

— Draft —

ENVIRONMENTAL ASSESSMENT

Minuteman III ICBM Extended Range Flight Testing

January 2006



Prepared for:

Air Force Space Command
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14. ABSTRACT This Environmental Assessment (EA) addresses the potential environmental effects of extending the targeting range of the Minuteman III (MM III) Intercontinental Ballistic Missile (ICBM). The flight test will originate from test launch facilities at Vandenberg Air Force Base (AFB) in California and impact will occur in the broad open ocean areas of the Pacific Ocean. Incorporated by reference is the EA for Minuteman III Modification (December 2004), which covers the effects of launch activities. This EA assesses the physical and biological effects in the impact areas in the Pacific Ocean.					
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1 **EXECUTIVE SUMMARY**

2 The proposed action discussed in this Environmental Assessment
3 (EA) is extending the targeting range of the Minuteman III (MM III)
4 Intercontinental Ballistic Missile (ICBM) for three missions between
5 Fiscal Year (FY) 06 and FY10. The action proponent is United
6 States Air Force Space Command (AFSPC).

7
8 Launches would be conducted from test launch facilities at
9 Vandenberg Air Force Base (AFB) on the coast of California. The
10 launch aspects of MM III test flights from Vandenberg AFB have
11 already been fully assessed in the *EA for Minuteman III Modification*
12 (USAF December 2004) (hereinafter, *MM III Modification EA*),
13 which is hereby incorporated by reference into this EA. The Finding
14 of No Significant Impact (FONSI) for the *MM III Modification EA*
15 was signed on 24 February 2005. Pertinent information from the
16 *MM III Modification EA* regarding launch will be summarized in this
17 EA for the purposes of compliance with NEPA.

18
19 Missile flight and impact would occur beyond the territorial
20 jurisdiction of the United States or any other nation. Executive
21 Order (EO) 12114 specifically requires federal agencies to assess the
22 environmental effects of major federal actions with the potential to
23 significantly harm the environment outside the 50 states, territories,
24 and possessions of the United States, including marine waters
25 seaward of the U.S. territorial seas. The procedures for
26 implementing EO 12114 in 32 CFR 187, as adopted by the U.S. Air
27 Force (USAF) per 32 CFR 989, specify that an EA should be brief
28 and concise, including sufficient information on which a
29 determination can be made as to whether the action would
30 significantly affect the environment of the global commons.

31 **ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION**

32 This EA evaluates the environmental effects of conducting three (3)
33 extended range missions for the MM III from launch to the
34 downrange impact of the reentry vehicles (RVs) in the Pacific
35 Ocean. The three extended range missions would extend the testing
36 ranges of existing MM III FDE missions by approximately 800 to
37 1,200 nautical miles (NM) beyond Kwajalein Atoll range. The
38 principal effects of the proposed action on the physical and natural
39 environment are discussed below.

40 **Airspace**

41 The proposed action would be conducted in accordance with
42 established Department of Defense and the range safety policies,
43 procedures, and guidance of the USAF 30th Space Wing at
44 Vandenberg AFB. This would ensure that the public remains clear
45 of designated operational areas and that there would be no
46 interference with the use of airspace by commercial or general
47 aviation during the three flight tests.

1 Air Quality

2 Air quality effects that would occur as a result of non-toxic exhaust
3 emissions from support vessels and aircraft and from launch and
4 subsequent flight of the MM III missile would not result in
5 significant harm to the environment. The air emissions generated
6 would primarily occur above the mixing layer and be quickly
7 dispersed and diluted over a large geographic area. Because the
8 launches are short-term, discrete events, the time between launches
9 would allow the dispersion of the emission products. No violation of
10 air quality standards or health-based standards for non-criteria
11 pollutants would be anticipated.

12 Water Quality

13 Ocean water quality could potentially be affected by chemical
14 constituents contained in the missile components that fall into the
15 ocean during mid-course flight and impact. However, before impact
16 in the ocean, the solid propellant in the rocket motors will have been
17 consumed. Any residual aluminum oxide and burnt hydrocarbon
18 coating inside of the motor casings would be insufficient to present
19 any toxicity concerns. However, residual amounts of hydraulic fluid,
20 small quantities of electrolyte material in the batteries, and strontium
21 perchlorate contained in the first and third stage rocket motors may
22 mix with the seawater. This would result in only minimal
23 contamination, which would quickly be buffered and diluted by
24 seawater to nontoxic levels and there would be no adverse long-term
25 water quality effects in any of the areas that would be affected by the
26 proposed action and no resulting significant harm to marine water
27 quality.

