EXECUTIVE SUMMARY

ES1.1 INTRODUCTION

This Executive Summary includes Background, Purpose and Need for the Proposed Action, Proposed Action, Proposed Alternatives, Decision to be Made, Methodology of the Environmental Impact Statement (EIS), and Summary of Environmental Impacts. Tables ES-1 through ES-12 include an Impacts and Mitigations Summary for each location and for the No Action Alternative at all locations.

ES1.2 BACKGROUND

The National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S. Code [USC] 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense (DoD) Instruction 4715.9, *Environmental Planning and Analysis*, and the applicable Service environmental regulations that implement these laws and regulations, direct DoD officials to consider environmental consequences when authorizing and approving federal actions. Accordingly, this EIS examines the potential for impacts to the environment as a result of the proposed construction, operation, and test activities associated with the proposed Ground-Based Midcourse Defense (GMD) Extended Test Range (ETR). Under this Proposed Action, additional test facilities, test equipment, infrastructure, and communications links would be constructed and operated for the purpose of providing more realistic GMD flight testing in the North Pacific Region. Existing range facilities would be enhanced, and additional launch and support sites would be established to support more robust missile flight tests.

Within the DoD, the Missile Defense Agency (MDA) (formerly the Ballistic Missile Defense Organization) is responsible for developing and testing a conceptual Ballistic Missile Defense System (BMDS). There are three segments that make up the BMDS, Boost Phase Defense, Midcourse Defense, and Terminal Defense. Each segment of the BMDS is being developed to destroy an attacking missile in the corresponding boost, midcourse, or terminal phase of its flight. The boost phase is the portion of a missile's flight in which it produces thrust to gain altitude and acceleration. This phase usually lasts between 3 to 5 minutes. The midcourse occurs outside much of the Earth's atmosphere and the missile coasts in a ballistic trajectory. This phase can last as long as 20 minutes in the case of intercontinental ballistic missiles. During the terminal phase, the missile enters the lower atmosphere and continues on to its target. This phase lasts approximately 30 seconds. Each segment of the BMDS is composed of one or more elements, each of which consists of an integrated set of technology components, such as interceptors, radars and communications links. GMD is one such element.

The GMD Joint Program Office, within the MDA, is responsible for overseeing the development of the GMD element. An operational GMD element architecture would include the five key components listed below and shown in figure ES-1.

- Ground-Based Interceptors (GBIs)
- X-Band Radar
- GMD Battle Management Command, Control, and Communications facilities and links
- Upgraded Early Warning Radars
- Space-Based Detection Capability

In July 2000, the MDA completed the National Missile Defense (NMD) Deployment EIS to support decisions concerning deployment of a GMD (formerly NMD) element. At the direction of the Secretary of Defense, however, the MDA re-focused the GMD element on operationally realistic testing under the concept of the GMD ETR. This EIS serves to analyze the proposed GMD ETR actions and alternatives for potential impacts on the environment.

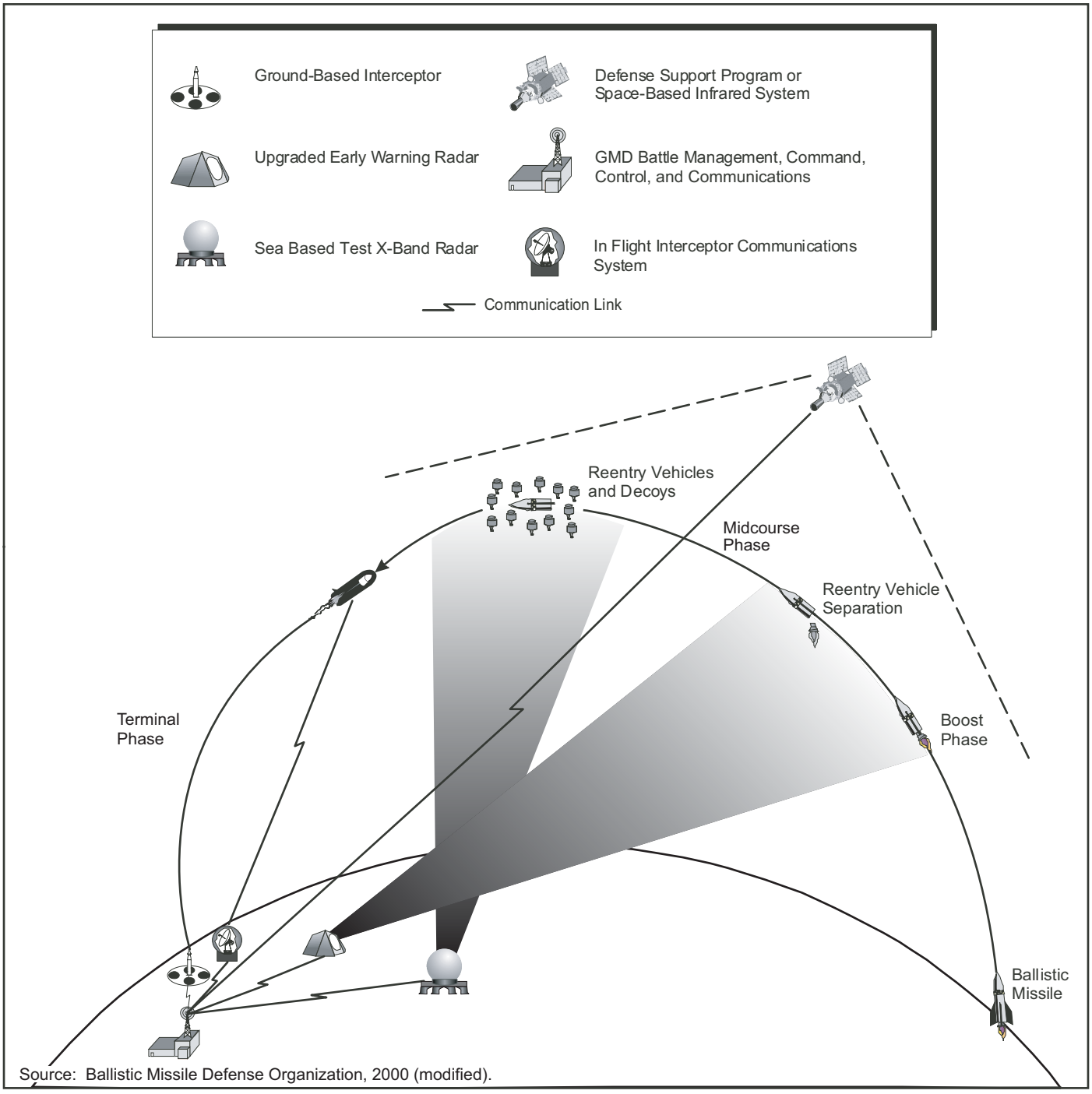
On 17 December 2002, President George W. Bush announced plans to begin deployment of an initial set of missile defense capabilities by the year 2004. The deployment capability would be used in a defensive mode. This decision, however, is outside the scope of this document. Furthermore, the full scope and location of those assets are not yet ripe for NEPA analysis and will be the subject of future NEPA documentation, as appropriate. It is possible that some of those assets could share assets in common with some of those of the GMD ETR. Where this is the case, the NEPA documentation addressing the limited deployment decision will examine any environmental impacts in its cumulative effects section.

ES1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The proliferation of weapons of mass destruction and long-range ballistic missile technology is increasing the threat to our national security. The GMD element would defend all 50 states against limited ballistic missile attack. The Secretary of Defense has identified the need to gain a higher level of confidence in the capability of the GMD to defend the United States through more robust interceptor flight tests under realistic conditions.

The purpose of the Proposed Action is to provide for more realistic flight tests in support of development of the GMD element. The ETR would achieve this by providing additional target and interceptor launch locations, and sensors, in a wider range of intercept engagements and under more stressing conditions.

More realistic testing using trajectories and distances that closely resemble those required of an operational element is needed to ensure the GMD element being developed has the capability to defend the United States against limited missile attacks. To meet this need, the MDA proposes to gain a higher level of confidence in GMD's capabilities to defend the United States through more robust system testing under realistic conditions.



Source: Ballistic Missile Defense Organization, 2000 (modified).

EXPLANATION

Note: Locations in this figure are for illustrative purposes only and are notional

GMD Element Architecture

Not to Scale

Figure ES-1

Currently, the existing test ranges located in the Pacific Region and elsewhere are limited in their capabilities to provide for a geographically dispersed operational environment, suitable for GMD types of testing. As a result, current GMD element testing is constrained by how missile flight tests can be conducted, and in opportunities for multiple engagement scenarios.

