

~~SECRET~~
UNCLASSIFIED

Joint DoD/DOE Phase 2 Feasibility Study of a High Power Radio Frequency (HPRF) Weapon

Final Report (U) 20 February 1996



11/06/99

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
1ST REVIEW DATE: <u>CP Demog</u>	DETERMINATION (CIRCLE NUMBER(S)) <input checked="" type="checkbox"/> 1. CLASSIFICATION RETAINED <input type="checkbox"/> 2. CLASSIFICATION CHANGED TO: <input type="checkbox"/> 3. CONTAINS NO DOE CLASSIFIED INFO <input type="checkbox"/> 4. COORDINATE WITH: <u>DOE</u> <input type="checkbox"/> 5. CLASSIFICATION CANCELLED <input type="checkbox"/> 6. CLASSIFIED INFO BRACKETED <input type="checkbox"/> 7. OTHER (SPECIFY)
AUTHORITY: <u>DAOC DAOC DAOC</u>	
NAME: <u>CP Demog</u>	
2ND REVIEW DATE: <u>11/6/99</u>	
AUTHORITY ACO	
NAME: <u>ML ROLBAY</u>	

QA ROLBAY J. Zarkin 11/99

DISTRIBUTION STATEMENT

Further dissemination only as directed by SA-ALC NWI (AFMC) Nuclear Weapons Integration Division, Nuclear Advanced Concepts Branch, Kirtland AFB, NM 87117-5617 (limitation applied Oct 93) or higher DOD authority.

WARNING

This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C. Sec. 2751 *et seq.*) or Executive Order 12470. Violation of these export laws are subject to severe criminal penalties.

DESTRUCTION NOTICE

Follow the destruction procedures in DOD 5200.1-R, Information Security Program Regulation, Chapter IX.

CLASSIFIED BY: Multiple Sources (see inside front cover)

THIS PUBLICATION CONTAINS 340 PAGES
COPY 14 OF 35 COPIES

SA-ALC NWI (AFMC)
Nuclear Weapons Integration Division
Weapon Management Branch
1651 First Street SE
Kirtland AFB NM 87117-5617

~~RESTRICTED~~
This information is classified "Secret" in accordance with the Atomic Energy Act of 1954. Unauthorized disclosure is prohibited by law and is subject to administrative and criminal sanctions.

~~RESTRICTED~~
This information is classified "Secret" in accordance with the Atomic Energy Act of 1954. Unauthorized disclosure is prohibited by law and is subject to administrative and criminal sanctions.

~~RESTRICTED~~
This information is classified "Secret" in accordance with the Atomic Energy Act of 1954. Unauthorized disclosure is prohibited by law and is subject to administrative and criminal sanctions.

UNCLASSIFIED

(This cover is unclassified)

~~UNCLASSIFIED~~
~~SECRET~~

This report has been reviewed and approved for publication.

UNCLASSIFIED

John R. Curry
JOHN R. CURRY, Colonel, USAF
Chief, Nuclear Weapons Integration Division

Joseph A. Jelic
Lawrence Livermore National Laboratory

Michael P. Bernardi
Los Alamos National Laboratory

J. C. Anderson
Sandia National Laboratories NM

James R. Hogan
Sandia National Laboratories CA

Dennis B. Umsaler
Department of Energy

G. B. ...
Headquarters Defense Nuclear Agency

Michael J. ...
United States Strategic Command

K. ...
Air Force Space Command

Philip ...
Department of the Army

Francis ...
Nuclear Weapons Integration Division

UNCLASSIFIED

Classification sources:

1. HPRF-1
2. Joint DOE/DOD Nuclear Weapons Classification Policy Guide, CG-W-5, Jan 84
3. Air Force Nuclear Weapons Security Classification Guide, Jun 85
4. Draft HPRF Program Security Classification Guide, Mar 1995

DOE §
DTRA
(b)(1) §
USAF

~~UNCLASSIFIED~~
~~SECRET~~

~~SECRET~~

UNCLASSIFIED

(U) Executive Summary

1.0. (U) PURPOSE

(U) The purpose of this study was threefold.

[Redacted]

DOE
DTRA
b(3)
USAF

2.0. (U) BACKGROUND

A. (S-FRD) The Air Force conducted a Phase 0 Scoping Study from August 1989 to May 1990 examining enhanced bomber penetration through Soviet Integrated Air Defenses (IAD).

[Redacted]

DOE
DTRA
b(3)
USAF

CG HPRF-1

The High Power Radio Frequency (HPRF) Phase 1 Conceptual Study was conducted from January 1991 to April 1992 using bomber penetration through the Soviet IAD as the mission of interest.

[Redacted]

DOE
DTRA
b(3)
USAF

CG HPRF-1

The Air Force initiated a 30-month HPRF Phase 2 Feasibility Study in August 1992 requesting Department of Energy (DOE) participation through the Nuclear Weapons Council Standing and Safety Committee.

[Redacted]

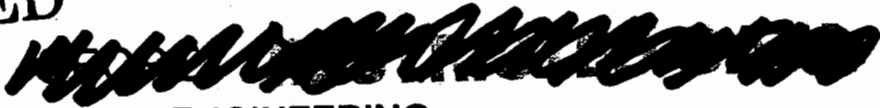
DTRA
b(3)
DTRA
b(3)
DOE
USAF

CG HPRF-1

UNCLASSIFIED

~~SECRET~~

UNCLASSIFIED



4.0 (U) SYSTEMS ENGINEERING

4.1 (U) INTRODUCTION

(S-RD) The Systems Engineering Working Group (SEWG) was organized to assess the issues associated with integrating the HPRF warhead into the MM III missile system.

USAF
DOE
&
DTRA
b(3)
USAF



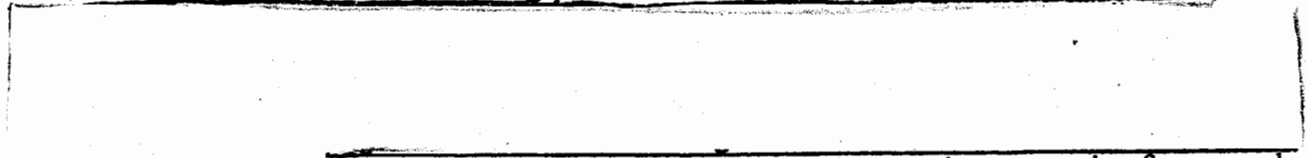
CG HPRF-1 (d.a.)

(U) Some of these designs only suggest the possible and are not optimized nor exhaustive. Features to be highlighted in one concept, might work equally well in other designs, but are shown only once for brevity. The final point designs will likely extract features from several different concepts.

