

Environmental Impact Analysis Process

Environmental Assessment

U.S. Air Force Wideband Gapfiller Satellite Program

October 23, 2000



DEPARTMENT OF THE AIR FORCE
Headquarters, Space and Missile Systems Center

**FINDING OF NO SIGNIFICANT IMPACT (FONSI)
U.S. AIR FORCE WIDEBAND GAFILLER SATELLITE SYSTEM
CAPE CANAVERAL AIR STATION, FLORIDA**

Pursuant to the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), Department of Defense (DoD) Directive 5000.2-R, and United States Air Force Instruction (AFI) 32-7061 (promulgated by 32 Code of Federal Regulations [CFR] 989), which implements these regulations in the Environmental Impact Analysis Process (EIAP), the U.S. Air Force has conducted an assessment of potential environmental consequences of processing up to six commercial-like Wideband Gapfiller System (WGS) satellites, with these satellites being deployed from existing facilities at Cape Canaveral Air Station, Florida (CCAS). The No Action Alternative also was considered. This Finding of No Significant Impact (FONSI) summarizes the results of the evaluation.

Proposed Action and Alternatives: Proposed Action is the processing of up to six new, commercial-like wideband satellites that are launch-ready. The WGS satellite will be deployed using existing facilities at CCAS, beginning in 2004. The WGS satellites will be compatible with the U.S. Air Force Evolved Expendable Launch Vehicle (EELV). Three contractors are currently competing to develop, and deliver WGS satellites to orbit. The competing contractors will be allowed to choose a satellite launch processing facility. MILSATCOM Joint Program Office (SMC/MCX) will take ownership of each WGS satellite after it is in orbit.

The purpose of the WGS satellites is to fulfill a growing wideband communication requirement for U.S. military forces. The WGS Program will provide high capacity X-band service that is compatible with DoD's existing Defense Satellite Communications System (DSCS) and Global Broadcast System (GBS) satellites, but will also have the capability of providing increased data throughput. DoD wideband satellite communication services are currently provided by a combination of DSCS and GBS satellites. These existing DoD satellite systems will not meet the growing DoD

date rate communication requirements in the future. The WGS Program provides an interim solution to assure the DoD's existing worldwide communication support is maintained until the development and deployment of the Advanced Wideband Satellite System.

The WGS Program proposes a "commercial-like" procurement as an option to DoD's entering into a full development process. The concept of the "commercial-like" WGS satellites recognizes the ability of industry to lead the development of DoD satellite communications technologies. This allows DoD to take advantage of new commercial technologies and manufacturing processes and achieve significant cost savings in system procurement. "Commercial-like" also recognizes that there are unique U.S. military needs that must be considered in developing a military SATCOM system. The WGS Program is a new partnership between DoD and industry to demonstrate how commercial technologies can provide affordable systems to provide satellite communications support to U.S. military operations.

The No Action Alternative consists of continuing to rely on existing DoD communication systems (i.e., DSCS and GBS) to support the communications needs of global U.S. military operations. If the WGS Program does not go forward, DoD satellite communications capabilities will be at risk and will not be adequate to meet DoD's future communication requirements.

No other alternatives to the WGS Program have been identified by the SMC/MCX.

Anticipated Environmental Effects: The Environmental Assessment (EA) evaluated the environmental impacts of processing of up to six WGS satellites. The potential environmental effects of the Proposed Action and alternative were assessed for the following environmental resource areas: hazardous materials and waste management, radiation, air quality and deorbiting debris. Impacts associated with the EELV launch vehicle were previously assessed in a Final Environmental Impact Statement (EIS) dated April 1998 and in a Supplemental EIS dated March 2000.

Processing of the WGS satellites will be conducted in accordance with applicable federal, state and local legislation and regulations, including existing permits. At the end of the operational life of each satellite, remaining fuel will be used to move the satellite to an orbit beyond geosynchronous Earth orbit. As a result, potential impacts related to deorbiting debris would not be significant. The EA determined that the WGS Program will have no impact on hazardous materials and waste management, radiation or air quality.


Public Comment Period: A period of public comment was held from October 13 to October 23, 2000. During this time, the EA was available for review in the El Segundo, California, and Broward County, Florida public libraries, and appeared in the Daily Breeze Newspaper of Torrance, California and Florida Today of Melbourne, Florida. Copies of the newspaper clippings reside in the SMC/PA files. A copy of the EA is currently available on the Los Angeles Air Force Base web site. During the public comment period, no comments were received.