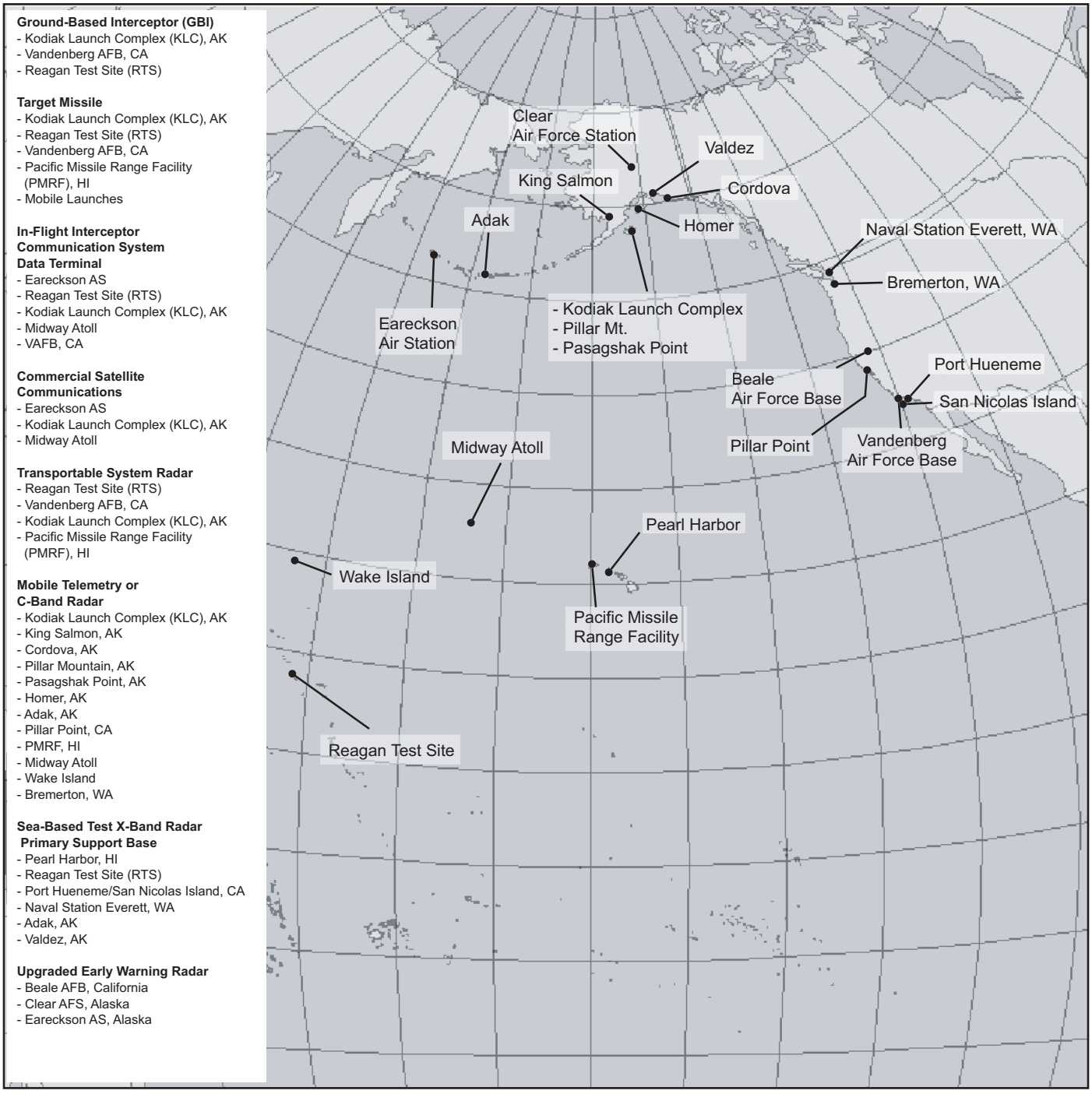
ES1.4 PROPOSED ACTION

The Proposed Action is to construct and operate additional launch and test facilities including the Sea Based X-Band Radar in the Pacific Region, and to conduct more realistic interceptor flight tests in support of GMD development. The extension of existing U.S. test ranges would increase the realism of GMD testing by using multiple engagement scenarios, trajectories, geometries, distances, and speeds of targets and interceptors that more closely resemble those for which an operational system would provide an effective defense. The GMD ETR testing would include pre-launch activities, launch of targets and GBIs from a number of widely separated locations, and missile intercepts over the Pacific Ocean. Proposed GMD ETR test and test support locations are shown in figure ES-2.

For the purpose of this EIS, a flight test or test event represents a target missile flight, an interceptor missile flight, an intercept of a target missile, or a test of a sensor(s) independent of a missile flight test. Most tests would include the launch of a target missile; tracking by range and other land-based, sea-based, airborne, and space-based sensors; launch of an interceptor missile; target intercept; and debris impacting into broad open areas of the Pacific Ocean. Some test events proposed for later in the program would require multiple target and/or interceptor missile flights to validate GMD system performance. GMD testing activities would include up to five missile launches (interceptors and/or targets) from each selected launch facility per year; a total of approximately 10 launches per year for the entire GMD ETR. The GMD ETR testing activities would likely occur over a period of approximately 10 years following a decision to proceed.

ES1.5 PROPOSED ALTERNATIVES

The alternatives for implementing the Proposed Action represent architectures for achieving more realistic interceptor flight tests in the Pacific Region. These architectures are organized around potential additional GBI missile launch sites, with other new and existing test components being located to provide maximum test effectiveness. For analysis purposes in this EIS, three alternative test architectures have been identified based on developing additional missile launch capability at (1) Kodiak Launch Complex (KLC), Alaska, (2) Vandenberg Air Force Base (AFB), California, and (3) both KLC and Vandenberg AFB. Target missiles launched as a part of this ETR program would originate from KLC, Vandenberg AFB, Pacific Missile Range Facility (PMRF), Hawaii, Reagan Test Site, Kwajalein Atoll, or from a mobile air or sea launch platform in the Pacific region. All missile intercepts would occur over the Pacific Ocean. Each alternative would include common GMD test components consisting of GBIs, target missiles, In-Flight Interceptor Communication System Data Terminals (IDT), the Sea-Based Test X-Band Radar (SBX), and other sensors and instrumentation.



EXPLANATION

Potential GMD ETR Test and Test Support Locations

Pacific Ocean

Not to Scale

NORTH

Figure ES-2

12-20-02 GMD Deploy Opt

ES1.6 NO ACTION ALTERNATIVE

Under the MDA No Action Alternative, the GMD ETR would not be established, and additional facilities and components to be used in ETR operations would not be built. Existing launch sites and test range activities, however, would continue at the various locations, including support of ongoing GMD test activities. The Federal Aviation Administration (FAA) also has a No Action Alternative related to this EIS, as described below.

ES1.7 DECISION TO BE MADE

The initial decision to be made by the MDA is whether to implement the Proposed Action to construct and operate additional GMD test facilities, infrastructure, and communication links to enable the MDA to conduct enhanced GBI flight testing; or choose the No Action Alternative. If the MDA selects the Proposed Action, then a second decision would be made as to which of the three alternative interceptor launch scenarios and locations would most effectively meet the objectives of the enhanced test program.

The FAA, which is a cooperating agency for this EIS, will also rely on this analysis to make its licensing decisions for the KLC. The FAA, Office of the Associate Administrator for Commercial Space Transportation, is a cooperating agency because of its regulatory authority in licensing the operation of KLC, as defined in 49 USC Subtitle IX—Commercial Space Launch Activities, 49 USC 70101-70121 and supporting regulations. The FAA has special expertise and legal responsibility related to the licensing of commercial launch facilities. The FAA is responsible for providing oversight and coordination for licensed launches and protecting the public health and safety, safety of property, and national security and foreign policy interests of the United States. Licensing of launches and reentries, operating a launch or reentry site, or some combination, is considered a federal action for which environmental impacts must be considered as part of the decision making process as required by NEPA.

Alaska Aerospace Development Corporation (AADC) applied for and was granted a launch site operator license for the operation of KLC in September 1998. A license to operate a launch site remains in effect for 5 years from the date of issuance unless surrendered, suspended, or revoked before the expiration of the term and is renewable upon application by the licensee (14 CFR 420.43). The existing FAA license for the operation of KLC will expire in September 2003.

Should the FAA not reissue a launch site operator's license for KLC to conduct launches, the MDA would be required to choose an alternative that does not include KLC. KLC is the only launch complex evaluated in the EIS that requires a license from the FAA.

An environmental review is just one component of the FAA's licensing process. FAA Order 1050.1D (*Polices and Procedures for Considering Environmental Impacts*) describes the Agency's procedures for implementing NEPA. Specifically, it requires that the FAA decision making process facilitate public involvement by including consideration of the effects of the Proposed Action and alternatives; avoidance or minimization of adverse effects attributable to

the Proposed Action; and restoration and enhancement of resources, and environmental quality of the nation. These requirements will be considered in the FAA's licensing decision.

In addition to the environmental review and determination, applicants must complete a policy review and approval, safety review and approval, payload review and determination, and a financial responsibility determination. The purpose of the Policy Review and Approval process is to determine whether or not the information in the license application presents any issues affecting U.S. national security or foreign policy interests, or international obligations of the United States. The purpose of the Safety Review and Approval process is to determine whether an applicant can safely conduct the launch of the proposed launch vehicle(s) and any payload. The purpose of the Payload Review and Determination is to determine whether a license applicant or payload owner or operator has obtained all required licenses, authorization, and permits. The purpose of the Financial Responsibility Determination is to ensure that all commercial licensees demonstrate financial responsibility to compensate for the maximum probable loss (MPL) from claims by a third party for death, bodily injury, or property damage or loss resulting from an activity carried out under the license; and the U.S. Government against a person for damage or loss to government property resulting from an activity carried out under the license. All of these reviews, including the environmental review, must be completed prior to issuing a license. All FAA safety analyses would be conducted separately and would be included in the terms and conditions of the license.

A license to operate a launch site authorizes a licensee to offer its launch site to a launch operator for each launch point for the type and weight class of launch vehicle identified in the license application and upon which the licensing determination is based. Issuance of a license to operate a launch site does not relieve a licensee of its obligation to comply with any other laws or regulations, nor does it confer any proprietary, property or exclusive right in the use of airspace or outer space (14 CFR 420.41).

ES1.8 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

The GMD testing would be of two types: (1) validation of the GMD operational concept and (2) more robust GMD element testing. The facilities and operations to validate the GMD operational concept, and improve the realism of GMD element testing, are each a part of the GMD Test Bed. Each part of the test bed, however, serves a different test function and has independent utility, purpose, and need. The independent parts of the test bed also have different implementation schedules. Consequently, the independent parts of the test bed are being evaluated in separate NEPA analyses. Validation of the operational concept is analyzed in the GMD Validation of Operational Concept Environmental Assessment (EA). These actions are designed to validate potential non-launch activities associated with the GMD operational concept by testing the interoperability of the GMD components in a realistic environment. The EA analyzed construction, testing, and support activities at Fort Greely, Clear Air Force Station, and Eielson AFB in central Alaska; Eareckson Air Station on Shemya, Alaska; and Beale AFB, California.

The second type of GMD testing, which is analyzed in this EIS, would involve more robust interceptor flight tests with participation of other GMD components such as an SBX and IDTs to achieve more realistic testing. This enhanced ETR flight testing would be accomplished through

the extension of existing Pacific Region test range areas that are currently supporting GMD test activities. By extending these test range areas, the realism of GMD testing would be increased through the use of multiple missile engagement scenarios, trajectories, geometries, distances, and speeds of targets and interceptors that more closely resemble those for which an operational system would provide an effective defense. Most tests would include the launch of a target missile; tracking by range and other land-based, sea-based, airborne, and space-based sensors; launch of a GBI; and missile intercepts at high altitudes over the Pacific Ocean. Some test events proposed for later in the program would require multiple target and interceptor missile flights to validate GMD element performance.

ES1.9 SCOPING PROCESS

The CEQ Regulations implementing NEPA require an open process for determining the scope of issues related to the Proposed Action and its alternatives. Comments and questions received, as a result of this process, assist the DoD in identifying potential concerns and environmental impacts to the human and natural environment.

The GMD ETR EIS public scoping period began on 28 March 2002, when the Notice of Intent to prepare an EIS was published in the *Federal Register*. The scoping comment period was originally scheduled to end on 10 May 2002, but was extended to 20 May 2002 in response to public request. Subsequently, inclusion of the SBX in the EIS analysis extended scoping and the comment period even further, through 20 December 2002.

