BOOST SURVEILLANCE AND TRACKING SYSTEM (BSTS)

AUGUST 1987

STRATEGIC DEFENSE INITIATIVE ORGANIZATION
SYSTEMS ENGINEERING
WASHINGTON D.C. 20301-7100

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION: UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	UNLIMITED
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION: Strategic Defense Initiative Organization; 6b. OFFICE SYMBOL (If applicable): SDIO-ENEC	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code): Capt. Gale Brown, SDIO/ENEC, The Pentagon, Rm. 1E149, Washington, DC 20301-7100	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION; 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)

Boost Surveillance and Tracking System (BSTS), Environmental Assessment (U)

12. PERSONAL AUTHOR(S)

Capt. Gale Brown, SDIO, Chairman of Dem/Val. Environmental Assessment Team

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
FINAL	FROM _____ TO _____	1987 August	

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Environmental Assessment, Boost Surveillance and Tracking System (BSTS), SDIO.
17	07	04	
24			

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This Environmental Assessment documents the results of an assessment of the potential for the magnitude of impacts from Demonstration/Validation activities of the Boost Surveillance and Tracking Systems (BSTS), August 1987.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL: Capt. Gale Brown	22b. TELEPHONE (Include Area Code): (202) 693-1833; 22c. OFFICE SYMBOL: SDIO/ENEC

DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE

17/07/04 Navigation, Detection & Cou
termeasures, Sp. Nav. & G
24 Envir. Pollution & Control

Cover Sheet

Responsible Agency: Strategic Defense Initiative Organization

Proposed Action: Conduct Demonstration/Validation tests of the Boost Surveillance and Tracking System (BSTS) technology.

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Designation: Environmental Assessment

Abstract: The Strategic Defense Initiative Organization (SDIO) and its proponents (U.S. Army and U.S. Air Force) plan to conduct Demonstration/Validation tests of the BSTS technology. These tests will demonstrate the ability of the technology to perform required tasks, and will validate a future decision on whether to proceed with Full-Scale Development. Demonstration/ Validation tests would be conducted at the National Test Facility, Cape Canaveral Air Force Station/ Eastern Test Range, and at contractor facilities. Tests would include analyses, simulations, component/ assembly tests, and flight tests. This document addresses the potential environmental consequences of the Demonstration/ Validation testing of the BSTS technology.

Available to the Public: August 1987

EXECUTIVE SUMMARY

INTRODUCTION

The National Environmental Policy Act, the Council on Environmental Quality regulations implementing the Act (40 CFR 1500-1508), and the Department of Defense (DoD) Directive 6050.1 which supplements these regulations, direct that DoD officials take into account environmental consequences when authorizing or approving major Federal actions in the United States. Accordingly, this Environmental Assessment analyzes the potential environmental consequences of a proposed transition from Concept Exploration to Demonstration/ Validation of the Boost Surveillance and Tracking System (BSTS), one of the technologies being considered in the Strategic Defense Initiative program. The tests and evaluations associated with Demonstration/Validation will accord with the Antiballistic Missile Treaty and are currently structured to conform to the restrictive interpretation of the Treaty. The decision to proceed to Demonstration/Validation for BSTS would not preclude other technologies, nor would it mandate the eventual Full-Scale Development or Production/ Deployment of BSTS.

BACKGROUND

The President's announcement of a Strategic Defense Initiative on March 23, 1983, initiated an extensive research program to determine the feasibility of developing an effective ballistic missile defense system to protect the United States and its allies from enemy missile attack. The Strategic Defense Initiative Organization was established to plan, organize, coordinate, direct, and enhance the research and testing of technologies applicable to strategic defense. Future implementation of a Strategic Defense System would be based on the Strategic Defense Initiative research program.

Many technologies currently are being investigated. Among the technologies being considered for Demonstration/Validation are space-based technologies:

- o Boost Surveillance and Tracking System (BSTS)
- o Space-based Surveillance and Tracking System (SSTS)
- o Space-Based Interceptor (SBI)

and ground-based technologies:

- o Exoatmospheric Reentry Vehicle Interception System (ERIS)
- o Ground-based Surveillance and Tracking System (GSTS)
- o Battle Management/Command and Control, and Communications (BM/C^3).

DoD Directive 5000.1 calls for a staged approach to the DoD acquisition process. In keeping with that mandate, DoD's major system acquisition process consists of four distinct stages: Concept Exploration, Demonstration/ Validation, Full-Scale Development, and Production/Deployment. These four stages are separated by three major decision points (Milestones I, II, and

III). Prior to Milestone I, the Defense Acquisition Board will review the results of Concept Exploration and decide whether the subject technology will be carried forward into Demonstration/Validation or remain in the Concept Exploration stage. The BSTS Strategic Defense Initiative technology is approaching the end of Concept Exploration and is preparing for Demonstration/ Validation.

PURPOSE AND NEED

The purpose of the Demonstration/Validation program for BSTS is to determine the ability of the technology to perform its intended function, and to provide the information necessary to make an informed decision whether to proceed with Full-Scale Development. These activities are the first steps needed to support a decision to develop, produce, and deploy the BSTS technology, which is integral to an effective strategic defense.

The function of BSTS would be to detect and track intercontinental and submarine-launched ballistic missiles during their boost phase. The BSTS would provide the necessary initial detection element of the proposed Strategic Defense System.

PROPOSED ACTION

The proposed action is the Demonstration/Validation program for the BSTS technology. This program would demonstrate whether the system can meet its specific performance requirements and would provide the information necessary for the Defense Acquisition Board to recommend a Milestone II decision to proceed into Full-Scale Development.

BSTS Demonstration/Validation would require the fabrication and ground testing of two competing design concepts. After a design review, one concept would be chosen for further development into a limited capability sensor equipped satellite. The satellite would be launched into space for on-orbit evaluation. The Demonstration/Validation satellite would use a conventional power source.

Demonstration/Validation of BSTS would address the following technological issues:

- Computer Hardware and Software: Verify that hardware and software can operate after exposure to radiation, accept information from the sensors, and operate in a space environment.
- Sensors and Detectors: Verify that sensors can be produced in sufficient quantities and can operate with an acceptable degree of reliability in the different types of environments that may be encountered after deployment; verify the ability to detect and identify targets.
- Spacecraft Platform: Verify that the platform can be controlled in space and that all components can be integrated on the platform.

The Demonstration/Validation testing activities for the BSTS program fall into four categories: analyses, simulations, component/assembly tests, and flight tests. The tests and their proposed locations are provided in Table S-1.

NO-ACTION ALTERNATIVE

The no-action alternative is to continue with Concept Exploration activities without progressing to the Demonstration/Validation stage at this time.

ENVIRONMENTAL SETTING

The test activities of the BSTS Demonstration/Validation program would be carried out at two competing contractor facilities (Lockheed Missiles and Space Company and Grumman Aerospace Company) and two government facilities (Cape Canaveral Air Force Station/Eastern Test Range and the National Test Facility). The attributes of each of these government facilities as they relate to the proposed testing activities are as follows.

The two contractors (Grumman and Lockheed) are established in aerospace research, development, and demonstration activities and have the requisite facilities, e.g., space chambers, radiation chambers, and anechoic chambers. Both companies are required to obtain all applicable Federal, State, and local permits and authorizations necessary for facility operations as part of the conditions of their contracts.

The Eastern Space and Missile Center is the host organization for Cape Canaveral Air Force Station/Eastern Test Range, as well as Patrick Air Force Base. Patrick Air Force Base provides support for the people and mission of the Eastern Space and Missile Center. Cape Canaveral Air Force Station includes a system of missile launch facilities located along the Atlantic Ocean in Brevard County, Florida. The Eastern Test Range includes a broad area of the Atlantic Ocean which extends offshore from Patrick Air Force Base, Cape Canaveral Air Force Station, and Kennedy Space Center to the Indian Ocean. The facilities of the Test Range are used to track launches. Launch and spacecraft operations are monitored and supported by the Air Force Satellite Control Facility, the Consolidated Space Operations Center, and the MILSTAR satellite communication system.

The National Test Facility will be constructed at Falcon Air Force Station in Colorado. An interim facility will be operated out of the Consolidated Space Operations Center, also located at Falcon Air Force Station, until construction is complete.

ENVIRONMENTAL CONSEQUENCES

Many of the tests for the BSTS Demonstration/Validation program would be conducted at the contractor facilities of Lockheed Missiles and Space Company and Grumman Aerospace Company. These contractors have been selected through the

TABLE S-1.

DEMONSTRATION/VALIDATION TESTING FOR THE BOOST SURVEILLANCE AND TRACKING SYSTEM

TEST ACTIVITIES	TEST TECHNIQUES				LOCATIONS[1]
	Analyses	Simulations	Component/ Assembly	Flight	
Demonstration of platform attitude control, maintainability and survivability under simulated space and battle conditions	X	X	Space Chamber, Radiation Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Performance and reliability of infrared sensor materials, focal plane array assembly; and evaluation of production yields	X	X	Space Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Development and testing of an integrated assembly of the optics and the focal plane array of detectors	X	X	Space Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]

[1] Adequate facilities exist unless otherwise noted.

[2] Lockheed Missiles and Space Company and Grumman Aerospace Company are both under competitive contract to develop BSTS.

[3] Contractors are required to certify compliance with all Federal, State, and local environmental laws and regulations necessary for facility operations.

[4] Facility construction or modification required (excluding minor modifications).

TABLE S-1 (Continued).

DEMONSTRATION/VALIDATION TESTING FOR THE BOOST SURVEILLANCE AND TRACKING SYSTEM

TEST ACTIVITIES	TEST TECHNIQUES				LOCATIONS[1]
	Analyses	Simulations	Component/ Assembly	Flight	
Development and testing of signal processor and computer hardware and software	X	X	Radiation Chamber, Anechoic chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Development and testing of system power unit for Demonstration/ Validation flight test	X	X			Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Launch satellite to test performance against targets on non-threat trajectories				X	Cape Canaveral AFS/ Eastern Test Range[4]
Analysis and storage of data from flight tests	X	X			National Test Facility[4]

[1] Adequate facilities exist unless otherwise noted.

[2] Lockheed Missiles and Space Company and Grumman Aerospace Company are both under competitive contract to develop BSTS.

[3] Contractors are required to certify compliance with all Federal, State, and local environmental laws and regulations necessary for facility operations.

[4] Facility construction or modification required (excluding minor modifications).

DoD procurement process. The contractors are required to meet all Federal, State, and local environmental laws and regulations necessary for facility operations.