Conclusion: Based on the EA, which is herein incorporated by reference, it is concluded that the Proposed Action will not result in significant environmental impacts or cause significant cumulative impacts in association with other programs. An EIS is not required. This FONSI, with the supporting EA, fulfills the requirements of NEPA, CEQ regulations, and AFI 32-7061. Point of contact for this document is Captain Sonny Kagan, Military Satellite Communications Joint Program Office, telephone (310) 336-4868. The final FONSI and its associated EA is stored in the Wideband Gapfiller Program Office program files, MILSATCOM Joint Program Office (SMC/MCX), 2420 Vela Way, Suite 1467-A8, Los Angeles Air Force Base, California 90245-4659 as well as the SMC/AXFV web site at <http://ax.laafb.af.mil/axf>.

Mitigation: The processing of up to six new commercial-like WGS satellites will occur within established private and military systems where policies and procedures are in place for compliance with local, state and federal regulations. As a result, existing measures are utilized to control potential impacts associated with hazardous materials and

waste management, radiation, air quality and deorbiting debris. Because of the characteristics of the WGS Program, which include use of in-place facilities and systems and compliance with existing regulations, mitigation measures are not required.

Approval:



WILLIAM O. BERRY, PhD
Associate Deputy Assistant Secretary
(Science, Technology and Engineering)
Assistant Secretary (Acquisition)

11.12.2000
DATE

TABLE OF CONTENTS

	<u>PAGE NO.</u>
LIST OF TABLES/LIST OF FIGURES	iii
1.0 PURPOSE AND NEED FOR ACTION	1
1.1 Background	1
1.2 Project Purpose and Need	1
1.3 Decision to Be Made	2
1.4 Purpose of the Environmental Assessment	2
1.5 Scope of Environmental Assessment	2
1.6 Issues	3
2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVE (DOPAA)	4
2.1 Proposed Action	4
2.1.1 Overview	4
2.1.2 Project Location	4
2.1.3 Elements of the WGS Program	4
2.1.3.1 WGS Terminal Segment	6
2.1.3.2 WGS Mission Control Segment	6
2.2 No Action Alternative	6
3.0 AFFECTED ENVIRONMENT	7
3.1 Background	7
3.2 Community Setting, Land Use and Aesthetics, Transportation, Utilities, Health and Safety, Geology and Soils, Water Resources, Noise, Biological Resources, Cultural Resources, Environmental Justice	7
3.3 Affected Environment - WGS Program	8
3.3.1 Hazardous Materials and Waste Management	8
3.3.2 Air Quality	9
3.3.3 Deorbiting Debris	9

TABLE OF CONTENTS (Continued)

		<u>PAGE NO.</u>
4.0	ENVIRONMENTAL CONSEQUENCES AND CUMULATIVE IMPACTS	11
4.1	Introduction	11
4.2	Community Setting, Land Use and Aesthetics, Transportation, Utilities, Health and Safety, Geology and Soils, Water Resources, Noise, Biological Resources, Cultural Resources, Environmental Justice	11
4.3	Proposed Action	11
4.4	Environmental Impact Evaluation - WGS Program	12
	4.4.1 Hazardous Materials and Waste Management	12
	4.4.2 Radiation	15
	4.4.3 Air Quality	15
	4.4.4 Deorbiting Debris	16
4.5	Mitigation Measures	17
4.6	Cumulative Impacts	17
4.7	No Action Alternative	18
5.0	REGULATORY REVIEW AND PERMIT REQUIREMENTS	19
6.0	PERSONS AND ORGANIZATIONS CONSULTED	20
7.0	REFERENCES AND SOURCES OF INFORMATION	21
8.0	LIST OF PREPARERS	22

TABLES

FIGURES

**TABLE OF CONTENTS
(Continued)**

LIST OF TABLES

<u>TABLE NO.</u>	<u>TITLE</u>	<u>PAGE NO.</u>
1	Hazardous Materials - WGS Program	14

LIST OF FIGURES

<u>FIGURE NO.</u>	<u>TITLE</u>	<u>PAGE NO.</u>
1	Wideband Gapfiller Satellite System Overview	5

1.0 PURPOSE AND NEED FOR ACTION

1.1 BACKGROUND

The Department of Defense (DoD) wideband satellite communication services are currently provided by a combination of Defense Satellite Communications System (DSCS) satellites and Global Broadcast System (GBS) packages hosted on Ultra High Frequency (UHF) Follow-On Satellites. These existing satellite systems will not meet the growing data rate communication requirements in the future. As the requirements continue to grow, the DSCS and UFO constellations are degrading. The DoD requires the Wideband Gapfiller Satellites (WGS) as an interim solution to maintain existing worldwide coverage of U.S. military communications support. The WGS Program will serve as part of a supplemental wideband communication system until development of the Advanced Wideband Satellite System that is expected to be fielded at the end of this decade.