4.1.1 (U) Technical Objectives

(S-FRD) The technical objectives of the SEWG were to document the information in a fashion that would provide a substantial starting point to subsequently develop this concept further.

DTRA
b(1)



The engineering effort developed implementation strategies for several different options but did not rank order the design options or down-select the candidates. Selecting the final candidates will be done when the MCs are finalized and a warhead is chosen. The SEWG was responsible for concept design of the warhead exclusive of the nuclear explosive package (NEP).

4.1.2 (U) Methodology

The Air Force is planning several changes for the MM III missile system: (1) "de-MIRVing" the missile, (2) replacing the guidance computer and (3) replacing some of the Mk12A/W78s with the Mk21/W87 warhead. The "de-MIRVing" and warhead replacement are dependent on ratification of START II. The guidance computer replacement is currently underway.

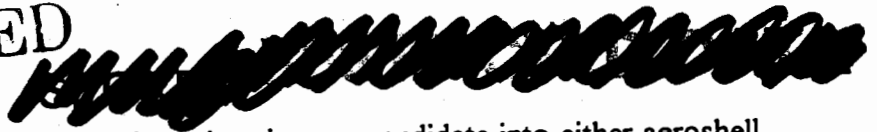
DOE b(1)
&
DTRA
b(1)
USAF

(S-FRD) The SEWG was divided into two design teams. The New Mexico team (Los Alamos National Laboratory (LANL) and Sandia National Laboratories New Mexico (SNL NM)) engineered the LANL warhead proposals, concentrating on their use in the Mk12A aeroshell and the California team (Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories California (SNL CA)) investigated the integration issues associated with placing the LLNL warhead candidates into Mk21 aeroshells. Insight gained by one team was useful to both

UNCLASSIFIED



UNCLASSIFIED



teams. The result is a data base that would permit engineering any candidate into either aeroshell. The New Mexico team also proposed a larger device which was not constrained by the Mk12A or Mk21. The New Mexico team designed a fixture for mounting the larger device directly on the MM III bus and provided its own aeroshell.

4.1.3 (U) Assumptions

(S-FRD) There were three major assumptions applied during the SEWG assessment.

DOE
§
DTRA
b(3)
USAF

CG HPRF-1

(S-FRD) The second assumption, which applied to most of the candidate options, was that the HPRF warhead would be compatible with the Mk12A or Mk21 RV. This was partially driven by Air Force Operation security particularly during START inspections.

DTRA
b(1)
USAF

CG HPRF-1

(U) The third assumption was that the MM III Single Reentry Vehicle (SRV) and Guidance Replacement Program (GRP) would be completed. Completing the GRP is critical because warhead safety intent signals, use control features, and the Mk21 interface depend on the new guidance computer.

USAF
DOE
§
DTRA
b(3)

CG HPRF-1

4.1.4 (U) Constraints

[Redacted]

DOE
§
DTRA
b(3)
USAF

Compatibility further requires that the electrical and mechanical interface of the existing RVs be maintained.

[Redacted]

DOE
§
DTRA
b(3)
USAF

CG HPRF-1

(C) The third constraint involved incorporating use control features into the HPRF warhead. The DoD issued a new use control directive, i.e., DoD Directive S-3150.7, towards the end of the

UNCLASSIFIED



UNCLASSIFIED



(S-FRD) The baseline WES for the New Mexico designs uses a conservative approach. The volume for the WES components is adequate so that space and form factor requirements do not stress component design. The designs feature simple interconnections and stockpile hardware where possible.

USAF
b(1)

The proposed system designs allow all of the nuclear safety and use control hardware to be built directly into the package as opposed to an add-on to a current WES. The New Mexico baseline WES design features a Dual Stronglink Assembly (DSA). The DSA concept was designed and developed in the late 1980s to implement and optimize modern concepts of safety and control.

DOE
DTRA
b(3)
USAF

Implementation could be done either by keeping the designs separate as partitions of an overall single assembly, or by having a completely integrated design.

Table 4-3. (U) New Mexico WES Options

FOR OFFICIAL USE

Safety Theme	Feature	Trajectory sensor
A	CDU+DSA	SESD
B	CDU+SSA+DSSL	SESD
C	DOI	SESD
D	MC 2969 SLS	MC 3160 ESD

USAF
b(1)

FOR OFFICIAL USE ONLY

(U) The California designs all use the W87 WES modified to accommodate use control features, if desired, and a programmer to interface with the new functions.

DOE
DTRA
b(3)

4.4.4 (U) Flight Performance

DOE
DTRA
b(3)
USAF

CG HPRF-1

UNCLASSIFIED

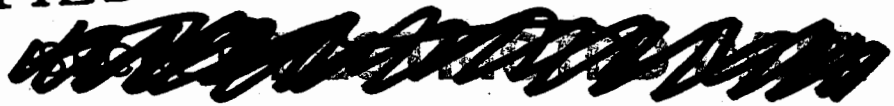


Table 7-1. (U) Agreements Forming the Basis for Current Warhead Certification Procedures.

"An Agreement between the Atomic Energy Commission and Department of Defense for the Development, Production, and Standardization of Atomic Weapons," March 21, 1953.
Supplement to 1953 Agreement. An updated agreement is now under review.
"Policy and Procedures for Certifying High-Yield Nuclear Warhead Designs for Stockpile," S.S. Hecker and J.H. Nuckolls, June 15, 1990.
"Inter-Laboratory Peer Review for Nuclear Weapon Development." T.P. Seitz and L. Woodruff, December 18, 1991.
"Amended Agreement on Inter-Laboratory Peer Review," W.J. Shotts, E.E. Ives, and T.P. Seitz, February 26, 1993.