A number of methods were used to inform the public about the GMD ETR Program and of the locations of the scheduled scoping meetings. These included:

- The Notice of Intent announcement in the Federal Register
- Paid advertisements in local and regional newspapers

Public scoping meetings were held at eight locations where communities could be affected by the GMD ETR program. During these public scoping meetings, attendees were invited to ask questions and make comments to the program representatives at each meeting. In addition, written comments were received from the public and regulatory agencies at the scoping meeting, and by letter and e-mail during the extended comment period. Comments received from the public and agencies pertaining to specific resource areas and locations were considered, and more detailed analysis provided in the EIS. Those comments received from the public concerning DoD policy and program issues are outside the scope of what is required to be analyzed in an EIS.

ES1.10 METHODOLOGY OF THE ENVIRONMENTAL IMPACT STATEMENT

To assess the significance of any impact, a list of activities necessary to accomplish the Proposed Action was developed. The affected environment at all applicable locations was then described. Next, those activities with the potential for environmental consequences were identified.

Fifteen broad areas of environmental consideration were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas included air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, visual and aesthetic resources, water resources, and subsistence resources for potential Alaska sites.

ES1.11 SUMMARY OF ENVIRONMENTAL IMPACTS

This section summarizes the conclusions of the analyses made for each of the areas of environmental consideration based on the application of the described methodology. Only those activities for which a potential environmental concern was determined at each candidate location are described for the No Action Alternative, and Alternatives 1, 2, and 3. Tables ES-1 through ES-12 include a description of all potential impacts and mitigation measures.

ES1.11.1 NO ACTION ALTERNATIVE

Kodiak Launch Complex

Land Use

AADC applied for and was granted a launch site operator license for the operation of KLC in September 1998. A license to operate a launch site remains in effect for 5 years from the date of issuance unless surrendered, suspended, or revoked before the expiration of the term and is renewable upon application by the licensee (14 CFR 420.43). The existing FAA license for the operation of KLC will expire in September 2003.

If the FAA renews the launch site operator's license, the AADC would continue launching various commercial and military launch vehicles from KLC. AADC has estimated that approximately five missiles would be launched per year from KLC.

After September, 2003, the FAA's No Action Alternative would be to not renew the AADC's launch site operator license which permits them to operate the KLC for the purposes of conducting launches. The KLC would no longer be licensed by the FAA to conduct launches. In the absence of any other arrangement, launch activity at the KLC would be discontinued. The AADC currently holds a 30-year renewable interagency land management assignment from the Alaska Division of Land. If launch activity were discontinued at the KLC, AADC would coordinate with the state to determine a proposed future use for the land. The facilities and

equipment at the site could be used for other government purposes or handled as government surplus (e.g., sold). The lands on Kodiak Island at Narrow Cape have previously been considered for other development activities such as prisons, schools, and other facilities. The site is located on one of the few improved roads on the Island, and may be available for development for other purposes if AADC were no longer licensed to conduct launches.

ES1.11.2 PROPOSED ACTION ALTERNATIVE 1

Kodiak Launch Complex

Air Quality

There would be an increase in air pollutant emissions from construction and operation of the GBI, target, IDT, and sensor elements of the GMD ETR at KLC. The majority of the ground disturbance would be completed in approximately 15 months. Construction emissions vary from day to day and activity to activity, with each activity having its own potential to release emissions. Because of the variability in timing and intensity of construction, estimating construction-phase pollutant emissions is difficult. Nevertheless, it is assumed that there would be particulate matter with and aerodynamic diameter of less than or equal to 10 micrometers (PM-10) impacts from ground disturbance and other pollutants (carbon monoxide, oxides of nitrogen, volatile organic compounds, and oxides of sulfur) primarily emitted from construction equipment exhaust. As construction activities are generally short-term and spread over a wide area, regional air quality standards would not be exceeded.

The primary exhaust products of the GBI booster are hydrogen chloride, aluminum oxide, chlorine, carbon monoxide, carbon dioxide, hydrogen, nitrogen, oxygen, and water. At KLC it was determined that typical emission rates of solid propellant vehicles, even under worse-case meteorological conditions (high humidity or precipitation), were not anticipated to cause adverse air quality impacts. Each missile launch is a discrete event. The logistics of the launch would allow sufficient time between launches so that no exhaust from one launch would impact the ambient air quality of another launch. In the event of dual launches, the exhaust products would nominally be double those for a single launch. Due to the limited industrialization of Kodiak Island and the surrounding environment, the potential cumulative impacts to air quality due to the proposed interceptor and target facility construction and launches would not be substantial. The KLC EA indicated no significant impacts to air quality as a result of nine annual launches and that impacts would not accumulate with multiple launches. It is not likely that the Proposed Action of up to five launches (GBI and target) in conjunction with other currently planned or anticipated launches at KLC would exceed this level of activity. Overall impacts to regional air quality are not expected to be adverse and would remain within National and state Ambient Air Quality Standards.

Biological Resources

No significant impacts to vegetation are anticipated, since new GBI related construction activities would occur mainly in upland areas of hairgrass-mixed forb meadow, one of the predominant vegetation types at KLC. This loss of vegetation (approximately 14 hectares [36 acres]) would represent only a small portion of the total vegetation available within KLC boundaries and the adjacent region. No federally proposed or listed candidate, threatened, or endangered species are located within the boundaries of KLC. The Steller sea lion (*Eumetopias jubatus*) population near Kodiak Island was included in the population classified as endangered in 1997. The closest Steller sea lion haulout area, approximately 5 kilometers (3

miles) away on Ugak Island, would not be affected by site preparation noise. No Steller sea lion rookeries have been identified in the ROI.

Federally threatened Steller's eiders and endangered short-tailed albatross offshore would also be outside the range of the highest site preparation noise levels and are not anticipated to be affected. Construction of the GBI launch silos and perimeter fencing around the launch area could disturb approximately 0.6 hectare (1.6 acres) of palustrine, emergent, persistent, seasonally flooded wetlands and 0.2 hectare (0.4 acre) of palustrine, scrub/shrub, broad-leaved deciduous, saturated wetlands. Indirect disturbance to wetlands would be minimized by implementing appropriate techniques to control runoff. Normal GBI launch activities are not expected to significantly impact vegetation. Blast residue would be contained within the silo, minimizing the potential for impacts on vegetation. Disturbance to wildlife from the GBI launches would be brief and is not expected to have a lasting impact nor a measurable negative effect. Target missile launches would be infrequent, up to five per year over a period of 10 years. The potential impacts to wildlife would be similar to those discussed above for GBI launch activities.

Hazardous Materials and Hazardous Waste

The construction of the GBI launch support would use small quantities of hazardous materials. The hazardous materials that are expected to be used are common to construction activities and may include diesel fuel, anti-freeze, hydraulic fluid, lubricating oils, welding gases, and small amounts of paints, thinners, and adhesives.

Substantial impacts to the environment are not expected from the presence of potentially hazardous materials and the generation of wastes during the GBI construction activities. Missile components would be transported to KLC for temporary storage, pre-launch assembly and checkout, and launch preparation in accordance with Department of Transportation (DOT) requirements. The hazardous materials contained within the missiles include solid propellant for the missile boosters and a form of monomethyl hydrazine liquid fuel and nitrogen tetroxide oxidizer for the GBI Exoatmospheric Kill Vehicle. No onsite fueling of the GBI would occur; therefore, the likelihood of release and environmental effect would be small. Small amounts of potentially hazardous and non-hazardous wastes are expected to be generated during launch operations. Wastes would be segregated as nonhazardous, hazardous, and possibly special wastes for collection and disposal in accordance with applicable state and federal requirements.

Health and Safety

All new construction or structure modification would be accomplished using the same procedures that AADC used to construct the present KLC infrastructure. Restricted public access to the construction site would be ensured through use of signs and fencing. A health and safety plan would be prepared by the contractor and submitted to the KLC/AADC to ensure the health and safety of onsite workers.

Prelaunch activities would include transportation of boosters, liquid fuel and liquid oxidizer tanks for the Exoatmospheric Kill Vehicle and missile preparation, assembly and integration testing. All components and equipment would be handled and shipped in accordance with applicable military, state, and DOT regulations. Missile components would be packaged in shipping containers designed according to Alaska, DOT, and military requirements for protection of missile components and reduction of fire/explosion or risk of hazardous materials release in the

event of an accident. The boosters would be processed and prepared for launch in the same manner as previous and ongoing missile launches from KLC. The major system components (boosters, in-flight destruct package, range safety equipment and missile instrumentation) would be assembled and tested in the Integration and Processing Facility. All preparation activities would be conducted in accordance with applicable safety regulations and operations plans.

Before each launch at KLC, the Range Integrator and the KLC Safety Officer must approve all flight plans, trajectories, and planned impact areas. The KLC Safety Officer would issue range clearance and surveillance for the Launch Hazard Area and flight safety corridor. The KLC Safety Officer would establish the safety zones around the launch site and along the missile flight path no less than 4 hours before each launch. Official notifications to airmen and mariners would be used to identify the areas to be cleared. The KLC Safety Officer would then ensure the safety zone is verified clear of non-mission essential personnel and vessels out to the territorial limit approximately 20 minutes before launch.

Water Resources

Best Management Practices and other standard operating procedures would be used during construction and operational activities to minimize erosion and other types of impacts that could reduce the quality of affected water resources. Standard operating procedures related to the handling, disposal, recycling, and other use of hazardous materials and wastes would be followed, including spill prevention, containment, and control measures while transporting equipment and materials. The GBI and Target missiles launched from KLC would disperse certain exhaust emission products over a large area. The primary emission products of concern from a water quality-standpoint are hydrogen chloride and aluminum oxide. These emissions are not expected to cause a significant water quality impact. Environmental monitoring was required as part of the KLC launch site operator license and called for the monitoring of at least the first five launches from KLC. As summarized in *Summary Findings of KLC Environmental Monitoring Studies 1998-2001*, water quality sampling and analysis indicate there have been no discernable effects on water chemistry from KLC launches to date. Water quality was sampled before and after KLC launches, including pH level, total aluminum, and perchlorate concentration.

Vandenberg Air Force Base

Air Quality

The proposed target missiles would contain less solid rocket fuel capacity than previously analyzed Titan IV, Delta II, Atlas V, and Delta IV missiles; therefore it is anticipated they would produce lower exhaust emissions. The logistics of a launch would allow sufficient time between launches so that no exhaust form one launch would impact the ambient air quality of another launch. In the event of dual launches, the exhaust emissions would conservatively be estimated to be double those of a single launch. The Targets Programmatic EA determined that 30 launches per year at Vandenberg AFB, in conjunction with other regional emissions, would continue to remain within the federal *de minimis* annual limits and would not be expected to cause or contribute to any new violation of any air quality standards in the ROI. Based upon this, the up to five proposed launches would not cause or contribute to violation of any regional air quality standards.