28
29 The debris that would be left on the ocean floor would be widely
30 scattered, small in volume, and not present any toxicity concerns.
31 Therefore, there would be no significant harm to the environment
32 occurring during launch or impact during the proposed flight tests.

33 Biological Resources

34 The principal effects on biological resources are acoustic and non-
35 acoustic effects on marine animals:

- 36
37 • **Fish.** The impact of missile components on the ocean surface
38 could cause fish mortalities; however, these effects would be
39 localized and transient. Fish populations from surrounding
40 areas would quickly repopulate the affected area. As a result,
41 the overall effects from the proposed flight tests would
42 produce no significant harm to the quality and/or quantity of
43 fish stocks, nor would essential fish habitat be adversely
44 affected.
- 45
46 • **Sea Turtles** may be present in any of the waters in the
47 proposed impact areas, but given the very deep water,
48 minimal forage opportunities for sea turtles, and no

1 anticipated phenomena (e.g., sargassum rafts, islands,
2 seamounts, etc.), sea turtles would not concentrate in these
3 locations. In the absence of reliable estimates of sea turtle
4 density for the launch or impact locations, it was
5 conservatively assumed that the maximum abundance and
6 density for any one location/season would be one-tenth the
7 highest dolphin density for that location/season. Since the
8 octave band flux levels for RV impacts peak at frequencies
9 most of which cannot be heard by sea turtles, it was also
10 conservatively assumed that sea turtle hearing is
11 approximately equivalent to dolphin hearing for 1,000 Hertz
12 (Hz) and below, which allowed application of the thresholds
13 and criteria used to assess impacts to dolphins to be applied to
14 sea turtles. Using these conservative assumptions, only a
15 negligible number of sea turtles (i.e., less than 0.0003) would
16 potentially incur acoustic and non-acoustic impacts during the
17 impact phases of flight testing with implementation of the
18 proposed action. Consequently, there would be no significant
19 harm to sea turtle species with implementation of the
20 proposed action.
21

22 • **Marine Mammals**

- 23 — **Acoustic Effects** associated with RV impact on the ocean
24 surface were the predominant acoustic effect of proposed
25 action implementation. These effects were assessed
26 using the methodology and criteria developed for use in
27 the *Final Environmental Impact Statements for the USS*
28 *Seawolf and USS Winston S. Churchill Ship Shock Trials*
29 (Navy 1998 and 2001b). The 182 decibels re 1
30 micropascal squared per second (dB re 1 $\mu\text{Pa}^2\text{-s}$) in the
31 highest one-third octave band criterion was used as a
32 conservative estimate of the zones of influence (ZOIs)
33 associated with the proposed action. For Level B
34 harassment, there would be no predicted “takes” of an
35 individual marine mammal species of more than 0.0324
36 annually due to acoustic impacts occurring during the
37 flight testing. For Level A injury or mortality, the
38 potential for “takes” due to acoustic impacts would
39 approach zero and be negligible during extended flight
40 testing.
41
- 42 — **Non-Acoustic Effects.** Given the estimated marine
43 mammal densities along the flight path and in the impact
44 areas, the probability that marine mammals would be
45 affected by non-acoustic impacts associated with falling
46 debris is very low to negligible. As a result, there would
47 be no significant harm to marine mammals from non-
48 acoustic effects.

1 **CONCLUSIONS**

2 Based on this scientific analysis, this EA concludes that
3 implementation of the proposed action will have no effect on
4 threatened or endangered species protected under the Endangered
5 Species Act, nor will it result in the reasonably foreseeable “takes”
6 of a marine mammal species by harassment or injury or mortality as
7 defined under the Marine Mammal Protection Act. Therefore,
8 neither consultation with NOAA Fisheries under ESA, nor
9 application for takings under MMPA, is required. In addition, an
10 EIS will not be prepared because the USAF has determined, on the
11 basis of this EA, that there will be no significant harm to the
12 environment.