~~UNCLASSIFIED~~

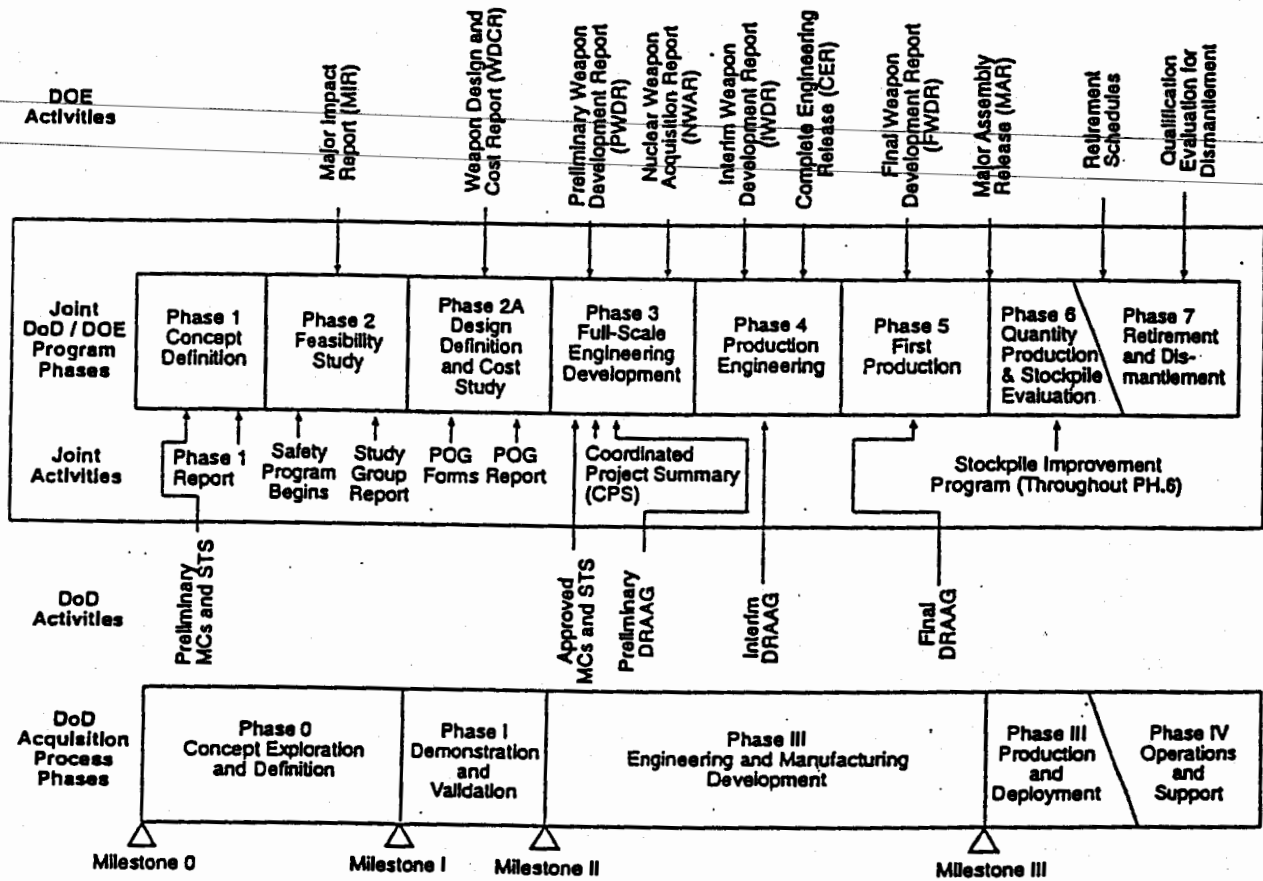


Figure 7-1. (U) Joint DoD/DOE Nuclear Weapon Program Phases and DoD Acquisition Process Phases Compared.

UNCLASSIFIED

~~SECRET~~

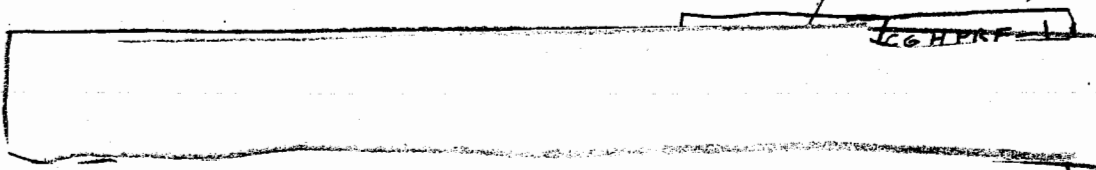
MILITARY CHARACTERISTICS
FOR THE
HIGH POWER RADIO FREQUENCY
(HPRF) WARHEAD (U)

DRAFT
January 1996

NUCLEAR WEAPONS INTEGRATION DIVISION
NUCLEAR WEAPONS DIRECTORATE
SAN ANTONIO AIR LOGISTICS CENTER
AIR FORCE MATERIEL COMMAND
1651 FIRST STREET SE
KIRTLAND AIR FORCE BASE, NEW MEXICO 87117-5617

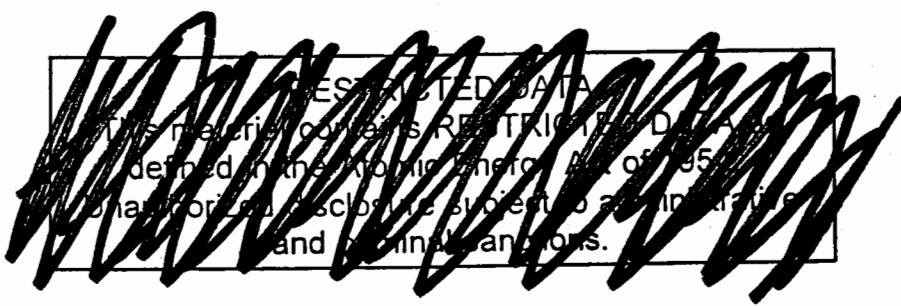
DTRA b(1)

USAE



~~CGHPRF~~

DOE b(3)



UNCLASSIFIED

(This cover is UNCLASSIFIED.)

~~SECRET~~

UNCLASSIFIED

MILITARY CHARACTERISTICS FOR THE HIGH POWER RADIO FREQUENCY (HPRF) WARHEAD (U)

DRAFT
January 1996

TABLE OF CONTENTS

(All portions of this Table of Contents are UNCLASSIFIED.)

1.0 GENERAL	1
1.1 Purpose	1
1.2 Contingencies	1
1.3 Definitions	1
1.4 Competing Characteristics	2
1.5 Warhead Endurance	3
2.0 WARHEAD CHARACTERISTICS	3
2.1 General Requirements	3
2.2 Operational Requirements	3
2.3 Physical Requirements	4
2.4 Functional Requirements	4
2.5 Environment and Vulnerability Requirements	4
2.6 Reliability Requirements	5
2.7 Nuclear Safety Requirements	5
2.8 Maintenance, Monitoring and Equipment Requirements	8
2.9 Command and Control Requirements	10

UNCLASSIFIED

~~RESTRICTED~~

CHARACTERISTICS

REMARKS/COMMENTS

1.0 (U) GENERAL

1.1 (U) Purpose. These Military Characteristics (MCs) define the Department of Defense (DoD) requirements for a High Power Radio Frequency (HPRF) nuclear warhead.