1.2 PROJECT PURPOSE AND NEED

The MILSATCOM Joint Program Office (SMC/MCX) is considering the processing of up to six new commercial-like, wideband satellites that are launch-ready. The WGS satellites will be deployed using existing facilities at Cape Canaveral Air Station, Florida (CCAS), beginning in 2004. The WGS satellites will be compatible with the Evolved Expendable Launch Vehicle (EELV). Three contractors are currently competing to develop and deliver WGS satellites to orbit. Contractors will be allowed to choose a satellite launch processing facility, either an existing commercial facility or a government-owned/government-operated facility, since satellite launch processing is part of the purchase package. SMC/MCX will take ownership of the satellite after each WGS satellite is in orbit.

The purpose of the WGS satellites is to fulfill a growing wideband communication requirement for U.S. military forces. The WGS Program will provide high capacity X-band service that is compatible with the existing DSCS and GBS satellites, but will also have the capability of providing increased data throughput. These existing DoD satellite systems will not meet the growing DoD data rate communication requirements in the future. The WGS Program provides an interim solution to assure that DoD's existing worldwide communication support is maintained until development and deployment of the Advanced Wideband Satellite System.

The WGS Program proposes a "commercial-like" procurement as an option to DoD entering into a full development process. The concept of the "commercial-like" WGS satellites recognizes the ability of industry to lead the development of DoD satellite communications technologies. This allows DoD to take advantage of commercial technologies and manufacturing processes and achieve significant

cost savings in system procurement. "Commercial-like" also recognizes that there are unique U.S. military needs that must be considered in developing a military SATCOM system. The WGS Program is a new partnership between DoD and industry to determine how commercial technologies can provide affordable systems to provide satellite communications support to U.S. military operations.

1.3 DECISION TO BE MADE

The decision to be made regarding the proposed implementation of the WGS Program is whether to:

- Sign a Finding of No Significant Impact (FONSI) for the Proposed Action.
- Direct the preparation of an Environmental Impact Statement (EIS) for the Proposed Action.
- Take no action on the Proposed Action (i.e., No Action Alternative) and continue to rely upon existing DoD systems to support the communications needs of global U.S. military operations.

1.4 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

The purpose of the EA is to provide information to U.S. Air Force decision-makers regarding potential environmental consequences of the Proposed Action and the No Action Alternative.

1.5 SCOPE OF ENVIRONMENTAL ASSESSMENT

This EA is part of the U.S. Air Force Environmental Impact Analysis Process (EIAP) for the proposed WGS Program. Requirements for the EIAP are included in Air Force Instruction (AFI) 32-7061 (promulgated by 32 Code of Federal Regulations [CFR] Part 989), *Environmental Impact Analysis Process*, which implements both NEPA and the President's Council on Environmental Quality (CEQ) Regulations for compliance with NEPA. Additional EIAP requirements are included in DoD Directive 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs*, and Air Force Policy Directive 32-70, *Environmental Quality*.

This EA evaluates the potential environmental consequences of the full range of activities associated with the Proposed Action and the reasonable alternative to the Proposed Action, which in this case is limited to the No Action Alternative. In accordance with AFI 32-7061, plus NEPA and CEQ regulations, this EA:

- Describes the existing baseline environmental conditions as related to the Proposed Action.
- Identifies and analyzes the potential environmental consequences of the Proposed Action, and potential cumulative environmental impacts of the Proposed Action and other projects.
- Identifies mitigation measures, as appropriate, to eliminate, limit or reduce potential environmental impacts associated with the Proposed Action.
- Identifies applicable environmental permits, if any, that may be required for the Proposed Action.

Applicable environmental data was collected and analyzed to document if any potential environmental consequences would occur as a result of the Proposed Action and No Action Alternative. This data included the technical requirements document for the WGS Program (U.S. Air Force, 1999), as well as responses from potential contractors to U.S. Air Force technical questions. References and sources of information are listed in Chapter 7.0 of this EA.

In accordance with NEPA and CEQ regulations, the U.S. Air Force is required to determine the environmental impacts of the Proposed Action and its alternatives. If, upon review of this EA for the WGS Program, the U.S. Air Force decision-makers approve the findings and conclusions of this EA that the potential environmental impacts are not significant, then the U.S. Air Force decision makers will approve a FONSI.

1.6 ISSUES

As a result of the above, this EA analyzes potential environmental issues associated specifically with the processing of up to six new commercial-like WGS satellites that are launch-ready. The WGS satellites will be deployed using existing facilities at CCAS. Based on the environmental evaluation, the following specific potential issues were identified:

- Hazardous Materials and Waste Management
- Radiation
- Air Quality
- Deorbiting Debris

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVE (DOPAA)

2.1 PROPOSED ACTION

2.1.1 OVERVIEW

The Proposed Action involves the processing of up to six new commercial-like WGS satellites. It is expected that the satellites will be deployed using existing facilities at CCAS beginning in 2004. The WGS satellites will be compatible with the U.S. Air Force EELV that has been analyzed in separate actions in accordance with NEPA and applicable DoD and/or U.S. Air Force regulations/instructions (U.S. Air Force, 1998; U.S. Air Force, 2000). The WGS Program consist of satellites, control terminals and user terminals. An overview of the WGS system is shown in Figure 1.