Biological Resources

Minor modifications to existing launch facilities would result in little to no ground disturbance, minimizing impacts to vegetation. Launch exhaust products would include hydrogen chloride, aluminum oxide, carbon monoxide, nitrogen dioxide, carbon dioxide, water, and chlorine. Nominal launch activities during dry conditions could result in the deposition of very small amounts of aluminum oxide from missile exhaust. Most of the aluminum oxide would be suspended in air and dispersed over extremely large areas; the amount deposited in surface waters would have little effect. The primary potential for impacts to wildlife would be from the noise created during the proposed missile launches. Disturbance to wildlife from the launches would be brief and is not expected to have a lasting impact nor a measurable negative effect on migratory bird populations. Waterfowl would quickly resume feeding and other normal behavior patterns after a launch is completed.

Cultural Resources

Minor modifications to existing launch facilities would result in little to no ground disturbance. Potential effects could result from this debris striking the ground where surface or subsurface archaeological deposits are located. The probability of this occurring, however, is considered remote and negligible adverse effects are anticipated.

Land Use

Maximum use would be made of Vandenberg AFB's existing infrastructure and facilities. Minor modifications to existing launch facilities would result in little to no ground disturbance. Regulations would minimize the potential for adverse impacts to land use and provide a means of mitigating adverse effects should an improbable mishap occur. Proposed activities would be in accordance with coastal consistency requirements.

Pearl Harbor, Reagan Test Site, Port Hueneme, Naval Station Everett, Port Adak, Port of Valdez

Potential impacts of SBX operations at these locations would be similar as described below, and would apply to Alternatives 1, 2, and 3.

Airspace, Health and Safety

Unrestricted operation of the SBX at the mooring location would have the potential to adversely affect air operations. In order to avoid or minimize adverse effects from electromagnetic radiation/electromagnetic interference, DoD has established a coordination process with responsible agencies and airspace users. A full electromagnetic radiation/electromagnetic interference survey and analysis would be conducted by the Joint Spectrum Center, in coordination with the FAA, DOT, and other potentially affected users. The survey is used in preparing a DD Form 1494 that would be required as part of the spectrum certification and frequency allocation process. The completed DD Form 1494 that has been processed and approved by the appropriate national and international authorities would be required prior to SBX testing. The results of the survey would also be used to define the safe operating area for the SBX (acceptable azimuths and operating angles). This operating area would not interfere with airspace operations and would allow for a safe operating environment.

ES1.11.3 PROPOSED ACTION ALTERNATIVE 2

Kodiak Launch Complex

Air Quality, Biological Resources, Hazardous Material and Hazardous Wastes, Health and Safety, and Water Resources

Impacts would be similar to Alternative 1, with approximately 25 percent less area disturbed during construction. There would be no construction or operations related to GBI launches and their associated support equipment including IDT.

Vandenberg Air Force Base

Air Quality

As determined in the Booster Verification Test EA the configuration of the proposed GBI is similar to that of the Athena-2 (formerly the Lockheed Martin Launch Vehicle). However, the Athena-2 has a much larger solid rocket fuel capacity compared to that of the GBI. Air quality emission modeling in the Booster Verification Test EA concluded that a normal launch of an Athena-2 at Vandenberg AFB would not cause a significant impact to regional air quality at Vandenberg AFB; therefore, the much lower levels of the GBI exhaust would not be expected to cause a significant impact to air quality.

In the event of dual GBI launches, the exhaust products are conservatively estimated to be twice the level of a single launch. During such an event, the level of hydrogen chloride is estimated to be approximately 68 percent of a single Athena-2 launch. Therefore, the lower levels of the dual launch GBI exhaust would not be expected to cause a significant impact to air quality.

Biological Resources

Impacts would be similar to those described for Alternative 1; however, facility modifications would also include GBI facilities. Other impacts would be as described for Alternative 1.

Cultural Resources

Construction would include minor modifications to existing facilities and construction of an IDT. After selection of an IDT site from the six alternative locations, records on file at Vandenberg AFB would be consulted to determine whether cultural sites have been identified at this location. Should cultural resources be found during the course of any GMD ETR activity, all activities would cease in the area and the proper authorities would be notified. Subsequent actions would follow the guidance provided. The GMD Project Office would be responsible for implementation of any cultural resources avoidance or mitigation measures assigned to this project as a condition of approval for proceeding with any proposed activity.

Land Use

Impacts would be as described for Alternative 1. Proposed activities would be in accordance with coastal consistency requirements.

ES1.11.4 PROPOSED ACTION ALTERNATIVE 3

Potential environmental impacts of activities in Alternative 3 would be as described for Alternatives 1 and 2. This would include GBI launches from KLC, Reagan Test Site, and Vandenberg AFB, and construction or modification of the required support facilities for dual launches of GBI and target missiles at each location.

Broad Ocean Area

Airspace

After launch, typically the GBI and target missiles would be above 18,290 meters (60,000 feet) within seconds of launch. As such, all other local flight activities would occur at sufficient distance and altitude that the target missile and GBI missiles would be little noticed. However, activation of stationary altitude reservation procedures, where the FAA provides separation between non-participating aircraft and the missile flight test activities, would impact the controlled airspace available for use by non-participating aircraft for the duration of the altitude reservation, usually for a matter of a few hours, with a backup day reserved for the same hours. Because the airspace in most of the intercept debris areas is not heavily used by commercial aircraft, and is far removed from the en route airways and jet routes crossing the North Pacific, the impacts to controlled/uncontrolled airspace would be minimal. However, the intercept scenarios with targets from KLC and GBIs from Vandenberg AFB may have moderate impacts to airspace due to the potential impacts from intercept debris.

It has been determined that intercept debris as small as 1 gram could cause significant damage to a commercial aircraft traveling at cruising speed and altitude. The debris cloud is approximately 35 kilometers (22 miles) in diameter, and the area where the probability of fatality is less than one in one million is approximately 22 kilometers (13.6 miles) in diameter. This area of higher risk would need to be avoided by all aircraft. The time for the intercept debris to pass through commercial airspace cruising altitudes is approximately 3 hours after the intercept. All en route airways and jet routes that are predicted to pass through the missile intercept debris areas would need to be identified before a test to allow sufficient coordination with the FAA to determine if the aircraft on those routes would be affected, and if so, if they would need to be re-routed or rescheduled.

Biological Resources

Of particular concern is the potential for impacts to marine mammals from both acoustic and non-acoustic effects. Potential acoustic effects include behavioral disturbance (including displacement), acoustic masking (elevated noise levels that drown out other noise sources), and (with very strong sounds) temporary or permanent hearing impairment. Potential non-acoustic effects include physical impact by falling debris, entanglement in debris, and contact with or ingestion of debris or hazardous materials. The missiles could generate a sonic boom upon launch or reentry. Each missile would propagate a unique sonic boom contour depending upon its mass, shape, velocity, and reentry angle, among other variables. The location of the possible impact point would vary depending upon the particular flight test profile. It is therefore difficult to produce the specific location, extent, duration, or intensity of sonic boom impacts upon marine life. These noise levels would be of very short duration. The first-, second-, and third-stage target missile boosters and the target vehicle's payload, which all fall to the ocean surface, would impart a considerable amount of kinetic energy to the ocean water upon impact. Missiles and targets would hit the water with speeds of 91 to 914 meters (300 to 3,000 feet) per second. It is assumed that the shock wave from their impact with the water would be similar to

that produced by explosives. At close ranges, injuries to internal organs and tissues would likely result. However, injury to any marine mammal by direct impact or shock wave impact would be extremely remote (less than 0.0006 marine mammals exposed per year).

Debris impact and booster drops in the Broad Ocean Area could occur within the 322-kilometer (200-mile) limit of the Exclusive Economic Zone of affected islands. The natural buffering capacity of seawater and the strong ocean currents would neutralize reaction to any release of the small amount of liquid propellant contained within the Divert and Attitude Control System or Liquid Propellant Missile. Analysis in the *Marine Mammal Technical Report*, prepared in support of the Point Mugu Sea Range EIS, determined that there is a very low probability that a marine mammal would be killed by falling missile boosters, targets, or debris as a result of tests at the Point Mugu Sea Range (less than 0.0149 marine mammals exposed per year). The potential for an object or objects dropping from the air to affect marine mammals or other marine biological resources is less than 10^{-6} (1 in 1 million). The probability of a spent missile landing on a cetacean or other marine mammal is remote.

This probability calculation was based on the size of the area studied and the density of the marine mammal population in that area. The analysis concluded that the effect of this missile debris and intact missiles coming down in the open ocean would be negligible. The range area at Point Mugu is smaller (93,200 square kilometers [27,183 square nautical miles]) than the PMRF range area (144,000 square kilometers [42,000 square nautical miles]), and the density of marine mammals at Point Mugu is larger than the density found at PMRF. It is reasonable to conclude that the probability of a marine mammal being injured or killed by missile or debris impact from U.S. Navy testing at PMRF is even more remote than at Point Mugu, since the area at PMRF is larger and the density of marine mammals is smaller. Following formal consultation, the National Marine Fisheries Service concluded that the Proposed Action is not likely to adversely affect any marine mammal species.

Table ES-1A: Impacts and Mitigation Summary, No Action Alternative

Resource Category	No Action Alternative				
	Kodiak Launch Complex	**Midway**	**Reagan Test Site**	**Pacific Missile Range Facility**	**Vandenberg Air Force Base**
Air Quality	Missile Defense Agency: No change to the region's current attainment status. Single target and commercial launches would continue. Federal Aviation Administration: No change to the region's current attainment. No launches would be allowed to occur.	No change to the region's current attainment status. Midway would continue to serve as a National Wildlife refuge.	No change to the region's current attainment status. Current missile activities would continue.	No change to the region's current attainment status. Current missile activities would continue.	No change to the region's current attainment status. Current missile activities would continue.
Airspace	Missile Defense Agency: Continued close coordination with the Federal Aviation Administration regarding missile launches would result in no change in airspace status or use. Federal Aviation Administration: No change in airspace status. No launches would be allowed to occur.	Not analyzed.	Continued close coordination with the Federal Aviation Administration regarding radar operations would result in no change in airspace status or use.	Continued close coordination with the Federal Aviation Administration regarding missile launches would result in no change in airspace status or use.	Not analyzed.
Biological Resources	Missile Defense Agency: Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris. Federal Aviation Administration: No impact to biological resources as no launches would be allowed to occur.	No impact.	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris. Personnel would be instructed to avoid areas designated as avian or sea turtle nesting or avian roosting habitat and to avoid all contact with any nest that may be encountered	Short-term disturbance to wildlife, including migratory birds, from minor site preparation activities and increased personnel. Reflection from outdoor lighting could disorient the Newell's Townsend's shearwater. Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.
Cultural Resources	Missile Defense Agency: No impact to cultural resources from continued operations. Federal Aviation Administration: No impact to cultural resources as no launches would be allowed to occur	Not analyzed	Not analyzed.	Not analyzed.	Resources would continue to be managed in accordance with cultural resources regulations.