To assess the potential for and the magnitude of impacts from Demonstration/ Validation at each government facility, a two-step methodology was utilized. The first step was the application of assessment criteria to identify activities with no potential for significant environmental consequences. Activities were deemed to present no potential for significant environmental consequences if they met all of the following criteria (i.e., all "yes" answers):

1. Are the facility and its infrastructure adequate for the proposed activity (i.e., can the tests be conducted without new construction, excluding minor modifications)?

2. Is current staffing at the facility adequate to conduct the test, excluding minor staff level adjustments?

3. Does the facility comply with existing environmental standards?

4. Are the resources of the surrounding community adequate to accommodate the proposed testing?

If a proposed test was determined to present a potential for impact (i.e., a "no" answer to any of the above questions), the second step was to evaluate the activity in the context of the following environmental considerations: air quality, water quality, biological resources, infrastructure, hazardous waste, land use, visual resources, cultural resources, noise, and socioeconomics. As a result of that evaluation, consequences were assigned to one of three categories: insignificant, mitigable, or potentially significant.

Environmental consequences were determined to be **insignificant** if, in the judgment of the analysts or as concluded in existing environmental documentation, no potential for significant environmental impacts exists. Consequences were deemed **mitigable** if concerns exist but it was determined that all potential consequences could be readily mitigated through standard procedures or by measures recommended in existing environmental documentation. If serious consequences exist that could not be readily mitigated, the activity was determined to represent **potentially significant** environmental impacts.

Cape Canaveral Air Force Station/Eastern Test Range would be used for one launch utilizing a new Titan IV booster. An existing launch complex would be modified to accommodate the Titan IV launch. No new staff would be required for BSTS activities. The environmental consequences of the launch complex construction and operation have been analyzed in "Environmental Assessment for the Complementary Expendable Launch Vehicle (CELV) Program at Cape Canaveral Air Force Station," which concluded that any impacts would be mitigable. Air quality, water quality, and biological resource impacts are mitigable by control measures recommended in the environmental assessment. No significant impacts are expected on infrastructure, hazardous waste, land use, visual and cultural resources, noise, or socioeconomics. The overall environmental consequences associated with BSTS Demonstration/Validation activities at Cape Canaveral Air Force Station/ Eastern Test Range are deemed to be mitigable

using the control measures described in the environmental assessment cited above.

The environmental consequences of constructing and operating the National Test Facility at Falcon Air Force Station are deemed to be mitigable. The consequences have been analyzed in "National Test Facility Environmental Assessment," which also identifies the necessary mitigation measures. The National Test Facility would employ 2,300 workers in a new facility. Until the facility is constructed, workers would be located in existing facilities at Falcon Air Force Station. Air quality, infrastructure, and land use impacts from construction and operation would be mitigable through the use of standard control and conservation practices. No significant impacts are expected on water quality, biological resources, hazardous waste, visual and cultural resources, noise, or socioeconomics.

If the no-action alternative is selected, no significant environmental impacts are anticipated, as current Concept Exploration activities would continue with utilization of current staffing and facilities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Development of the single BSTS candidate satellite through the Demonstration/Validation stage would result in irreversible and irretrievable commitment of resources such as electronic components, various metallic and nonmetallic structural materials, fuel, and labor.

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1. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The National Environmental Policy Act, the Council on Environmental Quality regulations implementing the Act (40 CFR 1500-1508), and the Department of Defense (DoD) Directive 6050.1 which supplements these regulations, direct that DoD officials take into account environmental consequences when authorizing or approving major Federal actions in the United States. Accordingly, this Environmental Assessment analyzes the potential environmental consequences of a proposed transition from Concept Exploration to Demonstration/Validation of the Boost Surveillance and Tracking System (BSTS), one of the technologies being considered in the Strategic Defense Initiative program. The tests and evaluations associated with Demonstration/Validation will accord with the Antiballistic Missile Treaty and are currently structured to conform to the restrictive interpretation of the Treaty. The decision to proceed to Demonstration/Validation for BSTS would not preclude other technologies, nor would it mandate the eventual Full-Scale Development or Production/Deployment of BSTS.

The approach followed to complete this assessment is presented in Figure 1-1. This section describes the test and evaluation activities that would be completed for BSTS and identifies the contractor and government facilities where the activities would be carried out. Section 2 characterizes those facilities and the surrounding communities and Section 3 assesses the potential environmental consequences of the activities.

Demonstration/Validation of the BSTS technology would consist of a number of tests. Descriptions of these tests were developed from documentation describing the BSTS Demonstration/Validation program and interviews with program personnel who developed the documentation. Section 1.3 describes the types of tests, and their locations. Also, where possible, other factors related to the tests, such as work force or hazardous materials requirements, have been described.

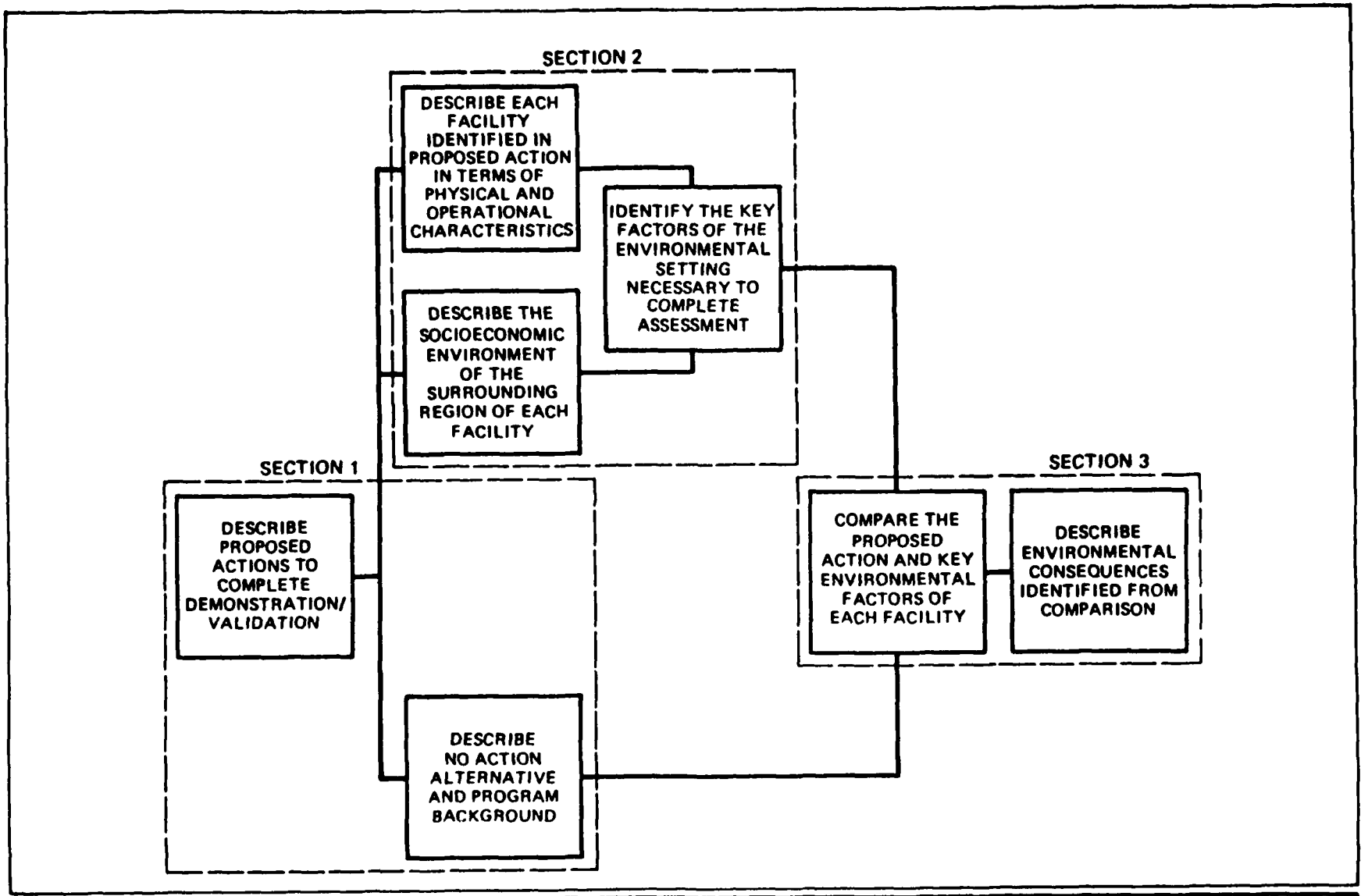
The remainder of this section briefly describes the background of the Strategic Defense Initiative program, the purpose of and need for the BSTS technology, the proposed action, and the no-action alternative.

1.1 BACKGROUND

The President's announcement of a Strategic Defense Initiative on March 23, 1983, initiated an extensive research program to determine the feasibility of developing an effective ballistic missile defense system to protect the United States and its allies from enemy missile attack. The Strategic Defense Initiative Organization was established to plan, organize, coordinate, direct, and enhance the research and testing of technologies applicable to strategic defense. Future implementation of a Strategic Defense System would be based on the Strategic Defense Initiative research program.

1.1.1 Classes of Architecture

The Strategic Defense Initiative has produced several candidate architecture options and has promoted advanced technology concepts to support these



GENERAL APPROACH TO COMPLETE ENVIRONMENTAL ASSESSMENT

FIGURE 1-1

architectures. The term "architecture" refers to the function and interrelationship of individual elements or subsystems within a possible system. To date, three classes of possible architecture have been defined (20):

- o Combined space-based and ground-based sensors and weapons to counter long-range ballistic missiles
- o Ground-based weapons to counter long-range ballistic missiles
- o Airborne sensors and ground-based weapons to counter shorter-range tactical ballistic missiles.

The combined space- and ground-based architectures would employ a series of satellites to sense, track, and destroy the threatening missiles and reentry vehicles (i.e., warheads) in the boost, post-boost, or midcourse phase of their trajectory. A ground-based system, which would back up the satellites, would intercept warheads in the latter part of their flight. Early evolving systems for both space- and ground-based architectures would use kinetic-energy weapons; later systems may use directed-energy weapons (lasers or particle beams).

As currently envisioned, the ground-based architecture could meet an offensive missile in the midcourse and reentry phases, although boost-phase intercept capability (by use of ground-based directed-energy weapons) is currently being investigated. A series of satellites would provide early warning, and ground-based intercept vehicles would then destroy the incoming warhead.

The third architecture would use airborne sensors to track shorter-range tactical ballistic missiles and ground-based weapons for target destruction. The shorter flight times of tactical ballistic missiles would require fast identification, tracking, discrimination, and reaction, which in turn would require greater sensor sensitivity and faster data processing.