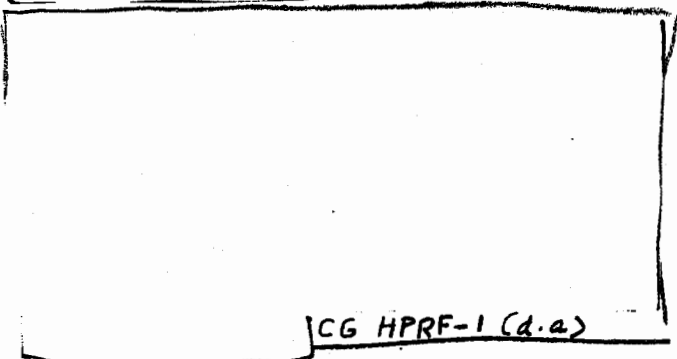
1.1 (U) The MCs were written in a two column format. The left hand column contains the MC requirement and the right hand column is used to document any remarks/comments associated with the MC requirement. The purpose for this format is to ensure any concerns and/or issues identified during Phase 2 are fully documented. These comments are intended to address the MCs only.

1.2 (U) Contingencies. Should it appear impractical for the Department of Energy (DOE) to meet any of these MCs, or should it appear meeting any criterion specified herein will delay the initial operational capability, modify the delivery rate, or increase the warhead cost by an amount deemed by the joint DoD/DOE HPRF Warhead Project Officers Group to be unreasonable, immediate notification shall be made to the Nuclear Weapons Council Standing and Safety Committee (NWCSSC).

1.3 (U) Definitions.

1.3 (U) Definitions for the RV, RS, and RSA are defined specifically for the HPRF warhead design purposes and may not be the same definitions for other warheads. The STS reflects the same definitions.

DOE
DTRA
E
JSAF
b(3)



CG HPRF-1 (d.2)

1.3.2 (U) The reentry vehicle (RV) is the DoD provided structure to contain DOE warhead components as well as the arming, fuzing, and firing (AF&F).

1.3.2 (U) The AF&F is a DoD responsibility. An integrated AF&F is a concept being considered by the Air Force. This concept would have to be fully documented (i.e. responsibility, definition, etc).

~~RESTRICTED~~



1.3.3 (U) The RS is defined to be the RV and DOE warhead components as well as the AF&F within the structure.

1.3.3 (U) The AF&F is a DoD responsibility. An integrated AF&F is a concept being considered by the Air Force. This concept would have to be fully documented (i.e. responsibility, definition, etc).

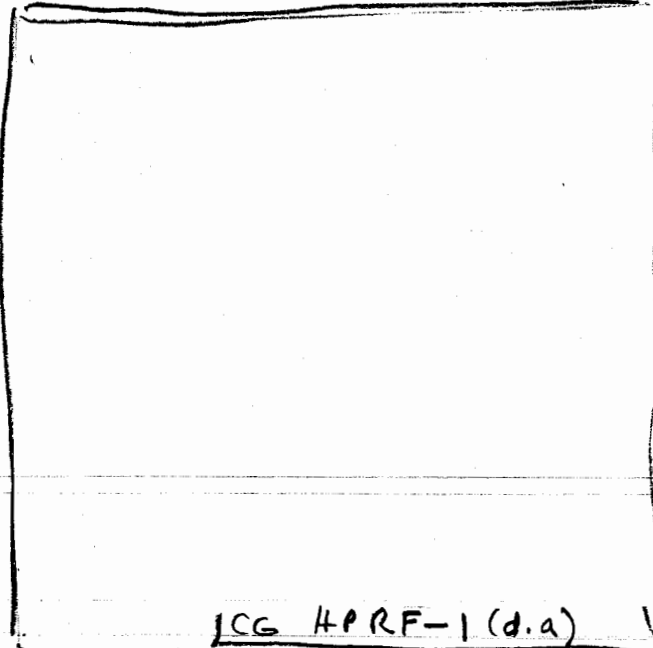
1.3.4 (U) The Reentry System Assembly (RSA) is defined as the mated RS, Deployment Module and Ascent Shroud.

1.3.5 (U) The Deployment Module is defined as the structure which includes the payload bulkhead support for mounting the RVs and chaff dispensers.

1.3.6 (U) The Ascent Shroud is defined as the low-drag aerodynamic shape which covers the arrangement of payload RVs during powered flight in the atmosphere.

1.4 (U) Competing Characteristics. In the event compliance with these MCs results in design conflicts, the HPRF Warhead POG shall evaluate design options on a case-by-case basis and forward recommended changes to the NWCSSC for approval. Trade-offs for reasons of technical feasibility and cost may be made with the guidance and approval of the HPRF Warhead POG and NWCSSC.

1.4.1 (U) Highest priority will be given to nuclear safety.



DOE
⋮
DTRA
⋮
USAF
b(3)

ICG HPRF-1 (d.a)



~~UNCLASSIFIED~~

UNCLASSIFIED

AIR FORCE

STOCKPILE-TO-TARGET SEQUENCE

FOR THE

HIGH POWER RADIO FREQUENCY (HPRF) WARHEAD (U)

PHASE 2 STUDY

January 1995

DRAFT

NUCLEAR WEAPONS INTEGRATION DIVISION

Air Force Materiel Command

Kirtland Air Force Base, NM

SUBJECT TO EXPORT CONTROL LAWS

This document contains information for the manufacturing or using munitions of war. Exporting this information or release of it to foreign nationals living in the United States without first obtaining an export licence violates the International Traffic in Arms Regulations. Under 22 UCSG 2778, such a violation is punishable by up to two years in prison and by a fine of \$100,000.

~~UNCLASSIFIED~~
1995 JAN 20 04

~~UNCLASSIFIED~~
The American government is prohibited from providing technical assistance, information, or training to any person or entity that is subject to economic sanctions.

UNCLASSIFIED

THIS PAGE IS UNCLASSIFIED

~~UNCLASSIFIED~~

UNCLASSIFIED

NUCLEAR WEAPONS INTEGRATION DIVISION

Air Force Materiel Command

Kirtland Air Force Base

New Mexico

This Stockpile-to-Target Sequence (STS) is classified SECRET - RESTRICTED DATA because it contains nuclear weapon design data and information concerning operational strategy. It does not contain Critical Nuclear Weapons Design Information (CNWDI).

WARNINGS

This material contains Restricted Data as defined in the Atomic Energy Act of 1954. Its dissemination or disclosure without authorization is prohibited.

When U.S. Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement program, the 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 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.

This document is made available for study with the understanding that proprietary interests in and relating thereto will not be impaired. In case of apparent conflict or any other questions between the Government's rights and those of others, notify the Judge Advocate, Air Force Materiel Command.