Table ES-1A: Impacts and Mitigation Summary, No Action Alternative (Continued)

Resource Category	No Action Alternative				
	Kodiak Launch Complex	**Midway**	**Reagan Test Site**	**Pacific Missile Range Facility**	**Vandenberg Air Force Base**
Geology and Soils	Missile Defense Agency: Maintenance and improvement construction activities would cause minor soil erosion. No adverse changes to soil chemistry are predicted to occur as a result of missile launch exhaust emissions. Federal Aviation Administration: No impact to geology or soils. No launches would be allowed to occur	Not analyzed.	Not analyzed.	Maintenance and improvement construction activities would cause minor soil erosion. No adverse changes to soil chemistry are predicted to occur as a result of missile launch exhaust emissions.	Not analyzed.
Hazardous Materials and Hazardous Waste	Missile Defense Agency: Continued handling and use of limited quantities of hazardous and toxic materials related to pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Kodiak Launch Complex, State of Alaska, Department of Transportation, and Department of Defense policies and procedures. Federal Aviation Administration: No impact. No launches would be allowed to occur.	As described in previous National Environmental Policy Act documentation, impact would be minimal.	Continued handling and use of limited quantities of hazardous and toxic materials related to pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with the U.S. Army Kwajalein Atoll Environmental Standards. Sea-Based Test X-Band Radar	Continued handling and use of limited quantities of hazardous and toxic materials related to pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Pacific Missile Range Facility, State of Hawaii, Department of Transportation, and Department of Defense policies and procedures.	Continued handling and use of limited quantities of hazardous and toxic materials related to pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Vandenberg Air Force Base, State of California, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	Missile Defense Agency: Planning and execution of target launches would continue. Ground and Launch Hazard Areas, Notices to Airmen and Notices to Mariners, and program Safety plans would protect workers and the general public. Compliance with federal, state, and local health and safety requirements and regulations, as well as Department of Defense and Kodiak Launch Complex Safety Policy would result in no impacts to health and safety. Federal Aviation Administration: No impact. No launches would be allowed to occur.	Not analyzed.	Planning and execution of target and Ground-Based Interceptor launches would continue. Compliance with Reagan Test Site standards and procedures ensure that potential risks to the general public, workers, and the launch areas do not exceed Range Commanders Council Standard 321-02 criteria, and there would be no impact to health and safety. Sea-Based Test X-Band Radar	Planning and execution of target launches would continue. Ground and Launch Hazard Areas, Notices to Airmen and Notices to Mariners, and implementation of Safety plans would protect workers and the general public. Compliance with federal, state, and local health and safety requirements and regulations, as well as Department of Defense and Pacific Missile Range Facility Safety Policy would result in no impacts to health and safety.	Planning and execution of target and Ground-Based Interceptor launches would continue. Ground and Launch Hazard Areas, Notices to Airmen and Notices to Mariners, and implementation of Safety plans would protect workers and the general public. Compliance with federal, state, local and Vandenberg Air Force Base health and safety requirements ensure there is no increase in risk to workers and the general public.

Table ES-1A: Impacts and Mitigation Summary, No Action Alternative (Continued)

Resource Category	No Action Alternative				
	Kodiak Launch Complex	Midway	Reagan Test Site	Pacific Missile Range Facility	Vandenberg Air Force Base
Land Use	Missile Defense Agency: Continued publication of availability of Kodiak Launch Complex's beaches and coastline. Federal Aviation Administration: No impact to land use as no launches would be allowed to occur.	Not analyzed	Not analyzed	Not analyzed	No impact. As described in previous National Environmental Policy Act documentation, Vandenberg Air Force Base publicizes recreation availability and activities are consistent with the California Coastal Zone Management Program.
Noise	Missile Defense Agency: Infrequent noise associated with target and commercial launches would continue to be audible for short periods of time. Federal Aviation Administration: No impact. No launches would be allowed to occur.	Not analyzed	Not analyzed	Not analyzed	No adverse impact. Infrequent noise associated with planned missile launches would continue.
Socioeconomics	Missile Defense Agency: No impact. Federal Aviation Administration: Any economic benefits to the Kodiak Island Borough from the periodic presence of launch-related personnel would not occur.	Not analyzed	Not analyzed	Not analyzed	No impact.
Transportation	Missile Defense Agency: No change to current level of service on roadways. Federal Aviation Administration: No launches would be allowed to occur.	Not analyzed	Not analyzed	Not analyzed	No change to current level of service on roadways.
Utilities	Missile Defense Agency: Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities. Federal Aviation Administration: No launches would be allowed to occur.	Not analyzed.	No impacts.	Not applicable.	Any increase in electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.

Table ES-1A: Impacts and Mitigation Summary, No Action Alternative (Continued)

Resource Category	No Action Alternative				
	Kodiak Launch Complex	Midway	Reagan Test Site	Pacific Missile Range Facility	Vandenberg Air Force Base
Visual and Aesthetic Resources	Missile Defense Agency: No impact. No construction of new structures or infrastructure is planned. Federal Aviation Administration: No impact. No launches would be allowed to occur.	Not analyzed.	Not analyzed.	Not analyzed.	No construction of new structures or infrastructure is planned.
Water Resources	Missile Defense Agency: Minor potential for short-term increase in erosion and turbidity of surface waters during construction. Missile launches would disperse exhaust emission products over a large area. These emissions would not cause a significant water quality impact.. Water quality monitoring would continue on an as-needed basis. Federal Aviation Administration: No impact to water resources as no launches would be allowed to occur.	Not analyzed.	Not analyzed.	Not analyzed.	Missile launches would disperse exhaust emission products over a large area. Previous studies concluded that water quality impacts would be adverse but not significant.
Environmental Justice	Missile Defense Agency: No impact. No low-income or minority populations would be disproportionately affected. Federal Aviation Administration: No impact. No launches would be allowed to occur.	Not analyzed.	Not analyzed.	Not analyzed.	Not analyzed.
Subsistence	Missile Defense Agency: No impact to subsistence uses in and around Kodiak Launch Complex. Federal Aviation Administration: Positive impact. There would be no closure of areas to subsistence harvesting as no launches would be allowed to occur.	Not applicable.	Not applicable.	Not applicable.	Not applicable.

Table ES-1B: Impacts and Mitigation Summary, No Action Alternative

Resource Category	No Action Alternative					
	Pearl Harbor	**Naval Base Ventura County Port Hueneme**	**Naval Station Everett**	**Port Adak**	**Port of Valdez**	**Broad Ocean Area**
Air Quality	No change to the region's current attainment status.	No change to the region's current attainment status.	No change to the region's current attainment status.	No change to the region's current attainment status	No change to the region's current attainment status.	Not analyzed.
Airspace	Continuing activities would not conflict with airspace use plans, policies or controls.	Continuing activities would not conflict with airspace use plans, policies or controls.	Continuing activities would not conflict with airspace use plans, policies or controls.	Continuing activities would not conflict with airspace use plans, policies or controls.	Continuing activities would not conflict with airspace use plans, policies or controls.	Continuing activities would not conflict with airspace use plans, policies or controls.
Biological Resources	Ongoing activities would not impact biological resources.	Ongoing activities would not impact biological resources.	Ongoing activities would not impact biological resources.	Ongoing activities would not impact biological resources.	Ongoing activities would not impact biological resources.	No adverse impact.
Hazardous Materials and Hazardous Waste	No change in the use and disposal of hazardous materials and wastes currently occurring at Pearl Harbor.	No change in the use and disposal of hazardous materials and wastes currently occurring at Naval Base Ventura County Port Hueneme.	No change in the use and disposal of hazardous materials and wastes currently occurring at Naval Station Everett.	No change in the use and disposal of hazardous materials and wastes currently occurring at Port Adak.	No change in the use and disposal of hazardous materials and wastes currently occurring at Port of Valdez.	Not analyzed.
Health and Safety	No change in the type of operations or health and safety plans currently implemented at Pearl Harbor.	No change in the type of operations or health and safety plans currently implemented at Naval Base Ventura County Port Hueneme.	No change in the type of operations or health and safety plans currently implemented at Naval Station Everett.	No change in the type of operations or health and safety plans currently implemented at Port Adak.	No change in the type of operations or health and safety plans currently implemented at Port of Valdez.	Ongoing missile flight test activities would continue to use the existing special use airspace and other areas in the Pacific Broad Ocean Area. The continuing activities would not conflict with commercial shipping lanes or airspace use plans, policies, and controls. Appropriate safety measures and procedures would continue to be followed.
Transportation	Not analyzed.	Not analyzed.	No impacts.	Not analyzed.	No impacts.	Prior warning of launch activities would allow commercial shipping to follow alternative routes away from the test areas.