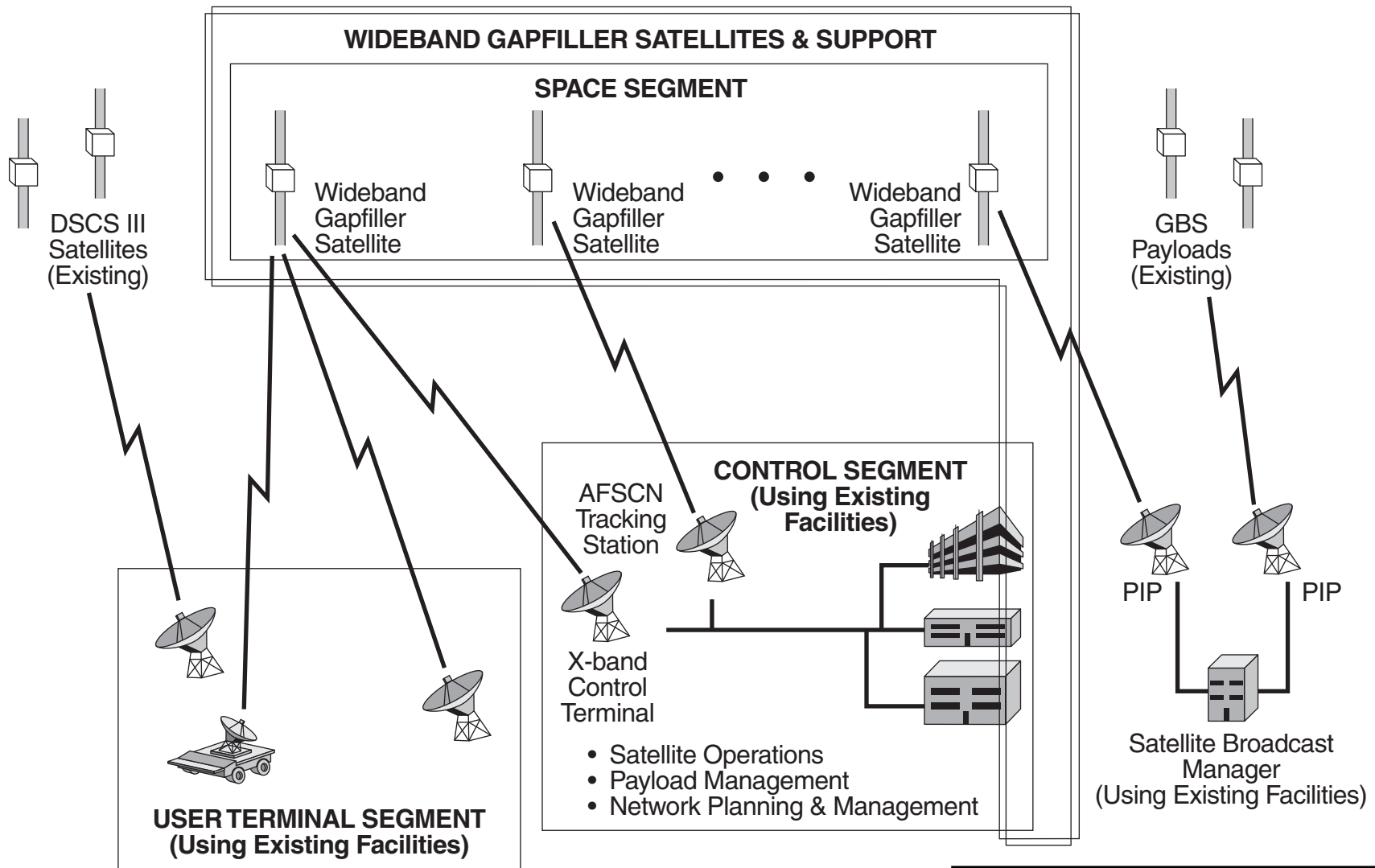
The WGS Program will supplement DoD's existing DSCS and GBS programs until the development and deployment of the Advanced Wideband Satellite System. The WGS Program uses a streamlined, commercial-like approach to process a constellation of up to six satellites ready to be launched into geosynchronous orbit.

2.1.2 PROJECT LOCATION

The Proposed Action is to process, launch, operate and dispose up to six new commercial-like WGS satellites. No new facilities of any type, including Ground Control Stations, will be constructed for the Proposed Action. The satellites will be transported by the selected civilian contractor via existing ground and/or air carriers to their destination for deployment using existing facilities at CCAS. Once at CCAS, the WGS satellites will be processed by the selected civilian contractor at either an existing commercial facility or a government-owned/government-operated facility, evaluated as separate action(s) to the extent required by NEPA and as appropriate by applicable DoD and/or U.S. Air Force regulations/instructions designed and built specifically for the processing of DoD satellites.