Many technologies currently are being investigated to support the three architectures described above. Among the technologies being considered for Demonstration/Validation are space-based technologies:

- o Boost Surveillance and Tracking System (BSTS)
- o Space-based Surveillance and Tracking System (SSTS)
- o Space-Based Interceptor (SBI)

and ground-based technologies:

- o Exoatmospheric Reentry Vehicle Interception System (ERIS)
- o Ground-based Surveillance and Tracking System (GSTS)
- o Battle Management/Command and Control, and Communications (BM/C^3).

Among the space-based technologies, the BSTS would concentrate on a fully responsive system to detect ballistic missiles as they are launched. If deployed, the BSTS would be an orbital sensor satellite system. It would detect the signals emitted by intercontinental or submarine-launched ballistic missiles as they were launched and provide an attack alert. The BSTS would be mounted on a platform that included the power source and equipment for

controlling the orientation of the sensor in response to directions from the onboard computer. The sensor would consist of an optical system which focused the signals emitted from incoming ballistic missiles onto the sensor array. The detectors responding to the booster radiation received would provide a moving picture of the rocket. The detector's responses would be converted by a signal processor into digital data which could be handled by the onboard computer. The computer would control the orientation of the sensor (e.g., track the rocket), and communicate with BSTS ground stations.

This Environmental Assessment addresses the BSTS technology. Separate Environmental Assessments have been prepared for the other technologies being considered for Demonstration/Validation. The potential cumulative environmental effects of testing several technologies at the same facility are addressed in the Strategic Defense Initiative Demonstration/Validation Program Environmental Assessments Summary.

A decision will be made as to whether the BSTS technology is ready to proceed to Demonstration/Validation based on examination of cost, schedule, readiness objectives, affordability, initial operational capability, conceptual soundness, and environmental consequences.

1.1.2 Stages of Strategic Defense Initiative Development

DoD Directive 5000.1 calls for a staged approach to the DoD acquisition process. In keeping with that mandate, DoD's major system acquisition process consists of four distinct stages: Concept Exploration, Demonstration/Validation, Full-Scale Development, and Production/Deployment. These four stages are separated by three major decision points (Milestones I, II, and III). Prior to Milestone I, the Defense Acquisition Board will review the results of Concept Exploration and decide whether the subject technology will be carried forward into Demonstration/Validation or remain in the Concept Exploration stage. The BSTS Strategic Defense Initiative technology is approaching the end of Concept Exploration and preparing for Demonstration/Validation.

In Demonstration/Validation, the BSTS technology is tested to demonstrate its ability to perform the task. The Demonstration/Validation stage for the BSTS technology includes the following test techniques:

1. Analyses: Examining and evaluating data to define or refine the current knowledge of a technology

2. Simulations: The use of software models representing both the test article and the environment to determine performance abilities

3. Component/Assembly Tests: Demonstrating performance of components and assemblies under simulated conditions such as space or battle environments

4. **Flight Tests:** The use of flight-qualified devices and assemblies in real flight environments to verify performance.

Some BSTS Demonstration/Validation activities may require modifications or additions to existing government facilities. Should this occur, the need for supplemental environmental evaluation would be determined in conformance with Council on Environmental Quality and DoD regulations.

1.2 PURPOSE AND NEED

The purpose of the Demonstration/Validation program for BSTS is to determine the ability of the technology to perform its intended function, and to provide the information necessary to make an informed decision whether to proceed with Full-Scale Development. These activities are the first steps needed to support a decision to develop, produce, and deploy the BSTS technology, which is integral to an effective strategic defense.

The function of BSTS would be to detect and track intercontinental or submarine-launched ballistic missiles during their boost phase, as shown on Figure 1-2. The BSTS would provide the necessary initial detection element of one alternative architecture of the proposed Strategic Defense System.

1.3 PROPOSED ACTION

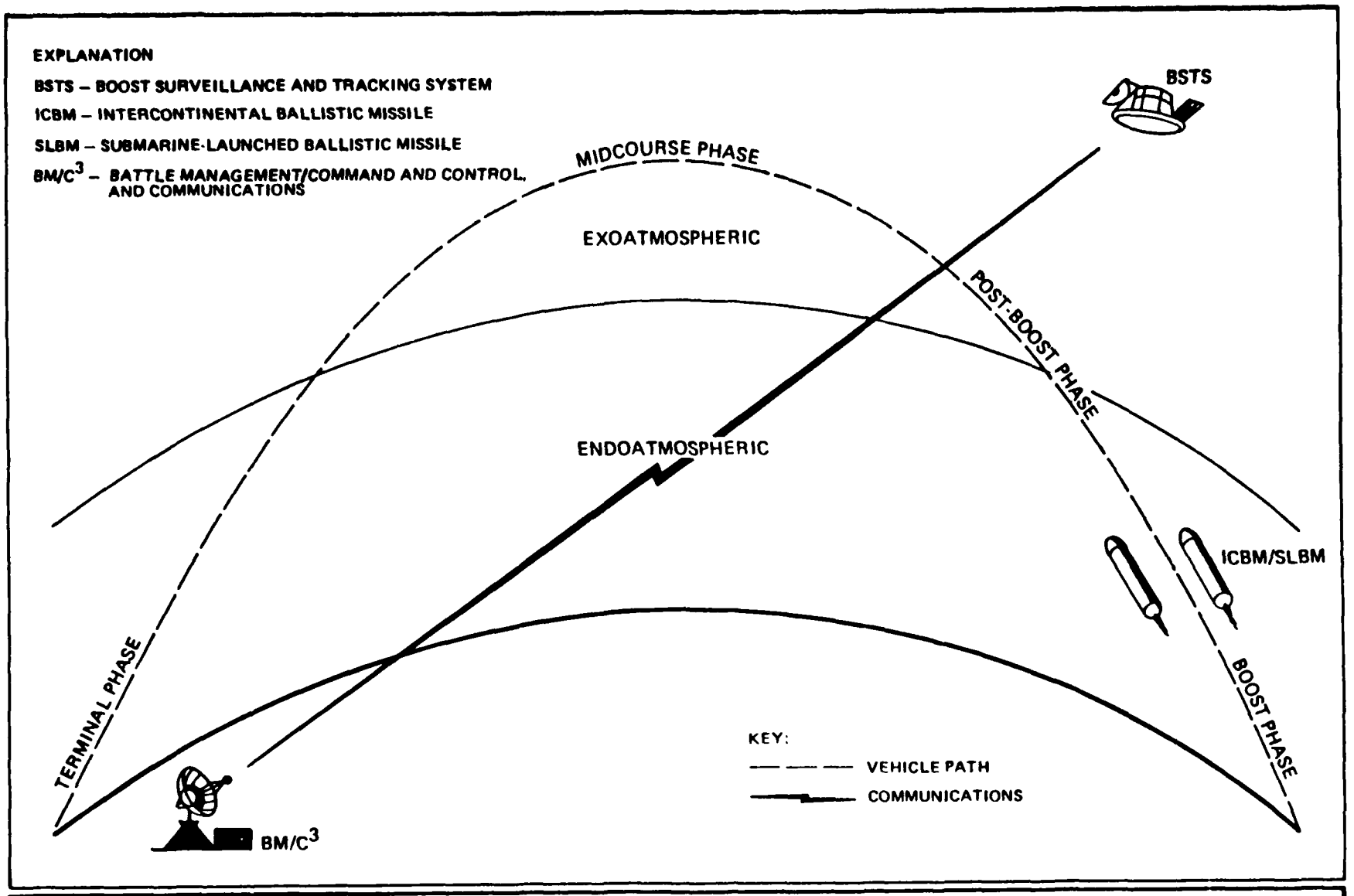
The proposed action is the Demonstration/Validation program for the BSTS technology. This program would demonstrate whether the system can meet its specific performance requirements and would provide the information necessary for the Defense Acquisition Board to recommend a Milestone II decision to proceed into Full-Scale Development.

Demonstration/Validation of BSTS would require the fabrication and ground testing of two competing design concepts. After a design review, one concept would be chosen for further development into a limited capability sensor-equipped satellite. The satellite would be launched into space for on-orbit evaluation. The Demonstration/Validation satellite would use a conventional power source.

To date, Concept Exploration activities for BSTS have included: (1) development of signal processing and digital data processing components; (2) development of optical sensor manufacturing techniques; (3) development of wide-field-of-view optics designs; (4) development of power generation techniques; (5) development of survivability techniques and equipment; (6) architecture design and performance testing of real-time signal processing components; and (7) study of phenomena associated with the boost phase of a ballistic missile.

Demonstration/Validation of the BSTS is needed to address the following technological issues:

- **Computer Hardware and Software:** Verify that hardware and software can operate after exposure to radiation, accept information from the sensors, and operate in a space environment.



FUNCTIONAL CONCEPT OF
BOOST SURVEILLANCE AND TRACKING SYSTEM

FIGURE 1-2

- o Sensors and Detectors: Verify that sensors can be produced in sufficient quantities and can operate with an acceptable degree of reliability in the different types of environments that may be encountered after deployment; verify the ability to detect and identify targets.

- o Spacecraft Platform: Verify that the platform can be controlled in space and that all components can be integrated on the platform.

The Demonstration/Validation testing activities for the BSTS program are divided into analyses, simulations, component/assembly tests, and flight tests. Each of the categories specific to BSTS is described in greater detail in Appendix A. The BSTS test activities are described in Table 1-1 by their test technique and the location of the facilities where the test activities are proposed to be conducted. The following paragraphs provide additional descriptions of the test activities where appropriate. Figure 1-3 shows the locations of the test facilities.

1.3.1 Analyses and Simulations

Both competing contractors (Grumman Aerospace Company and Lockheed Missiles and Space Company, with support from subcontractors and vendors) would conduct analyses and, where appropriate, simulation testing of the space platform, infrared sensor and optics, and computer hardware and software components, for the purpose of supporting conceptual design and ground demonstration activities. These activities would take place within existing contractor facilities.

Flight test data would be analyzed, and the data and results stored for further refinement of BSTS and eventually for future testing and simulation. This analysis and storage would take place at the National Test Facility.

1.3.2 Component/Assembly Tests

Performance tests to determine the ability of the sensors to detect, identify, and track targets would be conducted in a space environment chamber (vacuum, low temperature); the sensors and platforms would also be subjected to radiation testing, and the platform antenna radiation pattern determined. It is likely that these would be integrated chamber tests for all systems and would include simulation testing with a scene generator. The testing would occur at contractor facilities.