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ACRONYMS

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Acronym	Definition	Acronym	Definition
°C	Degrees Celsius	ICBM	Intercontinental Ballistic Missile
°F	Degrees Fahrenheit	IFAWCT	International Fund for Animal Welfare Charitable Trust
AFB	Air Force Base	IUCN	International Union for Conservation of Nature and Natural Resources
AFI	Air Force Instruction	kg	Kilogram
AFOSH	Air Force Occupational Safety and Health	kHz	Kilohertz
AFSPC	Air Force Space Command	km	Kilometer
AK	Alaska	km/hour	Kilometers per Hour
CA/OR/WA	California/Oregon/Washington	lbs	Pounds
CAA	Clean Air Act	LF	Launch Facility
CAAQS	California Ambient Air Quality Standards	LTMS	Long-Term Management Strategy
CARB	California Air Resources Board	µPa	Micropascal
CARF	Central Altitude Reservation	m	Meter
CEQ	Council on Environmental Quality	MK	Mark
CFR	Code of Federal Regulations	mm	Millimeter
CMS	Convention on Conservation of Migratory Species	MM III	Minuteman III
CNEL	Community Noise Equivalent Level	MMPA	Marine Mammal Protection Act
CNP	Central North Pacific	MOD	Model
CO	Carbon Monoxide	m/s	Meters per Second
CPS	Coastal Pelagic Species	NAAQS	National Ambient Air Quality Standards
CREI	Coral Reef Ecosystem Investigation	Navy	United States Department of the Navy
CV	Coefficient of Variation	NEPA	National Environmental Policy Act
dB	Decibel	NM	Nautical Mile
dB/µPa	Decibels Re 1 Micropascal at 1 Meter	NMIS	Navy Mobile Instrumentation System
dBA	A-Weighted Sound Level	NO ₂	Nitrogen Dioxide
DDT	Dichlorodiphenyltrichloroethane	NOA	Notice of Availability
DoD	U.S. Department of Defense	NOAA	National Oceanic and Atmospheric Administration
E	Endangered	NOTAM	Notices to Airmen
EA	Environmental Assessment	NOTMAR	Notices to Mariners
EEZ	Exclusive Economic Zone	NWHI	Northwestern Hawaiian Islands
EFH	Essential Fish Habitat	NWR	National Wildlife Refuge
EIS	Environmental Impact Statement	PAH	Polynuclear Aromatic Hydrocarbon
ENP	Eastern North Pacific	PCB	Polychlorinated Biphenyl
EO	Executive Order	PBV	Post Boost Vehicle
ESA	Endangered Species Act	PFMC	Pacific Fishery Management Council
ESL	Energy Source Level	PM2.5	Particulate Matter 2.5 Microns
EWR	Eastern and Western Range	PM10	Particulate Matter 10 Microns
FAA	Federal Aviation Administration	PMRF	Pacific Missile Range Facility
FDE	Force Development Evaluation	ppm	Parts per Million
FEIS	Final Environmental Impact Statement	ppt	Parts per Thousand
FONSI	Finding of No Significant Impact	PSD	Prevention of Significant Deterioration
FY	Fiscal Year	psi	Pounds per Square Inch
Hz	Hertz	PTS	Permanent Threshold Shift
ICAO	International Civil Aviation Organization	RAC	Regional Airspace Control

Acronym	Definition	Acronym	Definition
RV	Reentry Vehicle	T	Threatened
SAR	Stock Assessment Report	TTS	Temporary Threshold Shift
SBCAPCD	Santa Barbara County Air Pollution Control District	USAF	U.S. Air Force
SCB	Southern California Bight	USASMDC	United States Army Space and Missile Defense Command
SI	Système International d'unités	USC	United States Code
SO ₂	Sulfur Dioxide	USCG	United States Coast Guard
SPL	Sound Pressure Level	USEPA	United States Environmental Protection Agency
sq km	Square Kilometer	USFWS	United States Fish and Wildlife Service
SUA	Special Use Airspace	USGS	United States Geologic Survey
SWFSC	Southwest Fisheries Science Center	UXO	Unexploded Ordnance
SWI	Space Wing Instruction	VOC	Volatile Organic Compound
SWRCB	State Water Resources Control Board	WPRFMC	Western Pacific Regional Fishery Management Council
R-	Restricted Area	ZOI	Zone of Influence

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CONVERSIONS

For the purposes of discussion, this document will primarily use meters as the unit of measure (instead of feet or fathoms), in addition to nautical miles (NM), for distances. The following conversion table is provided for reference.