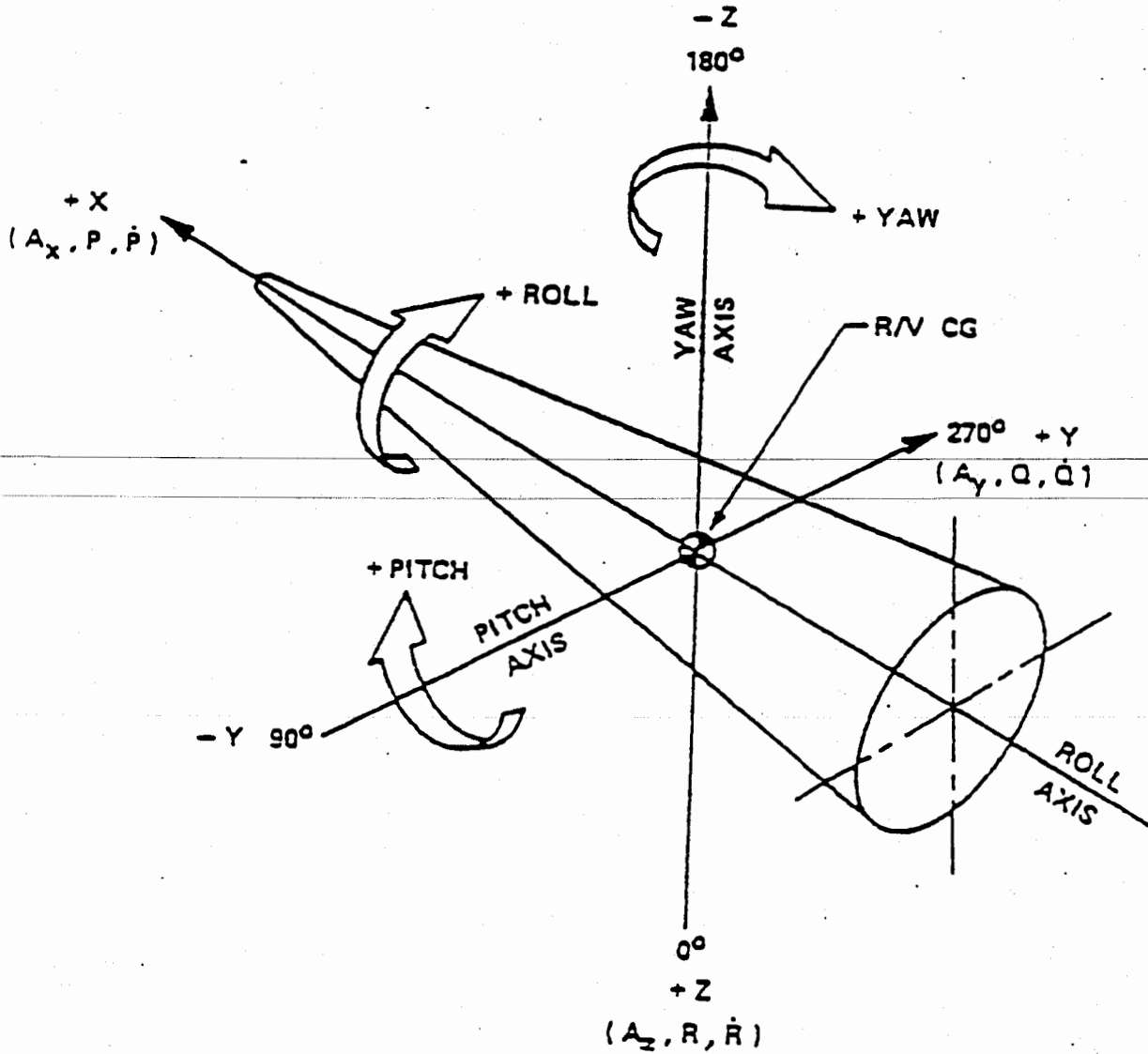
In addition to security requirements which apply to this document and must be met, each transmittal outside the agencies of the U.S. Government must have prior approval of the Nuclear Weapons Integration Division (SA-ALC/NWTW), 1651 1st St SE, Kirtland AFB, New Mexico 87117-5617.

Contracting Disclaimer

Nothing in this STS may be construed to constitute a change to any contract. Any questions concerning allowability under, or changes to, any contract must be resolved by the government contracting officer before proceeding in any manner which might obligate the government beyond any existing contract.

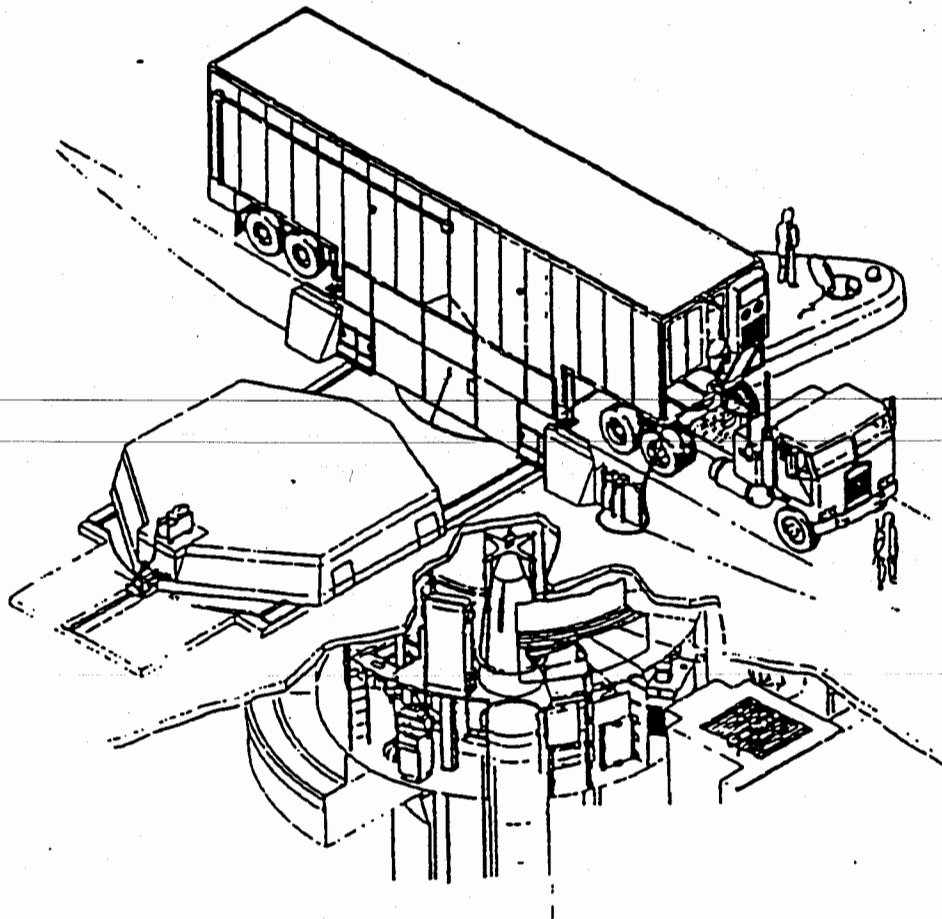
LIST OF FIGURES (concluded)
 (All portions of this List of Figures are UNCLASSIFIED)