1.3.3 Flight Tests

One limited capability satellite would be launched from Cape Canaveral Air Force Station aboard a Titan IV launch vehicle during Demonstration/Validation. The performance of the satellite would be tested by tracking launches from world-wide locations. The launch would be supported by the Eastern Test Range and continuing spacecraft operation would be monitored and supported primarily by existing contractor ground stations. The Air Force Satellite Control Center, the Consolidated Space Operations Center, and the MILSTAR communication satellite system may also provide support.

TABLE 1-1.
DEMONSTRATION/VALIDATION TESTING FOR THE BOOST SURVEILLANCE AND TRACKING SYSTEM

TEST ACTIVITIES	TEST TECHNIQUES				LOCATIONS[1]
	Analyses	Simulations	Component/ Assembly	Flight	
Demonstration of platform attitude control, maintainability, and survivability under simulated space and battle conditions	X	X	Space Chamber, Radiation Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Performance and reliability of infrared sensor materials, focal plane array assembly; evaluation of production yields	X	X	Space Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Development and testing of an integrated assembly of the optics and the focal plane array of detectors	X	X	Space Chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]

[1] Adequate facilities exist unless otherwise noted.

[2] Lockheed Missiles and Space Company and Grumman Aerospace Company are both under competitive contract to develop BSTS.

[3] Contractors are required to certify compliance with all Federal, State, and local environmental laws and regulations necessary for facility operations.

[4] Facility construction or modification required (excluding minor modifications).

TABLE 1-1 (Continued).
DEMONSTRATION/VALIDATION TESTING FOR THE
BOOST SURVEILLANCE AND TRACKING SYSTEM

TEST ACTIVITIES	TEST TECHNIQUES				LOCATIONS[1]
	Analyses	Simulations	Component/ Assembly	Flight	
Development and testing of signal processor and computer hardware and software	X	X	Radiation Chamber, Anechoic chamber		Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Development and testing of system power unit for Demonstration/ Validation flight test	X	X			Contractor facilities[2,3]
				X	Cape Canaveral AFS/ Eastern Test Range[4]
Launch satellite to test performance against targets on non-threat trajectories				X	Cape Canaveral AFS/ Eastern Test Range[4]
Analysis and storage of data from flight tests	X	X			National Test Facility[4]

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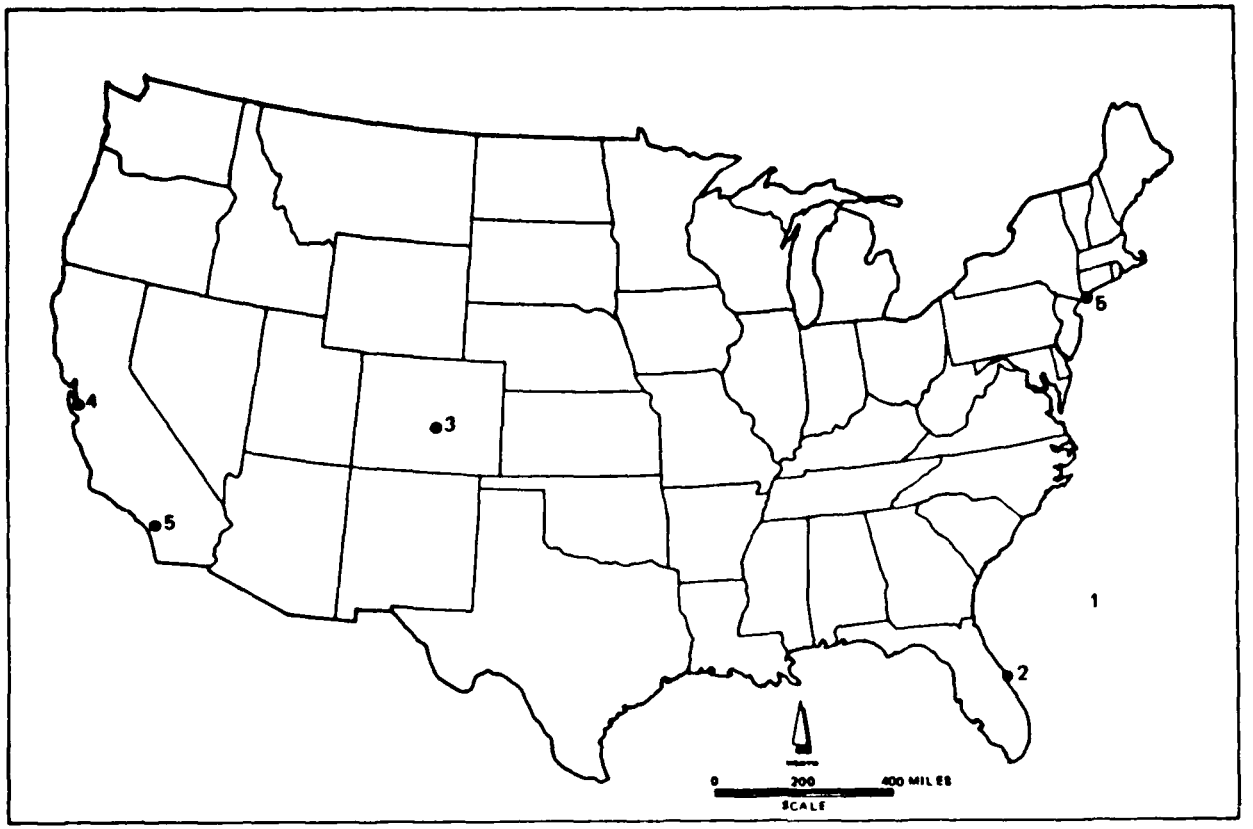

FACILITY

1. EASTERN TEST RANGE
2. CAPE CANAVERAL AIR FORCE STATION
3. NATIONAL TEST FACILITY
4. LOCKHEED MISSILES AND SPACE COMPANY
5. GRUMMAN AEROSPACE COMPANY

BOOST SURVEILLANCE AND TRACKING SYSTEM
DEMONSTRATION/VALIDATION FACILITIES

FIGURE 1-3

1.4 NO-ACTION ALTERNATIVE

The no-action alternative is to continue with Concept Exploration activities without progressing to the Demonstration/Validation stage at this time.

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2. ENVIRONMENTAL SETTING

The test activities of the BSTS Demonstration/Validation program and the facilities where they would be conducted were identified in Table 1-1. The tests would be conducted at contractor facilities in Sunnyvale, California; Bethpage, New York; and Irvine, California. Tests would also be conducted at government facilities at Cape Canaveral Air Force Station and the National Test Facility. This section describes the environmental setting of each government facility in terms of physical and operational characteristics of the facilities, permit status, and previous environmental documentation. Specific physical characteristics include facility size, base and test facilities, and environmental conditions. Operational characteristics include the socioeconomic parameters of staffing, payroll, and housing, and the infrastructure characteristics of electricity, solid waste, sewage treatment, transportation, and water supply.

Permits described are those that relate to air quality, water quality, and hazardous waste. Previous environmental documentation includes environmental compliance plans, base master plans, environmental assessments, and environmental impact statements. The socioeconomic characteristics of the counties and communities surrounding the facility are also presented.

The data for each planned test facility are presented in tables and figures. The level of detail in these tables reflects the availability of pertinent program and facility information.

Many of the tests for the BSTS Demonstration/Validation program would be completed in existing contractor facilities, specifically Lockheed Missiles and Space Company in Sunnyvale, California, and Grumman Aerospace Company in Bethpage, New York, and Irvine, California. The contractors have been selected through the DoD procurement process, and are required to meet all Federal, State, and local environmental laws and regulations necessary for facility operations.

The methodology used in developing the descriptions of the government facilities that would be used in the program involved identifying and acquiring available literature, such as environmental assessments, environmental impact statements, and base master plans. The literature was reviewed and data gaps (i.e., questions that could not be answered from the literature) were identified. To fill the data gaps, facility personnel were interviewed by telephone. Where this report utilizes information collected through telephone interviews, appropriate references are presented in the List of References, Section 6; primary contacts for each facility are listed in Section 5. The following subsections describe the environmental setting of each of the government facilities where Demonstration/Validation activities are planned.

Ten areas of environmental consideration are addressed: (1) air quality; (2) water quality; (3) biological resources; (4) infrastructure: electricity, solid waste, sewage treatment, water supply, transportation; (5) hazardous waste; (6) land use; (7) visual resources; (8) cultural resources; (9) noise; and (10) socioeconomics.

Several of the resource areas, specifically air and water quality, are regulated by federally mandated standards. The treatment, storage, and disposal of hazardous wastes are also regulated by Federal standards. Where federally mandated standards do not exist, qualitative evaluations were made. A discussion of each resource area is provided below.

Air Quality

Air quality concerns at each facility were evaluated in terms of the National Ambient Air Quality Standards and the location of the facility in an attainment or nonattainment area. For existing air emissions sources, the facility was evaluated based on the emission standards contained in the associated State Implementation Plan. Possible air emissions sources, such as expansion of facilities and new construction, were evaluated using the New Source Review requirements.

Water Quality

Water quality concerns at each location were identified and the facility's record of compliance with permits is presented.

Biological Resources

The Endangered Species Act protects plants and animals threatened with extinction. A review of the environmental documentation of the geographic area surrounding the facility was conducted to determine the documented presence of threatened and endangered species.

Infrastructure

Electricity, solid waste, sewage treatment, water supply, and transportation are infrastructure requirements that ultimately limit the capacity for growth. Capacity and current demand are described for each facility.

Hazardous Waste

The Resource Conservation Recovery Act regulates how a facility can dispose of its hazardous waste. The record of compliance was reviewed to determine the facility's capability to handle any additional wastes and to determine any potential disposal problems.

Land Use

Base master plans, environmental management plans, and other documentation were reviewed to determine any current conflicts between the facility and local standards, and to evaluate the probability of conflict resulting from any planned expansions.

Visual Resources

Existing environmental documentation was reviewed to determine if aesthetic concerns were an issue at any of the facilities.

Cultural Resources

Existing environmental documentation was reviewed to determine if any significant cultural resources in proximity to the facilities would be affected by test activities.

Noise

Existing environmental documentation was reviewed to determine if noise concerns were an issue at any of the facilities.

Socioeconomics

Key socioeconomic indicators (population, housing, employment, and income data) for the supporting region of each facility were examined to evaluate the potential consequences of increased population, expenditures, and employment.

2.1 CAPE CANAVERAL AIR FORCE STATION/EASTERN TEST RANGE

The Eastern Space and Missile Center is the host organization for Cape Canaveral Air Force Station/Eastern Test Range, as well as Patrick Air Force Base. Cape Canaveral Air Force Station and Patrick Air Force Base are located between the Banana River and the Atlantic Ocean in Brevard County on Florida's east coast (Figure 2-1), approximately 20 miles southeast of Titusville. Patrick Air Force Base is 10 miles south of Cape Canaveral Air Force Station.