Multiply	By	To Obtain
Fathoms	6	feet
	1.828804	meters
Feet	0.166667	fathoms
	0.3048	meters
Meters	0.54681	fathoms
	3.28084	feet
Miles (nautical)	1.852	kilometers

9

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) addresses the potential environmental effects of extending the targeting range of the Minuteman III (MM III) Intercontinental Ballistic Missile (ICBM) in the Pacific Ocean. The flight test will originate from test launch facilities at Vandenberg Air Force Base (AFB) in California and impact will occur in the broad ocean areas of the Pacific Ocean. This EA has been prepared in accordance with the following regulations, statutes, and standards:

- National Environmental Policy Act (NEPA) of 1969.
- Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*.
- The President's Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (Title 40 of the Code of Federal Regulations [CFR] Parts 1500-1508).
- U.S. Air Force (USAF) Regulations for Implementing NEPA (32 CFR 989, *Environmental Analysis Impact Process*).
- Department of Defense (DoD) Regulations for Assessing Environmental Effects Abroad of Major DoD Actions (32 CFR 187).

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to extend the targeting range of MM III ICBM flight tests by approximately 800 to 1,200 nautical miles (NM). The potential impact areas would be beyond the current targeting range in the vicinity of Kwajalein Atoll (Ronald Reagan Ballistic Missile Defense Site in the Republic of the Marshall Islands).

The primary function of the MM III is strategic deterrence. The concept of strategic deterrence means that a defending nation maintains a significant capability to strike a challenging nation such that a challenging nation will choose not to attack. The proposed action is needed in light of recent nuclear proliferation and the acquisition of offensive nuclear capabilities by foreign nations with potential hostile intent. The proposed action would extend the current test targeting range of the MM III, which would improve and demonstrate the capability and readiness of U.S. Armed Forces to respond to any serious nuclear threats from such foreign nations. The proposed action would also enable testing to be conducted at operationally representative ranges.

1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA evaluates the environmental effects of extending the targeting range of the MM III ICBM. Neither routine storage nor management of the MM III missiles or missile components before launch is included in this proposed action.

Launches would be conducted from test launch facilities at Vandenberg AFB on the coast of California. The launch aspects of MM III test flights from Vandenberg AFB have been fully assessed in the *EA for Minuteman III Modification* (USAF December 2004) (hereinafter, *MM III Modification EA*), which is hereby incorporated by reference into this EA. The Finding of No Significant Impact (FONSI) for the *MM III Modification EA* was signed on 24 February 2005. Pertinent information from the *MM III Modification EA* regarding launch will be summarized in this EA for the purposes of compliance with NEPA. This EA was prepared in accordance with CEQ regulations at 40 CFR 1501 *et seq.* and USAF regulations at 32 CFR 989.

In accordance with CEQ and USAF regulations, found in 40 CFR 1502.14(d) and 32 CFR 989.8(d), respectively, this EA also analyzes the No Action Alternative. The No Action Alternatives serves as the baseline from which to compare the proposed action.

1.4 DECISIONS TO BE MADE

Supported by the information and environmental impact analysis presented in this EA, the USAF will decide on whether to proceed with conducting MM III extended range flight testing in the Pacific Ocean or to select the No Action Alternative.

1.5 PUBLIC NOTIFICATION AND REVIEW

In accordance with CEQ and USAF regulations for implementing NEPA, the USAF will solicit comments on this Draft EA from interested and potentially affected parties. A Notice of Availability (NOA) for the Draft EA and the enclosed Draft FONSI, has been published in the following local newspapers on February 5, 6, and 7 2006:

- Santa Barbara News Press;
- The Lompoc Record;
- Santa Maria Times; and
- Santa Ynez Valley News.

In addition, copies of the Draft EA (and Draft FONSI) were placed in the following local libraries:

- Santa Barbara Public Library;
- Santa Maria Public Library; and

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- University of California, Santa Barbara Library.

Following the public review period, which begins on February 8, 2006 and ends on February 22, 2007, comments received will be considered in the preparation of the Final EA and the recommended changes will be incorporated, as appropriate. A copy of the Final EA and FONSI will be sent to those organizations and individuals who provide comments on the Draft EA/FONSI or who specifically request a copy of the final document.

