

(b) It is highly desirable if not mandatory that the trajectory of the interceptor missile be in as close a co-orbital plane with the satellite as accuracy permits in general, and during the terminal phase in particular, to minimize closing rates, velocities, and intercept kinematics. The consequences of off-orbital launching are larger missile systems, more difficult mid-course guidance, and possibly more complicated terminal navigation.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

DR-1971

Consideration of these important factors leads to the logical deduction that a mobile launching system would be advantageous to implement the co-orbital launch and intercept. In fact this has been suggested by several investigators including the author. To affect complete flexibility of operation it seems obvious that a ship-based system tied in with an airlaunched weapon would be the ultimate in mobility. For nominal orbital periods of two hours, the time to complete four passes would be eight hours. In this time period, an airplane cruising at even 350 knots would cover 2,800 n. miles, whereas a ship detection or tracking station, if necessary, could move a distance of 160 n. miles when cruising at 20 knots. It is with this concept in mind that a brief study was made of a carrier-based aircraft system launching a satellite interceptor missile. It appears that a vehicle weight of about 6,000 pounds would be required to boost a 200 pound interceptor to nominal satellite altitudes, when launched from a carrier-based airplane at  $M = 0.8$  and 35,000 feet altitude. The terminal phase could consist of a lead navigation mode, a velocity-control motor unit, and a 100 pound payload. The overall dimensions are about 27 feet long by 2 feet in diameter.

Consideration was also taken of a two-manned-stage system and a final interceptor missile stage to achieve satellite velocity. The system was comprised of the following components: -

- (a) The P6M-2 as a first stage recoverable booster.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

DR-1971

(b) An X-15 type airplane (possibly a modified F8U-3) as a top mounted second stage recoverable booster

(c) A 1,000 pound gross weight interceptor missile to carry a 100 pound warhead to orbital speeds and altitudes.

The P6M with its nominal operating radius of 600 n. miles can carry a 30,000 pound payload at  $M = 0.7$  and 40,000 feet altitude. The second stage, when released from the P6M, could attain an altitude of about 240,000 feet and a velocity at this altitude of about 6,000 ft/sec.

The missile would be correspondingly smaller, in the order of 13 feet long and 1.3 feet in diameter, than the carrier-based weapon.

It appears therefore that the use of sea basing may prove to be highly desirable in satellite interceptor application. However, the need for additional detailed study is plainly indicated to establish the Naval features of the system.

~~CONFIDENTIAL~~



~~CONFIDENTIAL~~

CONFIDENTIAL

[ This page is intentionally left blank. ]

CONFIDENTIAL

~~CONFIDENTIAL~~

[ This page is intentionally left blank. ]

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Distributed By **DTIC**  
Information For The Defense Community

~~CONFIDENTIAL~~

20090817280