Table ES-1B: Impacts and Mitigation Summary, No Action Alternative (Continued)

Resource Category	No Action Alternative					
	Pearl Harbor	Naval Base Ventura County Port Hueneme	Naval Station Everett	Port Adak	Port of Valdez	Broad Ocean Area
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.	Not analyzed.
Visual and Aesthetic Resources	No change in the Visual setting at Pearl Harbor.	No change in the Visual setting at Naval Base Ventura County Port Hueneme.	No change in the Visual setting at Naval Station Everett.	No change in the Visual setting at Port Adak.	No change in the Visual setting at the Port of Valdez.	Not analyzed.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	Target	In-Flight Interceptor Communication System Data Terminal /Transportable System Radar	Mobile Telemetry
Air Quality	A minimal increase in air emissions from construction would not affect the region's current attainment status. Single Ground-Based Interceptor launch activities, under worst case meteorological conditions would produce fewer emissions than the previously analyzed Athena-2. Dual Ground-Based Interceptor launch emissions are conservatively estimated to be double a single launch. During worst-case meteorological conditions, the level of hydrogen and aluminum oxide could exceed U.S. Air Force and Non-criteria Pollutant levels for a short time; however significant air quality impacts due to Ground-Based Interceptor launches are not anticipated.	A minimal increase in air emissions from target construction would not affect the region's current attainment status. Single target launch activities, under worst case meteorological conditions would produce fewer emissions than the previously analyzed Athena-2. Dual target launch emissions are conservatively estimated to be double a single launch. During worst-case meteorological conditions, the level of hydrogen and aluminum oxide could exceed U.S. Air Force and Non-criteria Pollutant levels for a short time; however significant air quality impacts due to target launches are not anticipated.	Increase in air emissions from construction and operation of the In-Flight Interceptor Communication System Data Terminal and Transportable System Radar would not affect the region's current attainment status.	Increase in air emissions from operation would not affect the region's current attainment status.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex (Continued)

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal/Transportable System Radar**	**Mobile Telemetry**
Airspace	The use of the required scheduling and coordination with the Federal Aviation Administration and issuance of Notices to Airmen would result in no change in airspace status or use.	The use of the required scheduling and coordination with the Federal Aviation Administration and issuance of Notices to Airmen would result in no change in airspace status or use.	Construction and operation would not impact airspace.	Operation would not impact airspace.
Biological Resources	Loss of small amount of mainly upland vegetation. Fence line would likely be altered to avoid impacts to wetlands. Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.	Loss of small amount of mainly upland vegetation. Fence line would likely be altered to avoid impacts to wetlands. Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.	Loss of small amount of mainly upland vegetation. Temporary, short-term startle effects from noise to terrestrial wildlife and birds. Short-term operational impacts to wildlife (non-listed only) from security lighting and noise from electrical generators required for the site. The Transportable System Radar is not expected to radiate lower than 5 degrees above horizontal and the relatively small radar beam would normally be in motion which reduces the probability of bird species remaining within this limited region of space.	Mobile sensors necessary to support Ground-Based Midcourse Defense Extended Test Range activities would be located on existing disturbed areas with minimal effect to biological resources.
Cultural Resources	No impacts are expected for the proposed action because previous archaeological surveys have not indicated that cultural resources are present within the upland areas of Kodiak Launch Complex and because project details would be submitted to the Alaska State Historic Preservation Officer for coordination.	No impacts are expected for the proposed action because previous archaeological surveys have not indicated that cultural resources are present within the upland areas of Kodiak Launch Complex and because project details would be submitted to the Alaska State Historic Preservation Officer for coordination.	No impacts are expected for the proposed action because previous archaeological surveys have not indicated that cultural resources are present within the upland areas of Kodiak Launch Complex and because project details would be submitted to the Alaska State Historic Preservation Officer for coordination.	No impacts are expected for the proposed action because the Mobile Telemetry will be established in areas that have previously been paved.
Geology and Soils	Final site layout and design for Extended Test Range facilities will consider available information bearing on seismic design and construction. Minor increase in soil erosion would be localized to the construction sites. No adverse changes to soil chemistry are predicted to occur as a result of missile launch exhaust emissions.	Final site layout and design for Extended Test Range facilities will consider available information bearing on seismic design and construction. Minor increase in soil erosion would be localized to the construction sites. No adverse changes to soil chemistry are predicted to occur as a result of missile launch exhaust emissions.	Final site layout and design for Extended Test Range facilities will consider available information bearing on seismic design and construction. Minor increase in soil erosion would be localized to the construction sites.	Soil disturbance from site preparation activities would be minor.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex (Continued)

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal/Transportable System Radar**	**Mobile Telemetry**
Hazardous Materials and Hazardous Waste	The Ground-Based Interceptor construction and launch activities would use small quantities of hazardous materials, which would result in the generation of some hazardous and non-hazardous waste that would be similar to current operations. All hazardous materials and waste would be handled in accordance with applicable state and federal regulations.	The target construction and launch activities would use small quantities of hazardous materials, which would result in the generation of some hazardous and non-hazardous waste that would be similar to current operations. All hazardous materials and waste would be handled in accordance with applicable state and federal regulations.	The construction and operation of the In-Flight Interceptor Communication System Data Terminal, and operation of the Transportable System Radar would use small quantities of hazardous materials, which would result in the generation of some hazardous and non-hazardous waste that would be similar to current launch support operations. All hazardous materials and waste would be handled and disposed of in accordance with applicable state and federal regulations.	No impact from short term operation of mobile sensors at existing gravel pad areas.
Health and Safety	Planning and execution of single and dual Ground-Based Interceptor launches would include establishing ground and Launch Hazard Areas, issuing Notices to Airmen and Notices to Mariners, and adherence to program Safety plans. These actions would be in compliance with federal, state, and local health and safety requirements and regulations, as well as Department of Defense and Kodiak Launch Complex Safety Policy and would result in no impacts to health and safety.	Planning and execution of single and dual launches would include establishing ground and Launch Hazard Areas, issuing Notices to Airmen and Notices to Mariners, and adherence to program Safety plans. These actions would be in compliance with federal, state, and local health and safety requirements and regulations, as well as Department of Defense and Kodiak Launch Complex Safety Policy and would result in no impacts to health and safety.	The In-Flight Interceptor Communication System Data Terminal emissions are considered to be of sufficiently low power so that there would be no exposure hazard and no impact to health and safety. Transportable System Radar Electromagnetic Radiation hazard zones would be established within the beam's tracking space and near emitter equipment. A visual survey of the area would verify that all personnel are outside the hazard zone prior to startup. The radar would be prevented from illuminating in a designated cutoff zone, in which operators and all other system elements would be located. Potential interference with other electronic and emitter units (flight navigation systems, tracking radars, etc.) would also be examined prior to startup. Adherence to Alaska Aerospace Development Corporation, Federal Aviation Administration, and Department of Defense safety procedures relative to radar operations would preclude significant impact to health and safety.	For mobile telemetry equipment, the associated radio frequency emissions are considered to be of sufficiently low power so that there is no exposure hazard.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex (Continued)

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal**	**Mobile Telemetry**
Land Use	Minimal impacts would occur as a result of site preparation and new construction limiting the utilization of land by livestock for grazing on a minute portion of the overall land available for such activity.	Minimal impacts would occur as a result of site preparation and new construction limiting the utilization of land by livestock for grazing on a minute portion of the overall land available for such activity.	No impacts would occur as a result of site preparation and new construction limiting the utilization of land by livestock for grazing on a minute portion of overall land for the proposed locations on Kodiak Launch Complex. Of the proposed locations outside the boundaries of Kodiak Launch Complex, any change in land use would be temporary and confined to the immediate operation area with no impacts expected to occur.	No impact would occur as a result of the temporary site use limiting the utilization of land by livestock for grazing on a minute portion of the overall land available for such activity.
Noise	Intermittent and short-term noise due to construction and infrequent noise associated with Ground-Based Interceptor launches would be audible for only short periods of time and would not be expected to interfere with the area's fishing, camping, or other recreational uses. Dual launches of Ground-Based Interceptors are not anticipated to occur simultaneously and would be the same as a single launch.	Intermittent and short-term noise due to construction and infrequent noise associated with target launches would be audible for only short periods of time and would not be expected to interfere with the area's fishing, camping, or other recreational uses. Dual launches of Ground-Based Interceptors are not anticipated to occur simultaneously and would be the same as a single launch.	Intermittent and short-term noise due to construction would be anticipated. Operational noise would stem from use of generators to run the Transportable System Radar and emergency use for the In-Flight Interceptor Communication System Data Terminal. They would not increase the noise levels of the regional environment.	Intermittent and short-term noise due to operation would stem from the use of generators to operate mobile telemetry. Regional noise levels would not be increased.
Socioeconomics	Potential significant impact during tourist season due to potential housing shortage during the month leading up to a launch. Construction and operations direct and indirect employment and materials expenditures would provide economic benefit to surrounding community's retail sales and tax base with no impact on public services. **Mitigation:** To reduce the potential of a housing shortage, construction of an addition to the existing Narrow Cape Lodge and/or the construction of an additional mancamp at Kodiak Launch Complex.	Potential moderate impact during tourist season due to potential housing shortage during the month leading up to a launch. Construction and operations direct and indirect employment and materials expenditures would provide economic benefit to surrounding community's retail sales and tax base with no impact on public services. **Mitigation:** To reduce the potential of a housing shortage, construction of an addition to the existing Narrow Cape Lodge and/or the construction of an additional mancamp at Kodiak Launch Complex.	Personnel associated with Ground-Based Interceptor related activities would operate such systems; therefore no personnel in addition to those already involved in Ground-Based Interceptor operation would be required; furthermore no impacts would occur. Construction and operations direct and indirect employment and materials expenditures would provide economic benefit to surrounding community's retail sales and tax base with no impact on public services.	Personnel associated with target missile related activities would operate such systems; therefore no personnel in addition to those already involved in target operation would be required; furthermore no impacts would occur. Construction and operations direct and indirect employment and materials expenditures would provide economic benefit to surrounding community's retail sales and tax base with no impact on public services.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex (Continued)

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal**	**Mobile Telemetry**
Transportation	Temporary traffic delays to Kodiak Launch Complex via Rezanof Drive as a result of movement of construction equipment and material would cause minimal and infrequent traffic delays.	Temporary traffic delays to Kodiak Launch Complex via Rezanof Drive as a result of movement of construction equipment and material would cause minimal and infrequent traffic delays.	No impact.	No impact.
Utilities	Increases in the level of electrical demand, potable water consumption, wastewater treatment services, and solid waste disposal services. **Mitigation:** Addition of new potable water and septic systems.	Increases in the level of electrical demand, potable water consumption, wastewater treatment services, and solid waste disposal services. **Mitigation:** Addition of new potable water and septic systems.	Increases in the level of electrical demand, potable water consumption, wastewater treatment services, and solid waste disposal services. **Mitigation:** Addition of new potable water and septic systems.	No impact.
Visual and Aesthetic Resources	Although new facilities would result in visual impacts, the area is designated as a commercial launch facility.	Although new facilities would result in visual impacts, the area is designated as a commercial launch facility.	Although new facilities would result in visual impacts, the area is designated as a commercial launch facility.	Although Mobile Telemetry stations would result in visual impacts, the area would be impacted only temporarily.
Water Resources	Minor potential for short-term increase in erosion and turbidity of surface waters during construction. The current potable water system has insufficient capacity to handle the increases in demand associated with Ground-Based Interceptor operations. The target would disperse exhaust emission products over a large area. These emissions would not cause a significant water quality impact. Mitigation: It is anticipated that packaged potable water systems, similar to the existing water systems, would be installed to meet the Extended Test Range requirements. The packaged system (well, pump, and above ground storage tank) would be located within the construction footprint of the proposed Ground-Based Midcourse Defense facilities. Permits would be obtained from the Alaska Department of Environmental Conservation for construction and use of the water supply systems.	Minor potential for short-term increase in erosion and turbidity of surface waters during construction. The current potable water system has insufficient capacity to handle the increases in demand associated with target operations. The target would disperse exhaust emission products over a large area. These emissions would not cause a significant water quality impact. Mitigation: It is anticipated that packaged potable water systems, similar to the existing water systems, would be installed to meet the Extended Test Range requirements. Permits would be obtained from the Alaska Department of Environmental Conservation for construction and use of the water supply systems.	Minor potential for short-term increase in erosion and turbidity of surface waters during construction.	Mobile telemetry operations would have minimal impact on water resources.