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2 PROPOSED ACTION AND ALTERNATIVES

This chapter briefly describes the MM III ICBM and provides a description of the proposed action and the No Action Alternative.

2.1 THE MINUTEMAN III MISSILE

The MM III ICBM consists of five major sections: the three-stage solid-propellant booster, the propulsion system rocket engine, the missile guidance set, the Model or MOD 7 instrumentation wafer (flight test configuration only), and the reentry system. The latter four sections comprise what is generally referred to as the post-boost vehicle (PBV). The PBV carries two reentry vehicles (RVs). Table 2-1 provides dimensions of the missile and the three stage motors. Additional detail on the MM III ICBM is available in the *MM III Modification EA*.

**Table 2-1
 Attributes of the MM III ICBM**

Attribute	Specifications			
	Missile	1 st Stage	2 nd Stage	3 rd Stage
Length	18.3 m (59.9 feet)	5.7 m (18.6 feet)	2.8 m (9.1 feet)	1.7 m (5.5 feet)
Diameter	1.7 m (5.5 feet)	1.7 m (5.5 feet)	1.3 m (4.3 feet)	1.3 m (4.3 feet)
Weight	36,000 kg (79,400 lbs) at launch	20,730 kg (45,700 lbs) (with fuel)	6,240 kg (13,750 lbs) (with fuel)	3,310 kg (7,300 lbs) (with fuel)

Source: USAF December 2004.

Key:
 lbs = pounds
 m = meter
 kg = kilogram

To provide electrical power to the MM III subsystems during flight, approximately 15 batteries of several different types are carried on board the missile. These include multiple silver-zinc batteries, a single lithium carbon monofluoride battery, and a single lithium silicon/iron disulfide (thermal) battery. Each battery can weigh from 1 to 21 lbs (0.5 to 9.5 kg).

Destruct devices, in the form of linear explosive assemblies, are used to separate the stages during flight. Other ordnance carried on the MM III includes motor igniter assemblies, shroud ejection motor initiator, gas generators, and an ordnance destruct package, used only for test launches at Vandenberg AFB. Unfired ordnance will sink into the ocean at the conclusion of an extended test flight.

2.2 PROPOSED ACTION

Currently MM III flight testing is conducted by the Air Force Space Command (AFSPC) as part of the ongoing Force Development Evaluation (FDE) testing program. MM III missiles are launched from test launch facilities at Vandenberg AFB in California and

1 targeted for RV impacts in the Kwajalein Atoll area, a fixed range
2 from Vandenberg AFB of approximately 4,200 NM.
3

4 The proposed action identified in this EA evaluates three (3)
5 extended range missions for the MM III from launch to the
6 downrange impact of the RVs in the Pacific Ocean. The three
7 extended range missions would extend the testing ranges of existing
8 MM III FDE missions by approximately 800 to 1,200 NM beyond
9 Kwajalein Atoll range. Figure 2-1 shows a representative ballistic
10 trajectory and the booster drop zones for an extended range mission.
11