2.1.3 ELEMENTS OF THE WGS PROGRAM

The WGS Program will consist of the processing of up to six commercial-like WGS satellites, which will be placed in geosynchronous orbit. These satellites will be of the same design. Each satellite will be comprised of: 1) a bus, together with its appropriate subsystems (attitude control, power, thermal, etc.); 2) an orbit insertion subsystem compatible with the EELV; 3) a



Current plans are to augment existing wideband control facilities to provide mission control segment support to the Gapfiller satellites.

WIDEBAND GAPFILLER SATELLITE SYSTEM OVERVIEW

DEPARTMENT OF THE AIR FORCE
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TRC

FIGURE 1

communications payload; and 4) a Telemetry and Command (T&C) subsystem capable of supporting telemetry monitoring and executing satellite and payload command functions. Each WGS satellite will provide coverage and capacity to U.S. military forces operating anywhere within each field of view from 65 degrees north to 65 degrees south latitude. The WGS satellites will be fully compatible with the existing DSCS and GBS satellites.

2.1.3.1 WGS Terminal Segment

The WGS will use existing ground control systems and user terminals. No additional facilities are planned as part of the Proposed Action. The scope of this USAF WGS Program does not cover user terminal acquisition. Each individual U.S. military service will initiate its own acquisition program to develop and procure terminals that are compatible with the WGS satellites.

2.1.3.2 WGS Mission Control Segment

The Air Force Space Command (AFSPC) Satellite Control System (SCS) will provide the primary control for the WGS satellites using existing facilities. Primary payload commanding, back-up platform commanding, and user network monitoring and control will be executed by the U.S. Army Space Command DSCS Operating Centers.

2.2 NO ACTION ALTERNATIVE

The No Action Alternative consists of continuing to rely on existing DoD communication systems (i.e., DSCS and GBS) to support the communications needs of global U.S. military operations. If the WGS Program does not go forward, DoD satellite communication capabilities will be at risk and will not be adequate to meet DoD's future and increasing communication requirements.

No other alternatives to the WGS program have been identified by the MILSATCOM Joint Program Office (SMC/MCX).

3.0 AFFECTED ENVIRONMENT

3.1 BACKGROUND

The Final Environmental Impact Statement (EIS) and Supplemental EIS for the EELV program analyzed both government and commercial use of EELV systems (U.S. Air Force, 1998; U.S. Air Force, 2000), using a combined government/commercial mission model. The government portion of the mission model included the total number of DoD and NASA space vehicle launches from CCAS anticipated from 2001 through 2020. The commercial portion of the model utilized commercial forecasts from the Air Force Space Command National Mission Model (AFSPC NMM), Department of Commerce, Commercial Space Transportation Advisory Committee (COMSTAC) launch forecast, and Federal Aviation Administration (FAA) estimates.

Based on the EELV Final EIS and Supplemental EIS, the existing environment for the launch of space launch vehicles that are expected be used to support the WGS Program at CCAS has been addressed. The EELV Final EIS and Supplemental EIS are herein incorporated by reference in this EA.

The EELV Final EIS and Supplemental EIS evaluated the following aspects of the affected environment for EELV-related activities at CCAS:

- Community Setting (employment and population)
- Land Use and Aesthetics
- Transportation
- Utilities
- Hazardous Materials and Hazardous Waste Management
- Health and Safety
- Geology and Soils
- Water Resources
- Air Quality (lower atmosphere)
- Air Quality (upper atmosphere)
- Noise
- Orbital Debris
- Biological Resources
- Cultural Resources
- Environmental Justice

3.2 COMMUNITY SETTING, LAND USE AND AESTHETICS, TRANSPORTATION, UTILITIES, HEALTH AND SAFETY, GEOLOGY AND SOILS, WATER RESOURCES, NOISE, BIOLOGICAL RESOURCES, CULTURAL RESOURCES, ENVIRONMENTAL JUSTICE

The EELV Final EIS and the EELV Supplemental EIS have been reviewed regarding the existing community setting, land use and aesthetics, transportation, utilities, health and safety, geology and soils, water resources, noise, biological resources, cultural resources and environmental justice as

they relate to the EELV at CCAS. Analyses of elements that are specific to the WGS Program are addressed in the following sections. These are: Hazardous Materials and Waste Management, Air Quality and Deorbiting Debris.