Table ES-2: Impacts and Mitigation Summary, Kodiak Launch Complex (Continued)

Resource Category	Kodiak Launch Complex			
	Ground-Based Interceptor	Target	In-Flight Interceptor Communication System Data Terminal	Mobile Telemetry
Subsistence	Although there is a decrease in the amount of land available for subsistence uses the area is not a main subsistence use area in the region.	Although there is a decrease in the amount of land available for subsistence uses the area is not a main subsistence use area in the region.	Although there is a decrease in the amount of land available for subsistence uses the area is not a main subsistence use area in the region.	Although there is a decrease in the amount of land available for subsistence uses the area is not a main subsistence use area in the region.

Table ES-3: Impacts and Mitigation Summary, Midway

Resource Category	Midway	
	In-Flight Interceptor Communication System Data Terminal	Mobile Telemetry
Air Quality	Increase in air emissions from construction on existing paved areas and operation would not affect the region's current attainment status	Increase in air emissions from operation would not affect the region's current attainment status
Biological Resources	Loss of small amount of previously disturbed vegetation. Temporary, short-term startle effects from noise to terrestrial wildlife and birds. Short-term operational impacts to wildlife (non-listed only) from security lighting and noise from electrical generators required for the site.	Mobile sensors necessary to support Ground-Based Midcourse Defense Extended Test Range activities would be located on existing disturbed areas with minimal effect to biological resources..
Hazardous Materials and Hazardous Waste	The construction and operation of the In-Flight Interceptor Communication System Data Terminal would use small quantities of hazardous materials, which would result in the generation of some hazardous and non-hazardous waste. All hazardous materials and waste would be handled and disposed of in accordance with applicable state and federal regulations.	No impact from short term operation of mobile sensors at existing paved or concrete areas.

Table ES-4: Impacts and Mitigation Summary, Reagan Test Site

Resource Category	Reagan Test Site		
	Ground-Based Interceptor	**Target**	**Sea-Based Test X-Band Radar**
Air Quality	Single and dual Ground-Based Interceptor launch activities would be similar to previously analyzed launch activities; therefore there would be no change to the region's current attainment status.	A minimal increase in air emissions from target construction is expected. Single and dual target launch activities would be similar to previously analyzed launch activities. Therefore, there would be no change in the region's current attainment status	The Sea-Based Test X-Band Radar would not be considered a stationary source; therefore a U.S. Army Kwajalein Atoll Environmental Standards New Source Review would not be required and the increase in air emissions from the operation of the Sea-Based Test X-Band Radar would not affect the region's current attainment status.
Air Space	Not analyzed.	Not analyzed.	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris. Personnel would be instructed to avoid areas designated as avian or sea turtle nesting or avian roosting habitat and to avoid all contact with any nest that may be encountered.	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris. Personnel would be instructed to avoid areas designated as avian or sea turtle nesting or avian roosting habitat and to avoid all contact with any nest that may be encountered.	Minor, short-term impacts from construction noise, such as startling and temporary displacement. The Sea-Based Test X-Band Radar is not expected to radiate lower than 2 degrees above horizontal and the relatively small radar beam would normally be in motion which reduces the probability of bird species, marine mammals, or sea turtles remaining within this limited region of space.
Hazardous Materials and Hazardous Waste	Procedures for handling hazardous materials and hazardous waste related to Ground-Based Interceptor launches are currently utilized at Reagan Test Site. Measures would be employed in accordance with the U.S. Army Kwajalein Atoll Environmental Standards.	Procedures for handling hazardous materials and hazardous waste related to missile launches are already utilized at Reagan Test Site. Measures would be employed in accordance with the U.S. Army Kwajalein Atoll Environmental Standards.	Construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. Handling and disposal of hazardous materials and hazardous waste would be in accordance with the U.S. Army Kwajalein Atoll Environmental Standards.

Table ES-4: Impacts and Mitigation Summary, Reagan Test Site

Resource Category	Reagan Test Site		
	Ground-Based Interceptor	Target	Sea-Based Test X-Band Radar
Health and Safety	Health and safety procedures for the launch of Ground-Based Interceptors are currently in place at Reagan Test Site. Adherence to these procedures would result in no impacts to health and safety.	Health and safety procedures for the launch of target type missiles are currently in place at Reagan Test Site. Adherence to these procedures would result in no impacts to health and safety.	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Reagan Test Site operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Utilities	Not analyzed.	Not analyzed.	No impact.

Table ES-5: Impacts and Mitigation Summary, Pacific Missile Range Facility

Resource Category	Pacific Missile Range Facility
	Target
Air Quality	Launching of Strategic Target System targets would be similar to previously analyzed launch activities. Therefore, there would be no change to the region's current attainment status.
Biological Resources	Short-term disturbance to wildlife, including migratory birds, from minor site preparation activities and increased personnel. Reflection from outdoor lighting could disorient the Newell's Townsend's shearwater. Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris. The Transportable System Radar is not expected to radiate lower than 5 degrees above horizontal and the relatively small radar beam would normally be in motion which reduces the probability of bird species remaining within this limited region of space..
Hazardous Materials and Hazardous Waste	The handling and use of limited quantities of hazardous and toxic materials related to pre-launch, launch and post-launch and Transportable System Radar activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Pacific Missile Range Facility, State of Hawaii, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	Planning and execution of target launches would include establishing ground and Launch Hazard Areas, issuing Notices to Airmen and Notices to Mariners, and implementing Safety plans in order to protect workers and the general public. Transportable System Radar Electromagnetic Radiation hazard zones would be established within the beam's tracking space and near emitter equipment. A visual survey of the area would verify that all personnel are outside the hazard zone prior to startup. The Transportable System Radar would be prevented from illuminating in a designated cutoff zone, in which operators and all other system elements would be located. Potential interference with other electronic and emitter units (flight navigation systems, tracking radars, etc.) would also be examined prior to startup. Adherence to Alaska Aerospace Development Corporation, Federal Aviation Administration, and Department of Defense safety procedures relative to radar operations would preclude significant impact to health and safety. Compliance with federal, state, and local health and safety requirements and regulations, as well as Department of Defense and Pacific Missile Range Facility Safety Policy would result in no impacts to health and safety.
Socioeconomics	Though limited in scope target missile launches and use of the Transportable System Radar, would have a minor positive effect on the local economy of the island.

Table ES-6: Impacts and Mitigation Summary, Vandenberg Air Force Base

Resource Category	Vandenberg Air Force Base		
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal**
Air Quality	The proposed single and dual Ground-Based Interceptor launches would produce less exhaust emissions than previously analyzed missiles. Based upon this, the proposed launches would not cause or contribute to violation of any air quality standards.	The proposed single and dual target launches would produce less exhaust emissions than previously analyzed missiles. Based upon this, the proposed launches would not cause or contribute to violation of any air quality standards.	Minimal increase in air emissions from construction and operational activities would not affect the region's current attainment status.
Biological Resources	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.	Temporary effects to vegetation from emissions, discoloration and foliage loss. Temporary, short-term startle effects from noise to wildlife and birds. Although a remote possibility, individual animals close to the water's surface could be hit by debris.	Loss of small amount of previously disturbed vegetation. Temporary, short-term startle effects from noise to terrestrial wildlife and birds. Short-term operational impacts to wildlife (non-listed only) from security lighting and noise from electrical generators required for the site.
Cultural Resources	Once specific project details are delineated coordination would occur with the Environmental Planning Section and the Cultural Resources Section at Vandenberg Air Force Base to further ensure that cultural resources would be protected.	Once specific project details are delineated coordination would occur with the Environmental Planning Section and the Cultural Resources Section at Vandenberg Air Force Base to further ensure that cultural resources would be protected.	Once specific project details are delineated coordination would occur with the Environmental Planning Section and the Cultural Resources Section at Vandenberg Air Force Base to further ensure that cultural resources would be protected.
Hazardous Materials and Hazardous Waste	Continued handling and use of limited quantities of hazardous and toxic materials related to Ground-Based Interceptor pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Vandenberg Air Force Base, State of California, Department of Transportation, and Department of Defense policies and procedures.	Continued handling and use of limited quantities of hazardous and toxic materials related to target missile pre-launch, launch and post-launch activities would generate small quantities of hazardous waste. The use and disposal of hazardous materials and wastes would be in accordance with Vandenberg Air Force Base, State of California, Department of Transportation, and Department of Defense policies and procedures.	Procedures for handling hazardous materials and hazardous waste from construction and operation of facilities similar to the In-Flight Interceptor Communication System Data Terminal are already utilized at Vandenberg Air Force Base. Quantities would be within existing use and disposal requirements.
Health and Safety	Planning and execution of Ground-Based Interceptor launches would continue. Ground and Launch Hazard Areas, Notices to Airmen and Notices to Mariners, and implementation of Safety plans would protect workers and the general public. Compliance with federal, state, local and Vandenberg Air Force Base health and safety requirements ensure there is no increase in risk to workers and the general public.	Planning and execution of target launches would continue. Ground and Launch Hazard Areas, Notices to Airmen and Notices to Mariners, and implementation of Safety plans would protect workers and the general public. Compliance with federal, state, local and Vandenberg Air Force Base health and safety requirements ensure there is no increase in risk to workers and the general public.	The In-Flight Interceptor Communication System Data Terminal emissions are considered to be of sufficiently low power so that there would be no exposure hazard and no impact to health and safety.
Land Use	The only disruption to land use would be routine closures of recreation areas near the region of influence during Ground-Based Interceptor launches. Such action would represent a minimal impact to land use.	The only disruption to land use would be routine closures of recreation areas near the region of influence during target launches. Such action would represent a minimal impact to land use.	Site preparation and new construction would be routinely accomplished and occur within an area compliant with the overall general land use; therefore no impacts would occur.