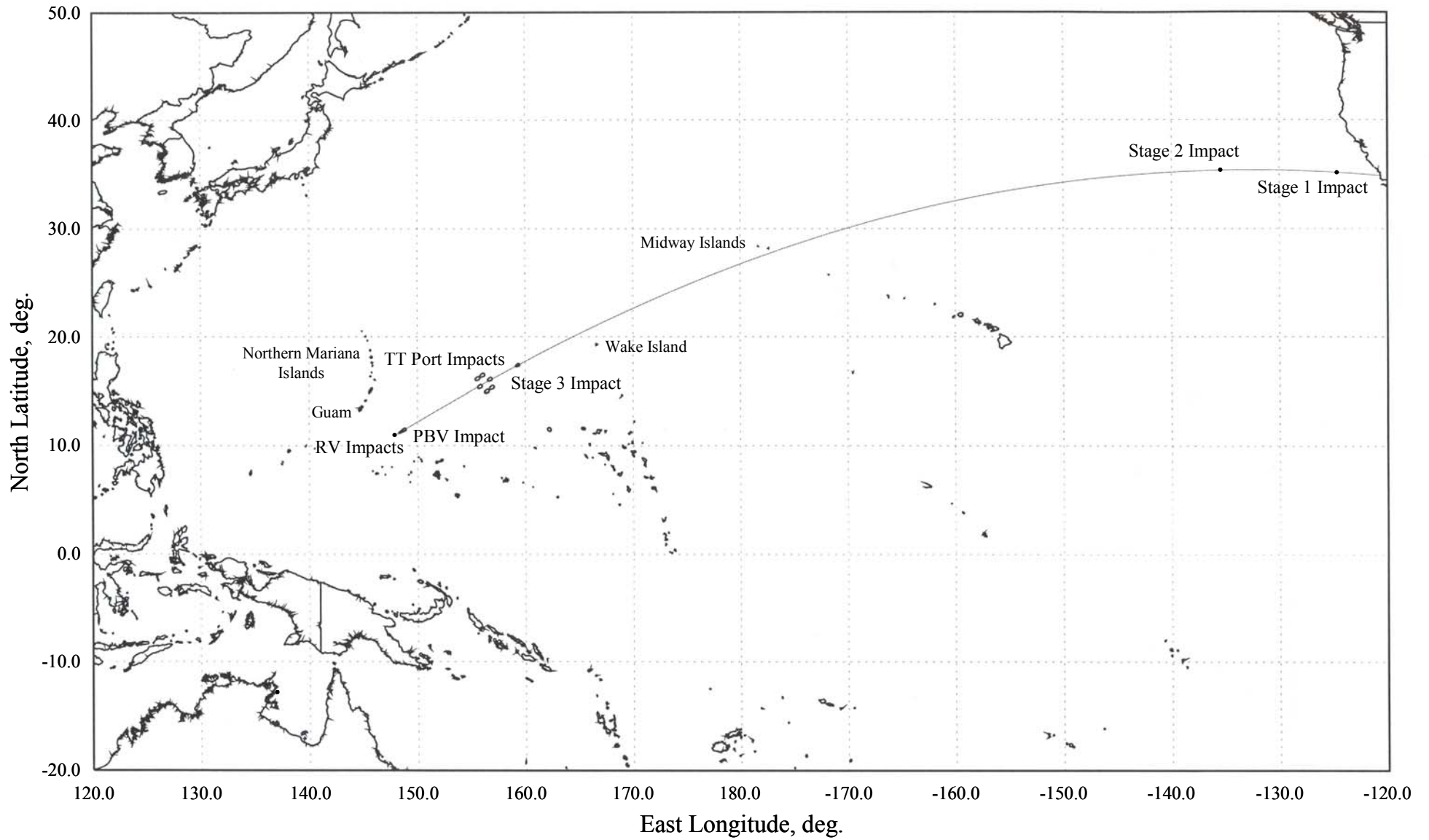
12 The total mission ranges would be about 5,000 to 5,400 NM and
13 would allow for extended exoatmospheric RV flight times and
14 reentry conditions not attainable by using impact areas at Kwajalein
15 Atoll. In addition, data collected from an assessment of the three
16 extended range missions will be critical to Air Force decision
17 making on Life Extension Programs for the current Mark (MK) 12A
18 and MK 21 RVs.
19

20 The proposed launches would occur from test launch facilities at
21 Vandenberg AFB. After launch and following motor burnout and
22 separation, the spent 1st stage motor would impact in the Pacific
23 Ocean within approximately 200 NM of the California coast.
24 Following in sequence, the spent 2nd stage motor would impact the
25 surface of the Pacific Ocean approximately 1,000 NM off the coast.
26 As the missile travels along its trajectory, it would reach an apogee
27 several hundred miles in altitude. Prior to this point, the spent 3rd
28 stage motor would have separated from the PBV and traveling on a
29 ballistic course, would impact in the open ocean approximately 4,300
30 NM from the California coast and to the northeast of Guam (in
31 between Wake Island and Guam). Expended rocket motors and
32 other missile hardware would not be recovered from the ocean
33 following each flight test.
34