3.3 AFFECTED ENVIRONMENT - WGS PROGRAM

This discussion of the affected environment addresses aspects of the WGS Program that are specific to the processing, orbital use and disposal of the WGS satellites and are not specifically covered in other environmental documents. These are:

- Hazardous Materials and Waste Management
- Air Quality
- Deorbiting Debris

3.3.1 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

Numerous types of hazardous materials are used to support the various missions and general maintenance operations at CCAS. Categories of hazardous materials used during ongoing activities include petroleum, organics and lubricants (POLs), volatile organic compounds (VOCs), corrosives, refrigerants, adhesives, sealants, epoxies and propellants. The existing hazardous materials and hazardous waste management program at CCAS are described in the EELV Final EIS (U.S. Air Force, 1998).

Hazardous waste management at CCAS is regulated under the Resource Conservation and Recovery Act (RCRA) (Title 40, Code of Federal Regulations [CFR] 260-280) and the Florida Administrative Code (FAC) 62-730. It is the responsibility of each contractor to manage and dispose of hazardous waste generated from its operations in accordance with local, state and federal regulations. Hazardous wastes are labeled with the U.S. Environmental Protection Agency (EPA) identification number for each contractor, under which they are transported, treated and disposed.

Individual contractors and organizations maintain their own hazardous waste satellite accumulation points (SAP) and 90-day hazardous waste accumulation areas, in accordance with applicable RCRA regulations. There is no limit to the volume of hazardous waste that can be stored at a 90-day hazardous waste accumulation area, but wastes must be taken to the permitted storage facility or disposed of offsite within 90 days.

The contractor is responsible for the collection and transport of hazardous wastes (including propellant waste) from the SAPs to a 90-day hazardous accumulation area, then to an offsite permitted treatment, storage and disposal (TSD) facility. The contractor is responsible for ensuring that management and disposal of hazardous wastes are conducted in accordance with applicable federal, state and local regulations and with plans for complying with these regulations.

3.3.2 AIR QUALITY

Air quality at CCAS is regulated federally under Title 40 CFR 50 National Ambient Air Quality Standards [NAAQS]), Title 40 CFR 51 (Implementation Plans), Title 40 CFR 41 and 63 (National Emission Standards for Hazardous Air Pollutants [NESHAPS]), and Title 40 CFR 70 (Operating Permits). Air quality at CCAS also is regulated under FAC 62-200 et. seq. and Florida Ambient Air Quality Standards (FAAQS). Existing facilities at CCAS that will be utilized for the Proposed Action are required to conduct activities at those facilities in compliance with these regulations. Detailed discussions of the existing environment for CCAS are provided in the EELV Final EIS (U.S. Air Force, 1998).

3.3.3 DEORBITING DEBRIS

Orbital debris refers to earth-orbiting objects except active satellites. Orbital debris can be classified as either natural or man-made. A 1996 Executive Branch policy directive, National Space Policy, provides guidance:

The United States will seek to minimize the creation of space debris. NASA, the Intelligence Community and the DoD, in cooperation with the private sector, will develop design guidelines for future government procurements of spacecraft, launch vehicles and services. The design and operation of space tests, experiments and systems will minimize or reduce accumulation of space debris consistent with mission requirements and cost effectiveness (U.S. Air Force, 1998).

The major sources of orbital debris are explosion/collision-induced satellite breakups. Although the exact cause of most breakups is unknown, it is generally thought to result primarily from inadvertent mixing of hypergolic fuels, overheating of residual propellants or deliberate fragmentation (U.S. Air Force, 1998).

The characteristics of orbital debris include the orbital regime in which it is found, its source, debris particle size, estimated population, altitude distribution and orbital life. The space around Earth in which satellites operate is generally divided into four regimes: low Earth orbit, medium Earth orbit, geosynchronous Earth orbit and "other."

4.0 ENVIRONMENTAL CONSEQUENCES AND CUMULATIVE IMPACTS

4.1 INTRODUCTION

The Proposed Action is to process, launch, operate and dispose of up to six new commercial-like WGS satellites. The various elements of the WGS Program will be conducted within or at existing commercial or government satellite processing facilities.

4.2 COMMUNITY SETTING, LAND USE AND AESTHETICS, TRANSPORTATION, UTILITIES, HEALTH AND SAFETY, GEOLOGY AND SOILS, WATER RESOURCES, NOISE, BIOLOGICAL RESOURCES, CULTURAL RESOURCES, ENVIRONMENTAL JUSTICE

The EELV Final EIS and Supplemental EIS has been reviewed regarding the community setting, land use and aesthetics, transportation, utilities, health and safety, geology and soils, water resources, noise, biological resources, cultural resources and environmental justice at CCAS as they relate to the EELV, which is the space launch vehicle expected to be used to support the WGS Program.

The Proposed Action will utilize existing commercial facilities or government-owned/government-operated facilities, without the requirement for new construction or new uses of existing facilities. Analyses of potential impacts specific to the WGS Program are addressed in the sections that follow. These are: Hazardous Materials and Waste Management, Radiation, Air Quality and Deorbiting Debris.