<u>Figure</u>	<u>Title</u>	<u>Page</u>
3-35	X-Ray Fluence for Ballistic Flight Environment	3-54
3-36	Exoatmospheric X-Ray for Ballistic Flight Environment	3-54
3-37	Total Neutron Fluence for Ballistic Flight Environment	3-55
3-38	1 MeV Equivalent Neutron Fluence for Displacement Damage in Silicon - Ballistic Flight	3-55
3-39	Free Field Neutron Induced Ionization Dose Rate for Exoatmospheric Ballistic Flight	3-56
3-40	Prompt Gamma Energy Spectrum for Exoatmospheric Ballistic Flight	3-56
3-41	Prompt Gamma Dose Rate for Ballistic Flight Environment	3-57
3-42	Debris Cloud Gamma Dose Rate for Ballistic Flight	3-57
3-43	Close-In Burst Radial Electric Fields for Ballistic Flight	3-59
3-44	EMP Radial Electric Field Spectral Density for Ballistic Flight	3-59
3-45	Close-In Burst Air Conductivity for Ballistic Flight Environment	3-60
3-46	Blast Loads as a Function of Altitude	3-60
3-47	Blast Pulse Shape	3-61
3-48	Time History of Fireball Thermal Radiation Incident at Location of Reentry Vehicle	3-61
3-49	Impact Velocities Along Flight Path	3-64
3-50	Impact Velocities Normal to Flight Path	3-65



UNCLASSIFIED

Figure 1-2 Reentry Vehicle Roll, Pitch and Yaw Axis Definition (U)

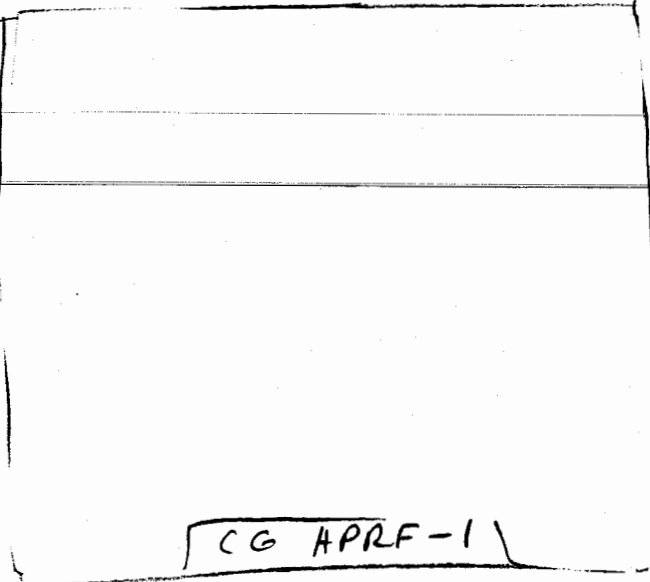


UNCLASSIFIED

Figure 2-4 Payload Transporter (PT) III Van (U)



DOE
DTRA
USAF
b(3)

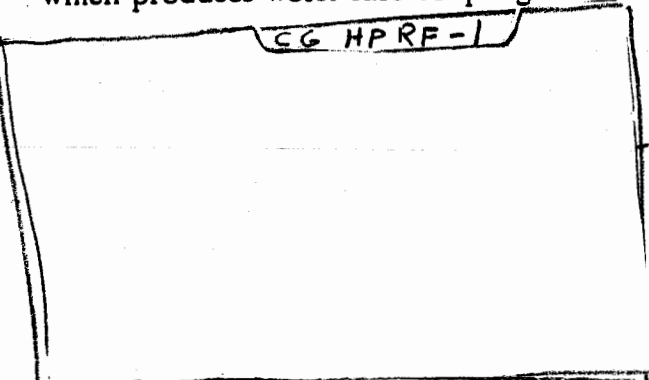


3.2.12.7.8 (U) Electromagnetic Pulse. The electromagnetic pulse environments are of two types with two sets of characteristics:

USAF
b(1)

For both types, burst direction will be that which produces worst case coupling.

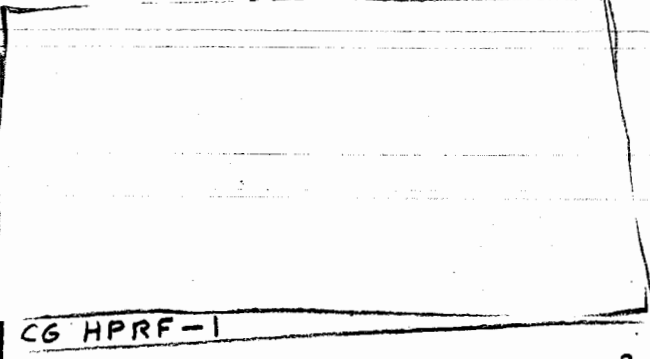
DOE
DTRA
USAF
b(3)



The air conductivity time history is specified in Figure 3-45.

3.2.12.7.10 (S) Distant Bursts. Distant bursts produce electric and magnetic fields as given in 3.2.12.4.8.

DOE
DTRA
USAF
b(3)



DOE
DTRA
USAF
b(3)



CG HPRF-1

3.2.12.9 (U) Ballistic Flight (Total Ionization Dose). The total ionization dose is specified in 3.2.12.6 added to that accumulated from exposure to the radiation environments specified in 3.2.12.7.1, 3.2.12.7.5, 3.2.12.7.6, and 1.25 times that specified in 3.2.12.7.7. Total ionization dose includes Compton effect (photon scattering), photofluorescence, inelastic neutron scattering, neutron capture, and charged particle production.

3.2.12.10 (U) Fireball Thermal Radiation. The time history of the environment at the location of the reentry vehicle is specified in Figure 3-48.