Patrick Air Force Base provides support for the people and mission of the Eastern Space and Missile Center. Cape Canaveral Air Force Station includes a system of missile launch facilities used to place satellites in orbit. A description of Cape Canaveral Air Force Station and its environment is provided in Table 2-1.

Launch Complex 41 at Cape Canaveral is being recommissioned to support launches of the Titan IV vehicle. The process of preparing and launching a satellite takes about 30 weeks and involves the following: (1) satellite check-out to ensure that all systems are functioning correctly; (2) assembling the launch vehicle and mating the payload to the vehicle in a vehicle integration building; (3) transporting the stacked assembly to the launch pad; and (4) launch of the vehicle. The Titan IV vehicle is lifted off and boosted to over 100,000 feet by solid-fuel boosters before the liquid fuel second-stage vehicle fires.

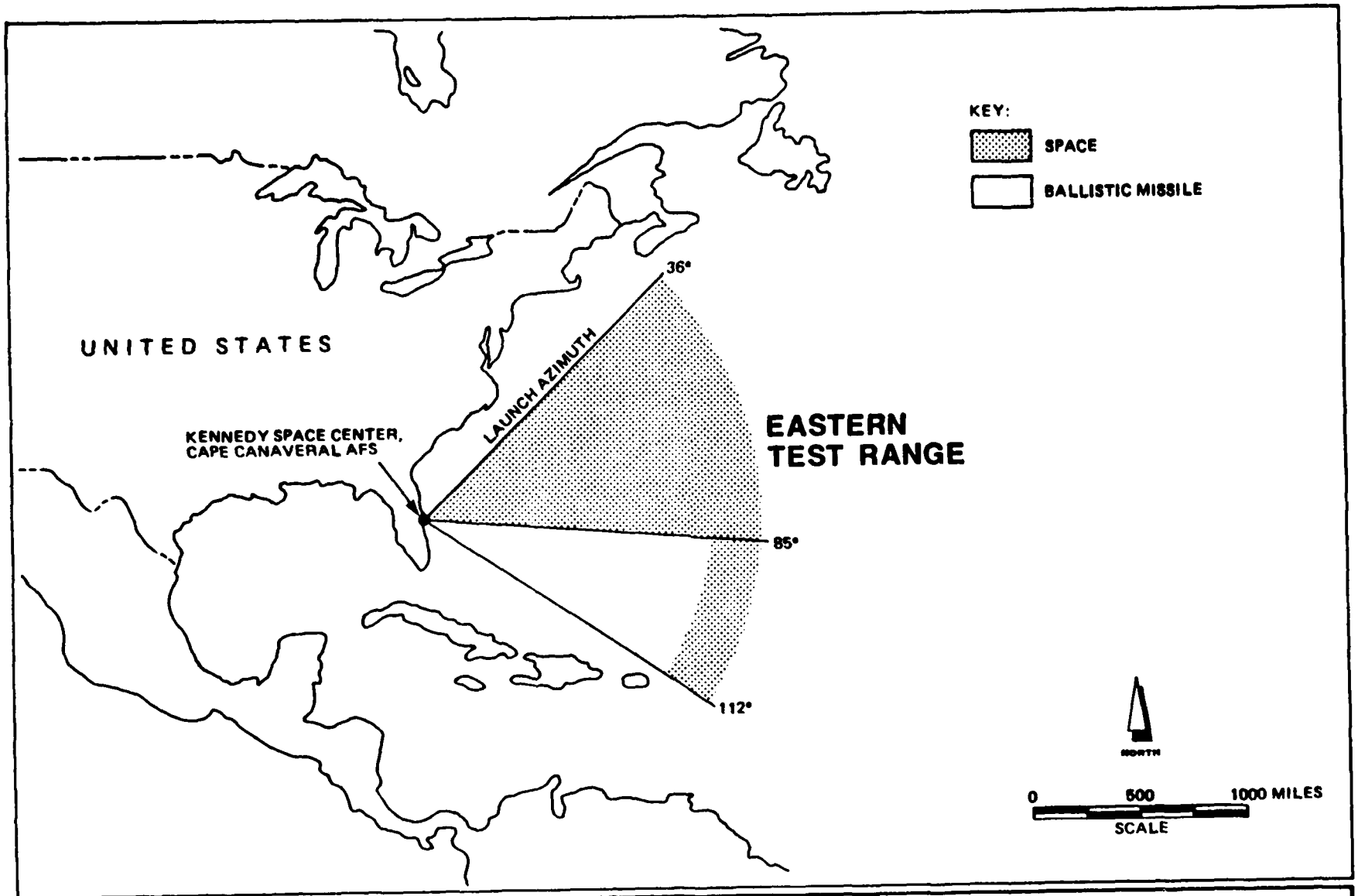
The Eastern Test Range includes a broad area of the Atlantic Ocean which extends offshore from Patrick Air Force Base and Cape Canaveral Air Force Station on the coast of Florida (Figure 2-2) to the Indian Ocean. The range functions as the test area for space and missile operations. It includes a network of tracking and data gathering facilities on islands in the Atlantic, supplemented by ships and aircraft (26). Its radar, optic, telemetry, and communications instrumentation acquire data that support launches from Cape Canaveral and the Kennedy Space Center (22). Launch and spacecraft operations are monitored and supported by the Air Force Satellite Control Facility, the Consolidated Space Operations Center, and the MILSTAR satellite communication system.

TABLE 2-1
SELECTED ENVIRONMENTAL CHARACTERISTICS
CAPE CANAVERAL AIR FORCE STATION

				REFERENCE NO.
PHYSICAL CHARACTERISTICS	FACILITIES	SIZE	16,000 acres	27
		BASE FACILITIES	All housing, recreational, and support facilities are located at Patrick Air Force Base 15 miles to the south. Cape Canaveral Air Force Station contains the Air Force Space Museum, range control center, and missile launch and support facilities.	27
		TEST FACILITIES	Complete assembly and launch facilities for ballistic missiles and space launch vehicles, and storage and dispensing station for fuels and oxidizers.	27
	ENVIRONMENTAL CONDITIONS	NATURAL RESOURCES	Commercial fishing offshore; no natural resource development on base	9
		VISUAL RESOURCES	Located on barrier island bounded by the Banana River on the west and the Atlantic Ocean to the east. The barrier island is approximately 10 miles wide at Cape Canaveral Air Force Station, and relief is generally less than 12 feet, with occasional dunes 12 to 24 feet high. Natural features include lagoons, beaches, dunes, and native vegetation.	28
		SPECIAL STATUS	Seven historical and archaeological sites on National Register of Historical Places. 21 additional sites eligible for list. Federally listed endangered species include: Wood Stork, Manatee, Green Turtle, Leatherback Turtle, Brown Pelican, and Bald Eagle. Federally listed threatened species include the Peregrine Falcon, Loggerhead Turtle, Eastern Indigo Snake, and American Alligator. The beach at Cape Canaveral Air Force Station is considered a habitat of special significance by the Base. The Banana River is designated outstanding by the State of Florida.	9
		NOISE	No exceedances	8
OPERATIONAL CHARACTERISTICS	SOCIOECONOMICS	STAFFING	Military = 4,494; Civilian = 1,640 (1987, For Patrick Air Force Base)	5
		PAYROLL	$190.6 million (1987; for Patrick Air Force Base)	5
		HOUSING	Officer = 168; NCO = 1,408 (1987; for Patrick Air Force Base)	5

TABLE 2-1 (Continued)
SELECTED ENVIRONMENTAL CHARACTERISTICS
CAPE CANAVERAL AIR FORCE STATION (Continued)

				REFERENCE NO.
OPERATIONAL CHARACTERISTICS (Continued)	INFRASTRUCTURES	ELECTRICITY	Average daily demand = 383 kWh; Peak hour demand = 50,000 kW; supplied by offbase plant operated by Florida Power and Light Company	12, 14
		SOLID WASTE	14,000 tons generated in FY 1986; disposed at offsite facility in Brevard County as of January 1987. Onsite facility used only for construction debris.	8, 12, 14
		SEWAGE TREATMENT	Capacity = 983,000 gallons/day; current use is approximately 80% of capacity. Facility is onbase government-owned and operated.	12, 13, 14
		TRANS-PORTATION	Cape Road is the main road in and out of Cape Canaveral AFS, and is quite congested. Indefinite plans are to widen road from south entrance to industrial portion of Cape Canaveral AFS.	14
		WATER SUPPLY	Consumption = 2.27 million gallons/year, purchased by contract from the City of Cocoa.	12, 15
PERMIT STATUS		AIR	Air shed classification II; attainment of air quality standards; several boiler permits with the state of Florida	8
		WASTE WATER	NPDES permit for several canals from one monitored outfall; Monitoring of canal surface water shows no exceedances.	8
		HAZARDOUS WASTE	84 tons generated for FY 1986 with no violations; storage facility with RCRA permit; munitions detonation facility with interim status.	8
ADDITIONAL ENVIRONMENTAL INFORMATION	Existing Base Comprehensive Plan. Two separate Environmental Assessments in progress for two new launch facilities. Environmental Assessment for Complementary Expendable Launch Vehicle (CELV) at Cape Canaveral.			6, 9
COMMENTS	The data presented on this table summarize conditions for Cape Canaveral AFS, and do not include data for Patrick AFB unless otherwise noted.			