35 Following separation of the 3rd stage motor, the PBV would continue
36 to steer the RVs towards the designated impact areas. Towards the
37 terminal end of each MM III extended range FDE flight, and beyond
38 the 3rd stage motor drop zone, the PBV fragments and RVs would
39 impact in the broad open ocean areas approximately 200 to 270 NM
40 southeast to southwest of Guam and between approximately 5,100
41 and 5,400 NM from California coast. These impact areas are remote
42 from any landmasses and beyond the territorial jurisdiction of any
43 nation.
44

45 The test RVs would impact the water surface at high velocities. RV
46 impact areas are depicted in Figure 2-2. Debris from the RVs would
47 not be not recovered from the ocean.
48

Figure 2-1 Typical Flight Path for an MM III Extended Range Mission



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1 Prior to conducting each MM III FDE flight test, USAF and
2 contractor personnel would conduct a comprehensive survey analysis
3 to determine specific missile launch and flight hazards. As part of
4 this analysis, risks to off-base areas and non-participating aircraft,
5 sea vessels, and personnel are determined. The results of the
6 analysis are used to more accurately identify the launch hazards
7 area, expended booster drop zones, PBV impact area, and a terminal
8 hazard area for the RVs. A flight termination boundary along the
9 MM III flight path is also predetermined, should a missile
10 malfunction or a flight termination action occur. The flight
11 termination boundary defines the limits at which command flight
12 termination would be initiated in order to contain the missile and its
13 debris within predetermined hazard and warning areas, thus
14 minimizing the risk to test support personnel and the general public.
15

16 In addition, as part of standard operating procedures, commercial and
17 private aircraft and watercraft are notified of all hazard areas several
18 days prior to launch through a Notice to Airmen (NOTAM) and a
19 Notice to Mariners (NOTMAR), respectively. Within a day prior to
20 each launch, radar, and possibly other remote sensors are used to
21 verify that the hazard areas are clear of non-mission-essential
22 aircraft, vessels, and people.
23

24 Should a MM III missile head off course or should other problems
25 occur during flight, the Missile Flight Control Officer would activate
26 the destruct package on the missile. This would stop the vehicle's
27 forward thrust, and the missile would then fall along a ballistic
28 trajectory into the ocean.
29

30 This EA covers the proposal to conduct three extended range MM III
31 FDE missions between Fiscal Year (FY) 06 and FY10. Supplemental
32 environmental documentation will be required if there are intended
33 changes in future flight testing operations or changes in the
34 circumstances of the relevant environment make flight tests
35 substantially different or a significant departure from those currently
36 contemplated with respect to environmental considerations.

37 **2.3 NO ACTION ALTERNATIVE**

38 Under the no action alternative, the USAF would continue to conduct
39 MM III testing at the fixed Kwajalein range. Implementation of this
40 alternative would preclude collection of RV performance data vital
41 for Life Extension Program decision. It would also limit the
42 capability to test MM III at operationally realistic profiles.

43 **2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION**

44 No other reasonable alternative sites were identified for either
45 launch or impact of the MM III ICBM. Other than Vandenberg
46 AFB, there are no other alternative launch sites within the U.S. and
47 its territories that can perform MM III launches using existing
48 facilities that allow missions to be conducted in a safe, secure, and

1 operationally realistic environment. With respect to impact areas,
 2 currently test flights terminate at Kwajalein Atoll. The proposed
 3 impact area for the extended test range is targeted due to the
 4 accessibility of the Navy Mobile Instrumentation System (NMIS).
 5 The suite of sensors available in this geographic area, because of the
 6 presence of the NMIS, makes the proposed extended test range the
 7 only economically feasible alternative capable of hosting and
 8 accomplishing the specific data gathering objectives required for the
 9 mission at this time.

10 **2.5 COMPARISON OF ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND THE**
 11 **NO ACTION ALTERNATIVE**

12 Table 2-2 presents a comparison of the potential environmental
 13 consequences of the proposed action and the no action alternative for
 14 those locations and resources affected. A detailed discussion of
 15 potential impacts is presented in Chapter 4 of this EA.
 16