~~UNCLASSIFIED~~
UNCLASSIFIED

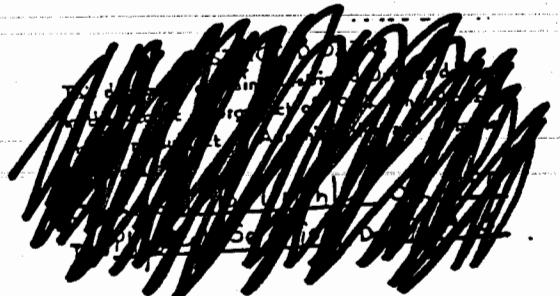
PRELIMINARY MAJOR IMPACT REPORT

FOR

JOINT DOD/DOE PHASE 2 FEASIBILITY STUDY OF A HIGH
POWER RADIO FREQUENCY (HPRF) WEAPON

SEPTEMBER 1995

UNCLASSIFIED



~~UNCLASSIFIED~~

~~TOP SECRET~~

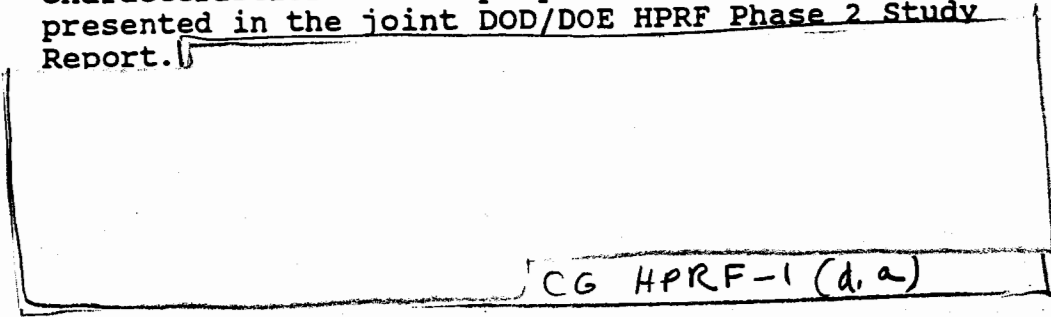
(U) -- I. SCOPE

(U) -- This Preliminary Major Impact Report (PMIR) was prepared in conjunction with the Joint DOD/DOE Phase 2 Feasibility Study of a High Power Radio Frequency (HPRF) Weapon. The request for the Department of Energy Albuquerque Operations Office (AL) participation in the Phase 2 Study and request to prepare a Major Impact Report (MIR) is documented in a September 14, 1992 memorandum from RADM W. G. Ellis, Deputy Assistant Secretary for Military Application and Stockpile Support. That memorandum also had attached to it Phase 2 tasking guidance dated September 4, 1992.

(CRD) -- The recommendation of the HPRF Phase 2 Study is to conduct further studies on the effectiveness of an HPRF weapon on identified military targets. Because an HPRF weapon is not recommended to go forward to a Phase 2A Study at this time, a PMIR was prepared. A final MIR can be prepared if further studies are undertaken and recommend that an HPRF weapon proceed to Phase 2A. The PMIR identifies those aspects of warhead design proposals which may influence the meeting of program objectives.

(U) -- II. PROPOSED WARHEAD DESIGNS

(CRD) -- Table I summarizes the major characteristics of the proposed warhead designs as presented in the joint DOD/DOE HPRF Phase 2 Study Report.



DOE
§
DTRA
§
USAF
b(3)

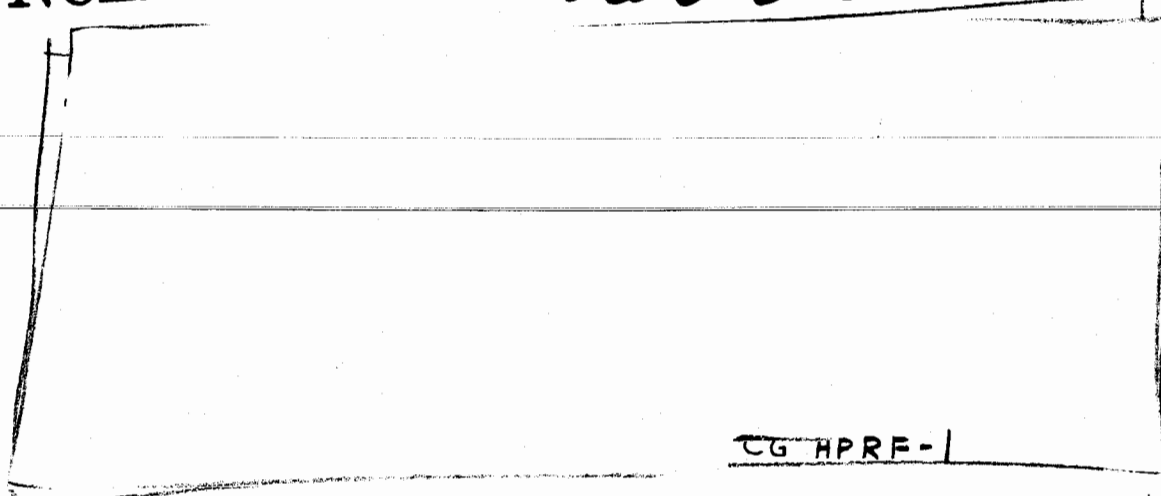
(U) -- III. ANALYSES

(U) -- A MIR meeting was held after the HPRF Executive Working Group (EWG) meeting May 31, 1995 at the Nuclear Weapons Integration Division, Air Force Material Command, Albuquerque, New Mexico. The development of a MIR was discussed, and subsequently, a draft of the PMIR was sent to appropriate DOE and National Laboratory EWG members for review.

~~TOP SECRET~~

UNCLASSIFIED

~~CONFIDENTIAL~~



DOE
|
DTRA
|
USAF
b(3)

CG HPRF-1

(U) -- VI. GENERAL CONSIDERATIONS

(U) -- A. Reconfiguration

(U) -- In September of 1993, DOE finalized plans to consolidate its nonnuclear operations. Three donor sites, Pinellas, Mound, and Rocky Flats are in the process of transferring personnel, equipment, and records to other sites within the nuclear weapons complex. The reconfiguration of nuclear operations and additional reconfiguration of nonnuclear operations in the DOE weapons complex is currently being studied. Options under consideration will be published in late 1995 in a Draft PEIS for Stockpile Stewardship and Management and in a final PEIS in late 1996.

(U) -- B. Warhead Certification

(U) -- The following discussion of warhead certification is excerpted from a June 1995 draft of the Replacement Warhead Assessment Final Report. The technical basis for the certification of warheads in the current stockpile has been vigorous experimental and analytical programs that included the ability to conduct nuclear tests as required. The basis for a future warhead certification will consist of several elements: data from above-ground experiments; data from previous nuclear tests that incorporated the same or related designs or technologies; numerical simulation of experiments and of warhead performance; and peer review.