LOCATION MAP OF EASTERN TEST RANGE

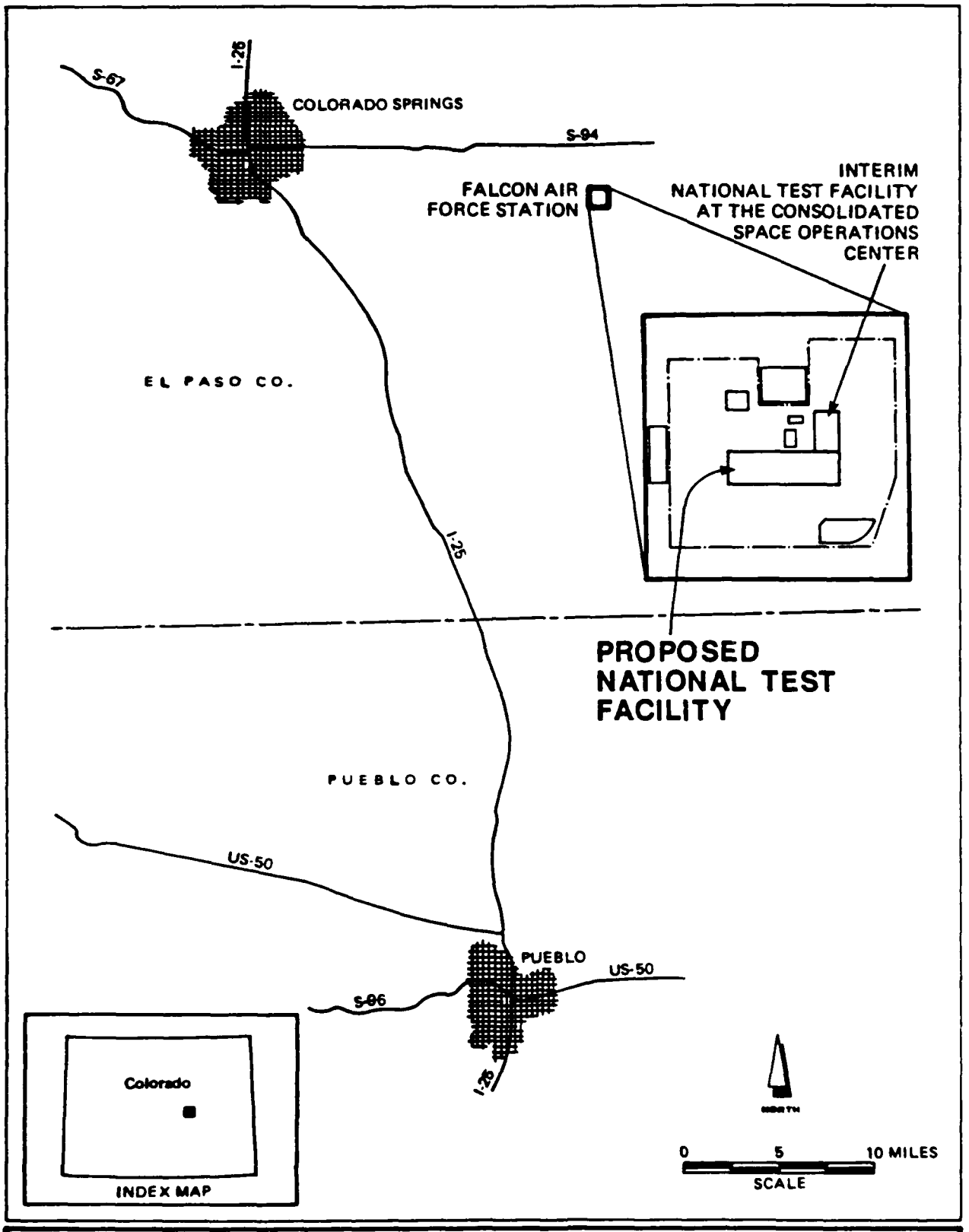
FIGURE 2-2

TABLE 2-2.
SELECTED SOCIOECONOMIC INDICATORS FOR THE SUPPORTING REGION CAPE CANAVERAL AIR FORCE STATION AND KENNEDY SPACE CENTER

Area/Indicator	1970	1980	1984	Annual Change 1970-1980 (%)	Annual Change 1980-1984 (%)
Brevard County					
Population	230,006	272,959	329,497	1.73	4.82
Year-Round Housing	77,871	112,970	N/A	3.79	N/A
Vacancy Rate (%)	11.9	9.9	N/A	--	--
Civilian Labor Force	87,987	121,034	140,078	3.24	3.72
Unemployment (%)	5.6	5.9	5.3	--	--
Per Capita Income ($)[1]	3,297	7,448	10,426	--	--
Median Family Income ($)[1]	11,144	19,388	N/A	--	--
Orlando					
Population	100,081	128,291	137,145	2.51	1.68
Year-Round Housing	36,827	51,344	N/A	3.38	N/A
Vacancy Rate (%)	8.0	7.2	N/A	--	--
Civilian Labor Force	39,169	58,189	77,566	4.04	7.45
Unemployment (%)	4.6	4.6	5.5	--	--
Per Capita Income ($)[1]	2,985	6,735	9,439	--	--
Median Family Income ($)[1]	7,945	16,125	N/A	--	--

References: 17, 18, 16, 19, 21

[1] Income figures refer to preceding year



LOCATION MAP OF NATIONAL TEST FACILITY AT FALCON AFS, COLORADO

FIGURE 2-3

TABLE 2-3
SELECTED ENVIRONMENTAL CHARACTERISTICS
NATIONAL TEST FACILITY

				REFERENCE NO.
PHYSICAL CHARACTERISTICS	FACILITIES	SIZE	640 acres	1
		BASE FACILITIES	Administrative offices, communications network	23
		TEST FACILITIES	Advanced communications network capabilities	23
	ENVIRONMENTAL CONDITIONS	NATURAL RESOURCES	None on facility	3
		VISUAL RESOURCES	Region consists of gently rolling plains characterized by semiarid grasslands used for agricultural grazing; Falcon Air Force Station is considered developed, as high-technology buildings and support facilities dominate the landscape.	23
		SPECIAL STATUS	None on facility	3
		NOISE	Current ambient noise level is 40 L_{dn}, which is below acceptable limits.	2
OPERATIONAL CHARACTERISTICS	SOCIOECONOMICS	STAFFING	Military = 895, Active Duty; Civilian = 2,088 (1987, at Falcon Air Force Station)	5
		PAYROLL	$0.9 Million (1987; Civilian payroll, at Falcon Air Force Station)	5, 29
		HOUSING	Officer = 106; NCO = 384; Transient = 130; (1987; at Peterson Air Force Base, no known housing at Falcon Air Force Station)	5

TABLE 2-3 (Continued)
SELECTED ENVIRONMENTAL CHARACTERISTICS
NATIONAL TEST FACILITY

				REFERENCE NO.
OPERATIONAL CHARACTERISTICS (Continued)	INFRASTRUCTURES	ELECTRICITY	Peak daily demand = 6,100 kWh for Consolidated Space Operations Center; Capacity = 15,000 kW; can be expanded to 25,000 kW	23
		SOLID WASTE	Disposed offsite at licensed landfill by private contractor	2
		SEWAGE TREATMENT	Design capacity = 0.069 millon gallons/day; designed to support 2,300 Base personnel	23
		TRANS-PORTATION	Access to Falcon AFS provided by State Highway 94 and Enoch Road. Current traffic at Enoch Road = 1,550 vehicles/day, capacity 11,300 vehicles/day. Current traffic at SH 94 = 3,500 vehicles/day, capacity 16,000 vehicles/day.	23
		WATER SUPPLY	The Cherokee Water District contract with Falcon Air Force Station limits delivery of water to 0.479 million gallons per day. Existing peak water demands at the installation are estimated at 0.409 million gallons per day.	23
PERMIT STATUS		AIR	Attainment by Colorado standards (Falcon AFS is located outside the Colorado Springs non-attainment areas for carbon monoxide and total suspended particulates)	2
		WASTE WATER	NPDES Permit is in place for wastewater that is discharged offbase into lagoons.	2
		HAZARDOUS WASTE	Potential Hazardous Wastes: electrolytes, sodium hydroxide, sodium sulphide, dichlorodiflouromethane, sulfur dioxide, SSP-55 all in very small amounts; offsite disposal by Defense Reutilization Management Office	2, 4
ADDITIONAL ENVIRONMENTAL INFORMATION	No environmental compliance plan available. The Base Master Plan is being developed and is expected to be completed in June 1988; there are no land use or zoning conflict issues. Current EA: National Test Bed Program, 1987; Final Environmental Impact Statement, Consolidated Space Operations Center, January, 1981			3, 23
COMMENTS	National Test Facility has categorical exclusion as stated in document 813 (control # AFSPC 86-1) dated 8-12-86. Data is for Falcon Air Force Station, unless otherwise noted.			25, 30

TABLE 2-4.
SELECTED SOCIOECONOMIC INDICATORS FOR THE SUPPORTING REGION NATIONAL TEST FACILITY

Area/Indicator	1970	1980	1984	Annual Change 1970-1980 (%)	Annual Change 1980-1984 (%)
El Paso County					
Population	235,972	309,424	349,066	2.75	3.06
Year-Round Housing	72,913	116,770	N/A	4.82	N/A
Vacancy Rate (%)	7.3	7.7	N/A	--	--
Civilian Labor Force	71,085	130,297	163,883	6.25	5.90
Unemployment (%)	5.5	7.6	5.4	--	--
Per Capita Income($)[1]	2,920	7,027	9,812	--	--
Median Family Income ($)[1]	8,974	18,729	N/A	--	--
Colorado Springs					
Population	140,512	215,105	247,739	4.35	3.59
Year-Round Housing	46,502	88,189	N/A	6.61	N/A
Vacancy Rate (%)	7.7	7.9	N/A	--	--
Civilian Labor Force	46,414	98,140	123,504	7.78	5.92
Unemployment (%)	5.7	7.4	5.3	--	--
Per Capita Income ($)[1]	3,001	7,404	10,292	--	--
Median Family Income ($)[1]	9,089	18,987	N/A	--	--

References: 17, 18, 16, 19, 21

[1] Income figures refer to preceding year

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3. ENVIRONMENTAL CONSEQUENCES

This section assesses the potential environmental consequences of the proposed BSTS tests. It is based on a comparison of the tests described in Section 1, and the facilities to be utilized at proposed test locations, as described in Section 2. Any identified environmental documentation that addresses the types of activities proposed for the facilities is incorporated by reference.

Many of the tests for the BSTS Demonstration/Validation program would be conducted at contractor facilities, specifically Lockheed Missiles and Space Company in Sunnyvale, California and Grumman Aerospace Company in Bethpage, New York, and Irvine, California. The contractors have been selected through the DoD procurement process and are required to meet all Federal, State, and local environmental laws and regulations necessary for facility operations.

The approach used to complete the Environmental Assessment of the BSTS Demonstration/Validation program was described in Section 1. To assess the potential for and the magnitude of impacts from Demonstration/Validation at each government facility, a two-step methodology was utilized (Figure 3-1). The first step was the application of assessment criteria to identify activities with no potential for significant environmental consequences. Activities were deemed to present no potential for significant environmental consequences if they met all of the following criteria (i.e., all "yes" answers):

1. Are the facility and its infrastructure adequate for the proposed activity (i.e., can the tests be conducted without new construction, excluding minor modifications)?