Table 2-2
Comparison of Potential Environmental Consequences

Location/Resources Affected	No Action Alternative	Proposed Action
Launch (Vandenberg AFB) - Based on Findings of the MM III Modification EA		
Airspace	Notices to mariners and airmen are published in advance to warn of launch hazard areas to be avoided. In addition, detailed flight safety analyses are conducted prior to each mission. As a result, no significant impacts to public or occupational health and safety are anticipated.	No change from the No Action Alternative.
Air Quality	No violation of air quality standards or health-based standards for non-criteria pollutants is anticipated. No changes in existing or new emission permits would be required. Emissions would be below the de minimis standards established by the General Conformity Rule.	No change from the No Action Alternative.
Noise	Noise exposure levels can be characterized as very loud, ranging from 125 decibels (db) (unweighted) in the immediate vicinity of a launch to 105 dB (unweighted) in some populated areas off-base. However, launches would occur infrequently and be very short in duration (about 20 seconds per launch). Sonic booms generated by missile flights would occur about 25 NM down range of the launch site and would not affect coastal areas.	No change from the No Action Alternative.
Biological Resources	Exposure to short-term noise from MM III launches could cause startle effects in marine mammals and migratory birds. However, NOAA Fisheries has determined, on the basis of prior launch monitoring studies, that missile launch activities have a negligible impact on marine mammal populations and stocks at Vandenberg AFB. Moreover, an incidental "take" permit is in place that authorizes incidental harassments of pinnipeds.	No change from the No Action Alternative.
Water Quality	Surface water monitoring conducted for larger launch systems at Vandenberg AFB has not shown long-term acidification of surface waters. Because the MM III represents a smaller launch system producing fewer emissions, the potential for adverse effects is minimal.	No change from the No Action Alternative.

**Table 2-2
 Comparison of Potential Environmental Consequences**

Location/Resources Affected	No Action Alternative	Proposed Action
Broad Open Ocean Areas of the Pacific Ocean		
Airspace	Flight tests would be conducted in accordance with established DoD and the range safety policies, procedures, and guidance of the USAF 30th Space Wing at Vandenberg AFB. This would ensure that the public remains clear of designated operational areas and that there would be no interference with the use of airspace by commercial or general aviation.	No change from the No Action Alternative.
Air Quality	Air emissions generated would primarily occur above the mixing layer and be quickly dispersed and diluted over a large geographic area. No violation of air quality standards or health-based standards for non-criteria pollutants would be anticipated.	No change from the No Action Alternative
Water Quality	Before impact in the ocean, the solid propellant in the rocket motors will have been consumed. Any residual aluminum oxide and burnt hydrocarbon coating inside of the motor casings would be insufficient to present any toxicity concerns. Residual amounts of hydraulic fluid, small quantities of electrolyte material in the batteries, and strontium perchlorate contained in the first and third stage rocket motors may mix with the seawater but would quickly be buffered and diluted by seawater to nontoxic levels and there would be no adverse long-term water quality effects. In addition, debris that would be left on the ocean floor would be widely scattered, small in volume, and not present any toxicity concerns.	No change from the No Action Alternative
Biological Resources	<ul style="list-style-type: none"> • Coral Reefs. Shallow coral reefs would be adversely affected. • Fish. No change from the no action alternative as assessed in the <i>MM III Modification EA</i>. • Sea Turtles. No change from the no action alternative as assessed in the <i>MM III Modification EA</i>. • Marine Mammals. No change from the no action alternative. as assessed in the <i>MM III Modification EA</i> 	<ul style="list-style-type: none"> • Coral Reefs. No effects on coral reefs. • Fish. The impact of missile components on the ocean surface could cause fish mortalities; however, these effects would be localized and transient. Fish populations from surrounding areas would quickly repopulate the affected area. As a result, the overall effects from the proposed flight tests would produce no significant harm to the quality and/or quantity of fish stocks, nor would essential fish habitat be adversely affected. • Sea Turtles. Although sea turtles may be present in any of the waters in the proposed impact areas, there are no features in these areas that would cause concentrations of sea turtles. Based on conservative estimates of sea turtle densities coupled with conservative hearing estimates of hearing, it was determined that only a negligible number of sea turtles (i.e., less than 0.0003) might be affected acoustically and non-acoustically by proposed extended range flight testing. • Marine Mammals. For Level B harassment, there would be no predicted "takes" of an individual marine mammal species of more than 0.0324 annually due to acoustic impacts. For Level A injury or mortality, the potential for "takes" due to acoustic impacts would approach zero. For non-acoustic effects, given the estimated marine mammal densities along the flight path and in the impact areas, the probability that marine mammals would be affected by falling debris is very low to negligible.

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