UNCLASSIFIED 7

~~CONFIDENTIAL~~
~~CONFIDENTIAL~~

UNCLASSIFIED

~~SECRET~~
~~CONFIDENTIAL~~

(U)--While each of these played a role in previous certifications, the key element was nuclear testing. Without the ability to conduct nuclear tests, the relative importance of the other elements increases. The final balance among them will depend on certain factors that will be characteristic of the particular nuclear design, including: the availability of relevant nuclear test data, the applicability of above-ground experiments to key design issues, and the applicability of available calculational techniques.

(U)--The consequences of the inability to conduct nuclear tests will be manifested in two ways. First, the uncertainties associated with the estimates of expected performance will be greater. Secondly, the degree of confidence that warhead performance will be unaffected by a previously unrecognized factor will be diminished.

(U)--VII. SUMMARY

CG HPRF-1

Production facilities to manufacture both nuclear and nonnuclear components should be available to support the production of such a weapon considering the time it would take a design team to produce a warhead design chosen for final development and the total quantity required.

DOE
DTRA
USAR
b(3)

UNCLASSIFIED

~~SECRET~~
~~CONFIDENTIAL~~

UNCLASSIFIED

DISTRIBUTION LIST

UNCLASSIFIED

UNCLASSIFIED

(This page intentionally left blank.)

UNCLASSIFIED

UNCLASSIFIED

DISTRIBUTION LIST

<u>DOE</u>	<u>COPIES</u>
HQ DOE, DP-12 ATTN: MS KAREN LOMBARDO PO BOX A GERMANTOWN MD 20874-0963	1
DOE AL/WPD ATTN: MR DENNIS UMSHLER PO BOX 5400 ALBUQUERQUE NM 87185-5400	1
SNL NM/5161 ATTN: DR JERRY CUDERMAN PO BOX 5800 MAIL STOP 0482 ALBUQUERQUE NM 87185-0482	1
SNL NM/2753 ATTN: MR JIM SOLBERG PO BOX 5800 MAIL STOP 0865 ALBUQUERQUE NM 87185-0865	1
SNL CA/5371 ATTN: DR JIM HOGAN PO BOX 969 MAIL STOP 9014 LIVERMORE CA 94550-0969	1
LANL/XTA ATTN: DR MICHAEL BERNARDIN ATTN: DR RONALD MCFEE PO BOX 1663 MAIL STOP B220 LOS ALAMOS NM 87545-2345	2 1
LLNL/DANT ATTN: DR JOE SEFCIK PO BOX 808 LIVERMORE CA 94550-0808	2

UNCLASSIFIED

UNCLASSIFIED

DISTRIBUTION LIST (Continued)

DOD

COPIES

OATSD(AE)
ATTN: MAJ KIZIAH
PENTAGON
ROOM 3C124
WASHINGTON DC 20301-3050

1

HQ DNA/PMPO
ATTN: DR GEORGE BAKER
6801 TELEGRAPH ROAD
ALEXANDRIA VA 22310-3398

1

HQ DNA/RAES
ATTN: MAJ GERALD BAIRD
6801 TELEGRAPH ROAD
ALEXANDRIA VA 22310-3398

1

FCDNA/FCPRA
ATTN: MAJ SKIP LANGBEHN
ATTN: CAPT JOHN WARZINSKI
1680 TEXAS STREET SE
KIRTLAND AIR FORCE BASE 87117-5616

2

USSTRATCOM/J523
ATTN: MAJ MIKE VAUGHN
902 SAC BOULEVARD, SUITE 2E10
OFFUTT AIR FORCE BASE NE 68113-6500

1

USSTRATCOM/J534
ATTN: CAPT DAVE HIDINGER
901 SAC BOULEVARD, SUITE 2E9
OFFUTT AIR FORCE BASE NE 68113-6500

1

USSTRATCOM/J533
ATTN: MR STAN GOOCH
901 SAC BOULEVARD, SUITE 2E9
OFFUTT AIR FORCE BASE NE 68113-6500

1

UNCLASSIFIED

UNCLASSIFIED

DISTRIBUTION LIST (Continued)

ARMY

COPIES

US ARMY, ARDEC
ATTN: MR PHILIP ANGELOTTI
SMCAR-FSS-E/SWS
PICATINNY ARSENAL NJ 07806-5000

1

AIR FORCE

SAF/AQSD
ATTN: LT COL BILL MULLINS
1060 AIR FORCE PENTAGON
WASHINGTON DC 20330-1060

1

HQ AFSPC/DOXN
ATTN: MAJ KIRK DICKENSON
150 VANDENBERG STREET, SUITE 1105
PETERSON AIR FORCE BASE CO 80914-4120

1

HQ ACC/DRAN
ATTN: LT COL NEAL LEWIS
204 DODD BOULEVARD, SUITE 226
LANGLEY AIR FORCE BASE VA 23665-2778

1

NAIC/TAC
ATTN: CAPT DOROTHA BIEMESSER
4115 HEBBLE CREEK ROAD, SUITE 25
WRIGHT-PATERSON AIR FORCE BASE OH 45433-5629

1

DET 10 SMC/VTYT
ATTN: CAPT DAVE SANDERS
1111 EAST MILL STREET
SAN BERNARDINO CA 92408-1621

1

PL/WSM
ATTN: MR SAM GUTIERREZ
3550 ABERDEEN AVENUE SE, B-909
KIRTLAND AIR FORCE BASE NM 87117-5776

1

SA-ALC/NWIW
ATTN: MR FRANK CARRILLO
1651 FIRST STREET SE
KIRTLAND AIR FORCE BASE NM 87117-5617

3

UNCLASSIFIED

UNCLASSIFIED

DISTRIBUTION LIST (Concluded)

NAVY

COPIES

DEPT OF NAVY, SSPO
ATTN: MR BEN WOSOOGH
1931 JEFFERSON DAVIS HIGHWAY
ARLINGTON VA 22241-5362

1

CONTRACTORS

KAMAN SCIENCES
ATTN: MR CLIFFORD DEJONG
PO BOX 7463
COLORADO SPRINGS CO 80933-7463

1

LOGICON RDA
ATTN: DR PHIL CASTILLO
PO BOX 9377
ALBUQUERQUE NM 87119-5000

1

ORION INTERNATIONAL TECHNOLOGIES, INC
MR MIKE RAFFERTY
6501 AMERICAS PARKWAY NE, SUITE 200
ALBUQUERQUE NM 87110-6501

1

UNCLASSIFIED