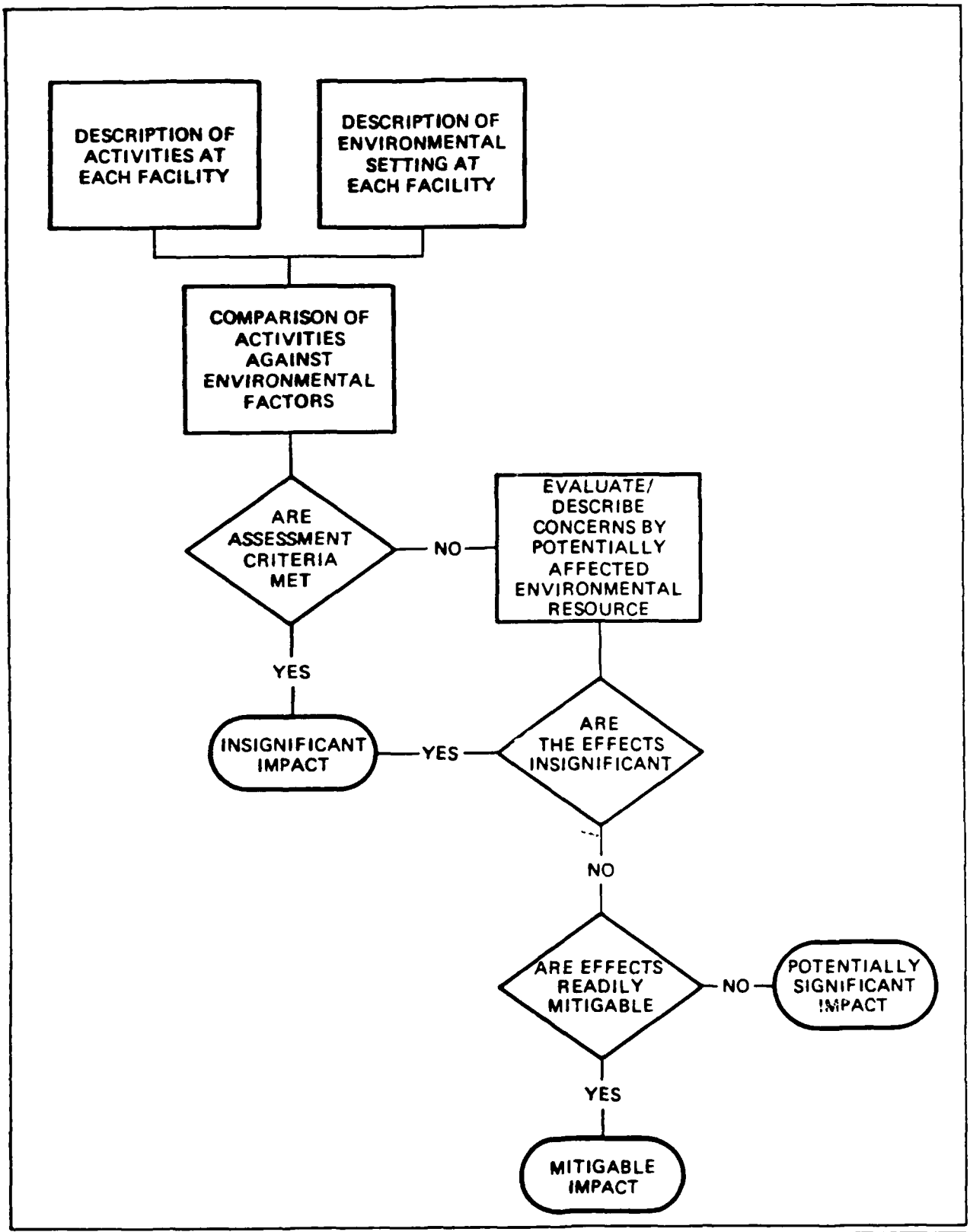
2. Is current staffing at the facility adequate to conduct the test, excluding minor staff level adjustments?

3. Does the facility comply with existing environmental standards?

4. Are the resources of the surrounding community adequate to accommodate the proposed testing?

If a proposed test was determined to present a potential for impact (i.e., a "no" answer to any of the above questions), the second step was to evaluate the activity in the context of the following environmental considerations: air quality, water quality, biological resources, infrastructure, hazardous waste, land use, visual resources, cultural resources, noise, and socioeconomics. As a result of that evaluation, consequences were assigned to one of three categories: insignificant, mitigable, or potentially significant.

Environmental consequences were determined to be **insignificant** if, in the judgment of the analysts or as concluded in existing environmental documentation, no potential for significant environmental impacts exists. Consequences were deemed **mitigable** if concerns exist but it was determined that all potential consequences could be readily mitigated through standard procedures, or by measures recommended in existing environmental documentation. If serious consequences exist that could not be readily mitigated, the activity was determined to represent **potentially significant** environmental impacts.



METHOD FOR ASSESSING
POTENTIAL ENVIRONMENTAL CONSEQUENCES

FIGURE 3-1

The remainder of this section provides discussions of the potential environmental consequences for each government location proposed for the BSTS Demonstration/Validation program. The impacts of the no-action alternative and irreversible and irretrievable commitments of resources that would accompany BSTS Demonstration/Validation are described at the end of this section.

3.1 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

3.1.1 Cape Canaveral Air Force Station/Eastern Test Range

Cape Canaveral Air Force Station/Eastern Test Range would be used for one launch of the BSTS during Demonstration/Validation. This launch would utilize the new Titan IV booster to place the test satellite in orbit. Support facilities at Patrick Air Force Base, the tracking facilities of the Eastern Test Range, and other support from the Air Force Satellite Control Facility, the Consolidated Space Operations Center, and the MILSTAR satellite communications system would be utilized as needed. These activities are within the scope of operations at Cape Canaveral/Eastern Test Range.

Modification of Launch Complex 41 at Cape Canaveral is required to accommodate Titan IV launches. Those modifications are in progress and will support several military space programs in addition to the proposed BSTS program (7). No new construction or modification of Eastern Test Range facilities would be required (7).

The environmental consequences of the Titan IV Launch Complex construction and operation have been analyzed in "Environmental Assessment for the Complementary Expendable Launch Vehicle (CELV) Program at Cape Canaveral Air Force Station." Copies of this documentation may be obtained from the Public Affairs Office at Cape Canaveral Air Force Station.

No new staffing would be required to support BSTS activities at Cape Canaveral Air Force Station/Eastern Test Range. All Titan IV launches, including any utilized for BSTS launches, would be staffed with existing permanent facility employees (7). Existing permanent infrastructure support facilities for Launch Complex 41 and the Eastern Test Range are adequate to support Titan IV launch activities (7).

The result of applying the four assessment criteria against the test activities and the facility modifications they would require shows the potential for environmental effects related to the modification of the Titan IV Launch Complex 41 at Cape Canaveral. Thus, a more detailed assessment addressing each of the environmental considerations for activities at Cape Canaveral was completed.

The other three assessment criteria at Cape Canaveral Air Force Station are met. With no staff increases there would be no additional pressure placed on the resources of the surrounding communities. In addition, the facilities at the Cape Canaveral Air Force Station are currently in compliance with all permit requirements (8).

The Eastern Test Range was also assessed against the four criteria. The result of this evaluation was a determination that the four criteria are met.

The results of the assessment of each of the environmental considerations are presented below.

Air Quality

Cape Canaveral currently meets all State and Federal air quality standards (8). Launches would affect air quality through the releases of perchlorates, which combine with the atmosphere to form hydrochloric acid. The specific impacts and their mitigation through use of an oxidizer vapor scrubber are described in the environmental assessment for the Titan IV Launch Complex modification (7).

Water Quality

Current water discharges are permitted and monitoring shows no exceedances (8). Most washdown deluge water used during launches runs off onto the ground and is not monitored, but the water that is collected on the launch platform (30-40 percent of all washdown water) is tested and has been found to be clean enough for release. The impacts and their mitigations are described in the environmental assessment for the Titan IV launch complex modifications (7).

Biological Resources

Threatened and endangered species are present in the area of Cape Canaveral (9). Any activities that may affect these threatened and endangered species must be reviewed and approved by the Fish and Wildlife Service as required by the Endangered Species Act of 1973 and may not proceed unless proper mitigation is applied.

Infrastructure

Evaluation of the effects on each of the infrastructure components is as follows:

- Electricity is currently supplied by Florida Power and Light (12, 14). No increases in demand over current capacity would result from BSTS test activities (7). Portable generators may be used to supplement permanent power supplies during Titan IV launches (7).

- Solid waste is disposed offsite (8, 12, 14); additional increases that may result from BSTS activities would be only a small part of the approximately 14,000 tons generated annually. Thus, consequences are anticipated to be insignificant.

- Sewage treatment is currently at 80 percent of capacity (12, 13, 14). As no staff increases are needed to support BSTS activities, potential increases in sewage generation rates are considered minor. Thus, consequences are anticipated to be insignificant.

- Water is currently purchased from the City of Cocoa (12, 15). Deluge water would be required for one BSTS launch. This would represent an insignificant increase in consumption.

- Transportation routes to the Cape Canaveral Air Force Station are currently congested (14). However, since no additional staff would be required for BSTS activities there would be no increase in the current congestion.

Hazardous Waste

The existing hazardous waste storage facility is adequate for the management of any additional hazardous waste generated by BSTS activities (8).

Land Use

The modification of an existing launch platform would result in no conflict with land use as specified in the base comprehensive plan (9).

Visual Resources

The modification of the existing Launch Complex 41 would result in insignificant changes to the visual resources of the area.

Cultural Resources

Modification of the existing Launch Complex 41 would not result in disruption of undisturbed land. Thus, no impacts are anticipated on historical and archaeological sites.

Noise

There are no specific standards for noise levels; however, the Titan IV is less noisy than the Space Shuttle which has been launched from the adjacent Kennedy Space Center with no significant impacts (11). Therefore, anticipated impacts are deemed insignificant.

Socioeconomics

No new staff are projected to support BSTS activities. Thus, there would be no pressure on the housing and services provided by the surrounding communities, and socioeconomic impacts of BSTS are anticipated to be insignificant.

The environmental consequences associated with BSTS Demonstration/Validation activities at Cape Canaveral Air Force Station/Eastern Test Range are anticipated to be mitigable using the planned control measures (7).

3.1.2 National Test Facility

The National Test Facility would be used for analysis and application of data from flight tests of the BSTS in simulation exercises. The functions of the National Test Facility for the BSTS tests are within the scope of the facility's design. Environmental effects of construction and operation of the

National Test Facility are presented in the "National Test Facility Environmental Assessment" (23). This environmental assessment estimated that minor erosion during construction and minor impacts on air quality, ecology, groundwater supply, and vehicular traffic during operation would occur. It concluded that with the implementation of proposed mitigation measures, no significant impacts are anticipated. Copies of this environmental assessment may be obtained from the Public Affairs Office at Falcon Air Force Station.