Table ES-6: Impacts and Mitigation Summary, Vandenberg Air Force Base (Continued)

Resource Category	Vandenberg Air Force Base		
	Ground-Based Interceptor	**Target**	**In-Flight Interceptor Communication System Data Terminal**
Noise	Noise impacts due to Ground-Based Interceptor launch activities would be similar to those that currently occur at Vandenberg Air Force Base during current missile launch activities. As launches are infrequent, short-term events, ambient noise levels at Vandenberg Air Force Base and the surrounding area would not be substantially affected on an annual basis.	Noise impacts due to target launch activities would be similar to launch activities that currently occur at Vandenberg Air Force Base. As launches are infrequent, short-term events, ambient noise levels at Vandenberg Air Force Base and the surrounding area would not be substantially affected on an annual basis.	Construction and operation would have minimal impact to the surrounding environment's noise levels.
Socioeconomics	Base operations would continue to provide economic benefits with no impacts expected to occur.	Base operations would continue to provide economic benefits with no impacts expected to occur.	Personnel associated with Ground-Based Interceptor related activities would operate such systems. No personnel in addition to those already involved in Ground-Based Interceptor operation would be required; furthermore no impacts would occur. Base operations would continue to provide economic benefits.
Transportation	No impact.	No impact.	Temporary traffic delays to as a result of movement of construction equipment and material would cause minimal and infrequent traffic delays.
Water Resources	The Ground-Based Interceptor would disperse exhaust emission products over a large area. Previous studies concluded that water quality impacts would be adverse but not significant.	The target would disperse exhaust emission products over a large area. Previous studies concluded that water quality impacts would be adverse but not significant.	Minor potential for short-term increase in erosion and turbidity of surface waters during construction.

Table ES-7: Impacts and Mitigation Summary, Pearl Harbor

Resource Category	Pearl Harbor Sea-Based Test X-Band Radar Primary Support Base and Mooring
Air Quality	The Sea-Based Test X-Band Radar would not be considered a stationary source and would not require a Prevention of Significant Deterioration review or a title V permit. Air emissions from the operation of the Sea-Based Test X-Band Radar would be in compliance with appropriate State Implementation Plans.
Airspace	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	Minor, short-term impacts from construction noise, such as startling and temporary displacement. The Sea-Based Test X-Band Radar is not expected to radiate lower than 2 degrees above horizontal and the relatively small radar beam would normally be in motion which reduces the probability of bird species, marine mammals, or sea turtles remaining within this limited region of space.
Hazardous Materials and Hazardous Waste	The small quantities amount of potentially hazardous materials used during construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. In compliance with Uniform National Discharge Standards, the Sea-Based Test X-Band Radar vessel would incorporate marine pollution control devices, such as keeping decks clear of debris, cleaning spills and residues and engaging in spill and pollution prevention practices, in design or routine operation. Handling and disposal of hazardous materials and hazardous waste would be in accordance with State of Hawaii, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Sea-Based Test X-Band Radar operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.
Visual and Aesthetic Resources	Visual impacts would be minor as the Sea-Based Test X-Band Radar would be comparable to ships passing along the horizon.

Table ES-8: Impacts and Mitigation Summary, Naval Base Ventura County Port Hueneme

Resource Category	Naval Base Ventura County Port Hueneme Sea-Based Test X-Band Radar **Primary Support Base and Mooring**
Air Quality	The Sea-Based Test X-Band Radar would not be considered a stationary source and would not require a Prevention of Significant Deterioration review or a title V permit. Air emissions from the operation of the Sea-Based Test X-Band Radar would be in compliance with appropriate State Implementation Plans.
Airspace	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	No significant long-term adverse impacts are anticipated to seabirds and shorebirds, Guadalupe fur seals, California sea lions, northern elephant and harbor seals, and sea otters or to widely distributed, open-water species such as gray and killer whales.
Hazardous Materials and Hazardous Waste	The small quantities amount of potentially hazardous materials used during construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. In compliance with Uniform National Discharge Standards, the Sea-Based Test X-Band Radar vessel would incorporate marine pollution control devices, such as keeping decks clear of debris, cleaning spills and residues and engaging in spill and pollution prevention practices, in design or routine operation. Handling and disposal of hazardous materials and hazardous waste would be in accordance with State of California, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Sea-Based Test X-Band Radar operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.
Visual and Aesthetic Resources	Because this type of activity consistently occurs at Naval Base Ventura County Port Hueneme, no impacts to visual resources are anticipated.

Table ES-9: Impacts and Mitigation Summary, Naval Station Everett

Resource Category	Naval Station Everett Sea-Based Test X-Band Radar Primary Support Base and Mooring
Air Quality	The Sea-Based Test X-Band Radar would not be considered a stationary source and would not require a Prevention of Significant Deterioration review or a title V permit. Air emissions from the operation of the Sea-Based Test X-Band Radar would be in compliance with appropriate State Implementation Plans.
Airspace	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	No significant long-term adverse impacts are anticipated to seabirds, shorebirds (bald eagle), or widely distributed, open-water species such as humpback, blue, fin, sei, and sperm whales; green, leatherback, and loggerhead sea turtles; and steller sea lions.
Hazardous Materials and Hazardous Waste	The small quantities amount of potentially hazardous materials used during construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. In compliance with Uniform National Discharge Standards, the Sea-Based Test X-Band Radar vessel would incorporate marine pollution control devices, such as keeping decks clear of debris, cleaning spills and residues and engaging in spill and pollution prevention practices, in design or routine operation. Handling and disposal of hazardous materials and hazardous waste would be in accordance with State of Washington, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Sea-Based Test X-Band Radar operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Transportation	Adequate coordination would prevent any conflicts with tribal fishing areas, and would prevent any impacts on current shipping schedules, ship-borne commerce or general transit.
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.
Visual and Aesthetic Resources	Because this type of activity consistently occurs at Naval Station Everett, no impacts to visual resources are anticipated.

Table ES-10: Impacts and Mitigation Summary, Port Adak

Resource Category	Port Adak Sea-Based Test X-Band Radar Primary Support Base and Mooring
Air Quality	The Sea-Based Test X-Band Radar would not be considered a stationary source and would not require a Prevention of Significant Deterioration review or a title V permit. Air emissions from the operation of the Sea-Based Test X-Band Radar would be in compliance with appropriate State Implementation Plans.
Airspace	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	No significant long-term adverse impacts are anticipated to area seabirds and water fowl or widely distributed, open-water species such as Steller sea lions, sea otters, harbor seals, and whales that occur around Adak Island.
Hazardous Materials and Hazardous Waste	The small quantities amount of potentially hazardous materials used during construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. In compliance with Uniform National Discharge Standards, the Sea-Based Test X-Band Radar vessel would incorporate marine pollution control devices, such as keeping decks clear of debris, cleaning spills and residues and engaging in spill and pollution prevention practices, in design or routine operation. Handling and disposal of hazardous materials and hazardous waste would be in accordance with State of Alaska, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Sea-Based Test X-Band Radar operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.
Visual and Aesthetic Resources	Due to limited visibility and a lack of sensitive viewers, impacts to visual resources are not anticipated.

Table ES-11: Impacts and Mitigation Summary, Port of Valdez

Resource Category	Port of Valdez Sea-Based Test X-Band Radar Primary Support Base and Mooring
Air Quality	The Sea-Based Test X-Band Radar would not be considered a stationary source and would not require a Prevention of Significant Deterioration review or a title V permit. Air emissions from the operation of the Sea-Based Test X-Band Radar would be in compliance with appropriate State Implementation Plans.
Airspace	Potential impacts to airspace would be minimized by adhering to operational requirements. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. The Sea-Based Test X-Band Radar high energy radiation area would be configured to minimize potential impacts to aircraft and other potentially affected systems, and would be published on aeronautical charts. In addition, Sea-Based Test X-Band Radar information would be published in the Airport Facility section of the *FAA Airport Guide*, and local Notices to Airmen would be issued. Flight service personnel would brief pilots flying in the vicinity about the Sea-Based Test X-Band Radar high energy radiation area.
Biological Resources	No significant long-term adverse impacts are anticipated to Essential Fish Habitat, area seabirds and water fowl, or widely distributed, open-water species such as humpback, killer, and minke whales, sea otters, Steller sea lions, harbor seals, and Dall and harbor porpoise that occur in Prince William Sound.
Hazardous Materials and Hazardous Waste	The small quantities amount of potentially hazardous materials used during construction activities would result in generation of added wastes that would be accommodated in accordance with existing protocol and regulations. The Sea-Based Test X-Band Radar would follow U.S. Navy requirements that, to the maximum extent practicable, ships shall retain hazardous waste aboard ship for shore disposal. In compliance with Uniform National Discharge Standards, the Sea-Based Test X-Band Radar vessel would incorporate marine pollution control devices, such as keeping decks clear of debris, cleaning spills and residues and engaging in spill and pollution prevention practices, in design or routine operation. Handling and disposal of hazardous materials and hazardous waste would be in accordance with State of Alaska, Department of Transportation, and Department of Defense policies and procedures.
Health and Safety	An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process. Implementation of Sea-Based Test X-Band Radar operational safety procedures, including establishment of controlled areas, and limitations in the areas subject to illumination by the radar units, would preclude any potential safety hazard to either the public or workforce. These limitations would be similar to the existing Ground-Based Radar Prototype on Kwajalein, resulting in no impacts to health and safety.
Transportation	Coordination with local Native American groups would be necessary to prevent any impacts to native fishing areas, particularly during the August salmon run and during other peak fishing seasons. Coordination would be required with the U.S. Coast Guard to lessen requirements for channel (Valdez Narrows) closure and preclude potential delays of oil tankers utilizing the area, as well as to establish any required security zone at the mooring site.
Utilities	Electricity demand, potable water consumption, wastewater usage, and solid waste disposal would be handled by existing facilities.
Visual and Aesthetic Resources	Because this type of activity consistently occurs at the Port of Valdez, no impacts to visual resources are anticipated.

Table ES-12: Impacts and Mitigation Summary, Broad Ocean Area

Resource Category	Broad Ocean Area	
	Ground-Based Interceptor and Target Intercept Debris	Sea-Based Test X-Band Radar
Airspace	Where flight paths cross intercept debris areas, air traffic would be rerouted or rescheduled during a 3- to 4-hour period, approximately five times a year.	Testing would occur in remote areas and result in minimal impacts to airspace. An Electromagnetic Radiation/Electromagnetic Interference survey and analysis and DD Form 1494 would be required as part of the spectrum certification and frequency allocation process.
Biological Resources	No adverse impact.	No adverse impact. Power densities emitted by the Sea-Based Test X-Band Radar are unlikely to cause biological impacts.
Health and Safety	Testing operations pose potential impacts that would be minimized through pre-flight planning and coordination with the Federal Aviation Administration and issuance of Notices to Airmen and Notices to Mariners.	Testing operations pose potential impacts that would be minimized through pre-flight planning and issuance of Notices to Airmen and Notices to Mariners.
Transportation	Prior warning of Ground-Based Midcourse Defense Extended Test Range activities would allow commercial shipping to follow alternative routes away from the test area.	Minor impact to commercial shipping routes in the Gulf of Mexico or Pacific Ocean during testing.