4.3 PROPOSED ACTION

The Proposed Action is to process, launch, operate and dispose of up to six new commercial-like WGS satellites. No new facilities will be constructed or used for the project. The WGS satellites will be provided by aerospace contractors who are currently involved in other similar programs, and who will use existing facilities.

The WGS satellites will be transported by the civilian contractor from the point of origin to CCAS. The satellites will be transported via existing ground and/or air carriers for which the task will be a part of normal operations. Potential direct effects to employment and other related factors and to transportation-related impacts will be within existing variables as to fuel use, road wear and traffic. Impacts from the transport of these satellites will not be significant.

At CCAS, the WGS satellites will be processed by the civilian contractor at existing commercial or government-owned/government-operated processing facilities that are already in use for such purposes. No new construction will be required or is anticipated. The processing of satellites occurs routinely at CCAS, using existing personnel, facilities and infrastructure. Processing activities for the satellites are within the scope of ongoing activities and will not represent additional work. Therefore, impacts of processing the WGS satellites will not be significant.

The WGS satellites will be deployed from CCAS by EELVs. No new launch sites will be required. The deployment of the WGS satellites will occur beginning in 2004 and will be completed by 2010. Once in orbit, the WGS satellites will be established in a geosynchronous orbit, with on-board systems for guidance and propulsion.

4.4 ENVIRONMENTAL IMPACT EVALUATION - WGS PROGRAM

This discussion of impacts addresses aspects of the WGS Program that are specific to the satellite program and, therefore, not specifically addressed in the previous environmental documents. These issues are:

- Hazardous Materials and Waste Management
- Radiation
- Air Quality
- Deorbiting Debris

4.4.1 HAZARDOUS MATERIALS AND WASTE MANAGEMENT

The management of hazardous and non-hazardous materials for the WGS satellites is within the capabilities of existing, permitted procedures for both the potential contractors and launch facilities. Waste materials generated during the processing of the satellites will be handled within existing, approved systems. Further, the selected contractor will be required to demonstrate effective waste disposal capability for hazardous and non-hazardous waste produced as a result of the Proposed Action.

Existing commercial and government-owned/government-operated processing facilities at CCAS have in-place hazardous materials and hazardous waste management procedures in compliance with federal, state, local and U.S. Air Force regulations. The requirements of the Proposed Action are within the parameters of existing permits and capabilities.

Hazardous materials used for WGS satellite processing will be transported, stored and dispensed in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1926, AFOSH Standards 91-XX (Safety) and 48-XX (Health), as well as applicable federal, state and local regulations governing the transport, storage and use of hazardous materials. There may be minor air emissions associated with the use of solvents, coatings and adhesives. No other impacts are expected under the Proposed Action from the normal use of hazardous materials in accordance with applicable regulations.

Some materials classified as hazardous are normally used in the processing and operation of satellites and may be used in the WGS satellites (see Table 1). For the WGS Program, no materials emitting ionizing radiation will be used. "Rare" metals such as gold, rhenium and/or iridium may be used. No ozone-depleting compounds (ODCs) will be used in the WGS Program.

The WGS satellites will be fueled at existing facilities. The WGS satellites will carry fuel for station keeping, repositioning and disposal (see Table 1).

During processing of the WGS satellites, the only hazardous material on the EPA list is toluene solvent, which is contained in Uralene adhesives. However, this substance becomes non-toxic when fully cured.

Hazardous waste resulting from the use of hazardous materials will be the responsibility of the contractor, who will be responsible for identification, containerization, labeling and accumulation of hazardous wastes in accordance with applicable federal, state, local and U.S. Air Force regulations. Hazardous wastes generated from WGS satellite processing activities will be transported, treated, stored and disposed of by the contractor. The annual hazardous waste generation rates for CCAS include hazardous wastes from other satellite and payload programs. As such, processing of up to six WGS satellites is not expected to increase hazardous waste generation from its current level.

TABLE 1
HAZARDOUS MATERIALS - WGS PROGRAM⁽¹⁾

SATELLITE PROCESSING	ESTIMATED QUANTITY PER SATELLITE (POUNDS)⁽²⁾
Blue sol	As required
Helium	250
Hydrogen	250
Isopropyl alcohol	350
Red epon	As required
Toluene	20 (included in Uralene Adhesive)
ON-BOARD SATELLITE	
Anhydrous ammonia	600
Beryllium	Trace
Hydrazine ⁽³⁾	1,000
Iridium	Trace
Monomethylhydrazine ⁽³⁾	1,000
Nickel metal hydride	Trace
Nitrogen tetroxide	1,600
Potassium hydroxide	Trace
RDX/diphenylamine/nitro-cellulose	Trace
Zirconium	Trace
Potassium Perchlorate	Trace

Note:

- (1) The above is a composite of hazardous materials submitted by each potential contractor for the WGS Program. The exact type and amount of the above materials actually utilized will depend on which contractor is selected.
- (2) The estimated quantity of hazardous materials that could potentially be used for the WGS Program are based on estimated quantities for similar types of satellite programs. (U.S. Air Force, 1995; U.S. Air Force, 1997).
- (3) While hydrazine and monomethylhydrazine are both listed in this table, it is likely that one or the other, not both, would be used to fuel the WGS satellite. Both propellants are listed here as the selected contractor will decide which fuel to use.