Until the National Test Facility is constructed, the staff necessary to complete the BSTS tests would be located at existing facilities at Falcon Air Force Station. The environmental consequences of the proposed use of these existing facilities were addressed in a "Request for Environmental Impact Analysis," control number AFSPC 86-1 (25). The result of this request was an assessment that the interim National Test Facility qualified as a categorical exclusion in accordance with U.S. Air Force Categorical Exclusion 2x. This categorical exclusion states, "This is an administrative action utilizing interior space for personnel and computer equipment." Thus, no further environmental documentation is necessary. The categorical exclusion refers to the environmental impact statement for the Consolidated Space Operations Center (24). Copies of this document may be obtained from the Public Affairs Office at Falcon Air Force Station.

Operation of the National Test Facility would require a significant increase in the staff at Falcon Air Force Station. The previously completed "National Test Facility Environmental Assessment" (23) predicted the creation of approximately 2,300 permanent onsite jobs, as well as a daily average of 400 visitors (because each visit is likely to last a minimum of several days, visitors were counted as equivalent to employees). Including the visitors, the total maximum daily population would thus be increased by 2,700. On the assumption that only 10 percent of the daily population would be drawn from the local area, it was predicted that more than 2,400 families would relocate to the area. No estimates of the portion of the staffing specific to BSTS have been made. While it can be assumed that only a portion of the total staffing is relevant to BSTS, the consequences of complete staffing are included as a worst-case analysis.

The result of applying the four assessment criteria against the test activities and the facility construction they would require shows the potential for environmental effects related to the construction and operation of the National Test Facility, the proposed staffing requirements of the facility, and the resulting socioeconomic presence in surrounding communities. The assessment criteria for compliance with permits is met by the existing facilities. The results of the environmental assessment conducted for the National Test Facility are summarized below.

Air Quality

Current operations at Falcon Air Force Station are in attainment by Colorado standards. Once the National Test Facility is constructed, operations are predicted to add to an existing violation of the 1-hour and 8-hour carbon monoxide Federal standard from automobiles at the intersection of Petersen Boulevard and Highway 94 outside the base (23). This addition can be mitigated through the use of van pools and other conservation measures.

Water Quality

All discharges are in compliance with current permits (2). The environmental assessment for the National Test Facility predicts no significant impact on groundwater or surface water quality (23).

Biological Resources

No threatened or endangered species are identified in the vicinity of the National Test Facility (23). Impacts to biological resources were predicted to be insignificant (23).

Infrastructure

Evaluation of the effects on each of the infrastructure components is as follows:

- Electrical substation can be expanded to 25,000 kW with additional cooling equipment. The National Test Facility will require the addition of 13,000 kW, which could be accommodated by expansion of the substation (23).

- Solid waste is disposed of offsite in a licensed landfill. The amount of solid waste that would be generated by the National Test Facility has not been estimated, but it is anticipated to be a relatively small volume (2).

- Sewage treatment capacity is currently adequate but the construction of the National Test Facility requires an expansion of the capacity of the sewage treatment plant by 0.124 million gallons/day (23). The expansion could encroach on a flood plain. All impacts are anticipated to be mitigable (23).

- Construction and operation of the National Test Facility are projected to increase water requirements from 0.37 million gallons/day to 1.0 million gallons/day (23). Mitigation measures such as conservation, reuse, and drought-tolerant landscaping would reduce the projected water requirements to 0.5 million gallons/day (23). Additional mitigation measures would have to be implemented to prevent exceeding water supply.

- Transportation system capacity exceeds current traffic demands. The addition of the National Test Facility would create significant increases in vehicular traffic, but would be below design capacity; however, increased delays would occur at some intersections (23).

Hazardous Waste

Any hazardous waste would be disposed of in accordance with current applicable regulations (2, 4).

Land Use

There are no current land use or zoning conflicts (3). No conflicts are anticipated for the development and operation of the National Test Facility (23). Expansion of the sewage treatment plant could encroach on a flood plain. This impact can be mitigated through the use of standard flood control measures.

Visual Resources

The current visual landscape is a rolling agricultural grassland (23). The National Test Facility would have an insignificant additional impact on the visual resources because it will be adjacent to an existing building (23).

Cultural Resources

No cultural resources have been identified on the facility (23); therefore, impacts are anticipated to be insignificant.

Noise

Due to the administrative and industrial nature of existing facilities on Falcon Air Force Station, impacts from construction and operation are anticipated to be insignificant (23).

Socioeconomics

Unemployment in El Paso County of 5.4 percent (8,800 persons) in 1984, and an adequate availability of housing, indicate that the socioeconomic impacts of the growth resulting from construction and operation of the National Test Facility would be insignificant (23).

The environmental consequences associated with the construction and operation of the National Test Facility are mitigable by the measures described in the "National Test Facility Environmental Assessment" (23). No significant environmental consequences have been identified associated with the operation of the interim National Test Facility based on the "Request for Environmental Impact Analysis" (control number AFSPC 86-1) (24, 25).

3.2 ENVIRONMENTAL CONSEQUENCES OF NO ACTION

If the no-action alternative is selected, no additional environmental consequences are anticipated. Concept Exploration would continue at currently staffed facilities with no changes in operations.

3.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Development of the single BSTS candidate satellite through Demonstration/Validation stage would result in irreversible and irretrievable commitment of resources such as electronic components, various metallic and nonmetallic structural materials, fuel, and labor. This commitment of resources is not different from those necessary for many other aerospace research and development programs; it is similar to the activities that have been carried out in previous aerospace programs over the past several years.

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APPENDIX A
TEST ACTIVITY DESCRIPTIONS

The Demonstration/Validation test activities have been divided into four categories: analyses, simulations, component/assembly tests, and flight tests. This Appendix describes in greater detail the simulations, component/assembly tests, and flight tests identified in Section 1.3.

SIMULATION TESTING

Simulation testing of a physical entity (machine, system component, etc.) is accomplished by developing a computer model of that entity. The model then interacts with data representing physical stimuli to assess the entity's capabilities in real-world conditions. A simulation involves writing and running computer programs, with possible interfaces to other systems or system elements. No impacts on the physical environment are involved other than the commitment of manpower and electrical energy involved in computer operations.

COMPONENT/ASSEMBLY TESTING

The basic concept of component/assembly testing is to control the physical conditions in which the hardware item is tested. Tests are typically conducted in specialized environments, and data are collected regarding the performance of the hardware item in that environment. The scope of the tests may range from single microchip components up to major subassemblies. This section describes those special environments and the tests to be performed.

Space Environment Chamber

A space environment chamber simulates some or all of the characteristics of space (thermal, vacuum, radiation, etc.) in order to closely emulate the space environment in which the test object is designed to operate.

Nuclear Radiation Chambers

The object of a radiation chamber is to determine the detrimental effects of various types of radiation. Radiation testing (other than that involving nuclear explosions) can be accomplished by exposing materials to:

- Radiation from a research or test nuclear reactor
- A beta/gamma radioactive source, such as cobalt-60 or cesium-137, in an exposure chamber or pool
- Nuclear particles in an accelerator (Van de Graff, cyclotron, etc.) in a target room (requires very large power source)
- X rays from an x-ray machine (requires large power source).

The specific device used will depend on the type of radiation, energy, and intensity desired, the size of the object, and the availability of the facility.

Anechoic Chamber

This "black box" is typically used in measuring antennae radiation patterns. (Anechoic chambers also exist for other parts of the electromagnetic and audio spectra.) The walls of the room are constructed of materials that absorb virtually all the radiated energy without reflection, refraction, or reradiation. It sometimes requires special refrigeration equipment to prevent undue heating of the room's interior.

None of these facilities typically consumes large amounts of power or other utilities, or generates any hazardous wastes.

FLIGHT TESTING

The government normally establishes flight ranges to test specific type systems from a dedicated facility. For the purpose of the Strategic Defense Initiative, flight testing can include missiles in ballistic flight trajectories or tests with objects in orbit.

Missile Range

Missile ranges consist of a launch area with launch pads and associated control and support facilities, a safety area around the launch area, and a controlled land/sea/air/space area for flight and impact. A missile range comprises large areas of the earth's surface and include tracking, communications and recovery facilities.

Orbit Range

Orbit ranges are an extension of missile ranges; however, additional tracking and communication sites are required to follow test vehicles in orbit. The Consolidated Space Operations Center will be the centralized facility for all space vehicle tracking information.

FINDING OF NO SIGNIFICANT IMPACT

STRATEGIC DEFENSE INITIATIVE ORGANIZATION
U.S. DEPARTMENT OF DEFENSE

AGENCY: Department of Defense

ACTION: Decision to conduct Demonstration/Validation tests of the Boost Surveillance and Tracking System (BSTS).

BACKGROUND: Pursuant to Council on Environmental Quality Regulations for implementing the procedural provisions of the National Environmental Policy Act of 40 CFR Parts 1500-1508, and Department of Defense (DoD) Directive on Environmental Effects in the United States of DoD Actions, the DoD has conducted an assessment of the potential environmental consequences of Demonstration/Validation testing of The Boost Surveillance and Tracking System developed by the Strategic Defense Initiative Organization.

SUMMARY: Demonstration/Validation would involve four types of tests: analyses, simulations, component/assembly tests, and flight tests. The locations of test activities for the Boost Surveillance and Tracking System are:

FACILITY	TEST TYPE
Colorado	
National Test Facility, Falcon Air Force Station	Analyses, Simulations
Florida	
Cape Canaveral Air Force Station/Eastern Test Range	Flight Tests

To determine the potential for significant environmental impacts of the Demonstration/Validation of the Boost Surveillance and Tracking System, the magnitude and frequency of the tests that would be conducted at proposed test locations were compared to the current activities at those locations.

To assess impacts, the activity was evaluated in the context of the environmental considerations for air, water, biological resources, infrastructure, hazardous waste, land use, visual resources, cultural resources, noise, and socioeconomics. As a result of that evaluation, consequences were assigned to one of three categories: insignificant, mitigable, or potentailly significant.

Environmental consequences were determined to be insignificant if no serious concerns existed regarding potential impacts of the potentially affected area. Consequences were deemed mitigable if concerns existed but it was determined that all of those concerns could be readily mitigated through standard procedures or by measures recommended in existing environmental documentation. If serious concerns were identified that could not be readily mitigated, the activity was determined to represent potentially significant consequences.

FINDING: No significant impacts would result from analyses, simulations, component/assembly testing and flight testing of the Boost Surveillance and Tracking System.

FURTHER INFORMATION: A copy of

Boost Surveillance and Tracking System,
Demonstration/Validation Program,
Environmental Assessment,
July 1987

is available from

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