In the event of a launch failure/in-flight abort, the hazardous materials on-board the affected satellite (primarily liquid propellants as shown on Table 1) would be destroyed along with the components of the satellite and the launch vehicle itself. The in-flight abort/safety program implemented for launches from CCAS is designed to assure that human populations are not affected by in-flight failures/aborts. In addition, the relatively small quantities of liquid propellants on-board the WGS satellites represent a de-minimus percentage of the total propellants on an EELV launch vehicle and will not result in an increase impact to the environment from an in-flight failure/abort of an EELV launch vehicle carrying the WGS satellite. In the event of an in-flight failure/abort, it is expected that the liquid propellants on-board the WGS satellite would be consumed by the resulting explosion of the EELV launch vehicle.

4.4.2 RADIATION

The WGS satellites are not anticipated to include nuclear reactors or other significant sources of ionizing radiation. As a result, the WGS Program will not result in radiation impacts.

4.4.3 AIR QUALITY

Sources of air emissions associated with satellite processing, including remote propellant storage locations and other areas that support the existing operations at CCAS, are part of other, ongoing operations and will generate emissions in the absence of the Proposed Action. Also, boilers and scrubbers are considered part of existing emissions, as they are permitted sources.

Potential air emission sources associated with processing the WGS satellites include generators, aboveground diesel storage tanks, and materials containing VOCs. Based on the ongoing level of activities at CCAS, emissions from WGS satellite processing will be negligible and will not significantly contribute to overall emissions.

Facilities currently in operation at CCAS have the appropriate permits or are exempt from permitting. Because the potential impacts of permitted sources on air quality are evaluated during the permitting process, the permit requirements reflect results of analyses of emission levels that will not adversely affect air quality. The conditions for exempting sources from permitting also reflect emission levels that will not adversely affect air quality. As such, emissions from exempt sources are considered by the permitting agencies to have no adverse effect on ambient air quality.

At CCAS, emissions from the WGS satellite processing would not violate NAAQS or Florida ambient air quality standards or U.S. Air Force air toxics regulations. As a result, the WGS Program will not have a significant effect on existing air quality.

No Class I ODC will be utilized in the manufacture, processing or operation of the WGS Program. The only Class II ODCs associated with the WGS Program are related to the on-ground air conditioning systems. These will be released to the atmosphere only in the event of an accident or leak. Therefore, ground facility operations are not anticipated to adversely affect stratospheric ozone.

4.4.4 DEORBITING DEBRIS

The only pieces of the WGS Program that will reach orbit are the satellites and launch vehicle upper stages. The design and operational procedures for the WGS Program will be consistent with USSPACECOM Satellite Disposal Procedures (UPD 10-39) and the draft federal Orbital Debris Mitigation Practices.

Solid rocket motors of the type that could potentially be used for the WGS Program eject aluminum oxide dust (typically less than 0.004 inch) into the orbital environment and may release pieces of unburned solid propellant or slag. However, solid rocket motor particles typically either decay very rapidly (likely within a few perigee passes) or are dispersed by solar radiation pressure. Thus, the operational emissions of solid rocket motors are limited to brief periods of time related to specific mission events. As a result, impacts will be negligible.

For deorbiting debris, it has been estimated that one stratospheric ozone (O₃) molecule per one billion per day would be destroyed by the material-bound nitrogen mechanism and one part per 10 billion per year by the thermal mechanism of deorbiting debris. Evaluation of heterogeneous mechanisms has addressed the direct orbital decay of large and small particles, as well as the stripping of small particles from the surfaces of larger space objects by aerodynamic drag forces during reentry. Based on a study by TRW in 1994, the ozone depletion by heterogeneous mechanisms of deorbiting debris was estimated to be 10,000 to 100,000 years to destroy one percent of the stratospheric O₃ (U.S. Air Force, 1995). Based on this evaluation, the contribution of the Proposed Action will be negligible and, therefore, not significant.

The WGS satellites will be in geosynchronous Earth orbit, occupied by objects orbiting at an altitude of 22,238 miles with an orbital period of about 24 hours. The WGS satellite fuel budget

accounts for a final end-of-life (i.e., disposal) boost to a geosynchronous disposal orbit at least 300 km above the operational altitude for geosynchronous satellites. As a result, the Proposed Action will not result in impacts from the disposal of the WGS satellites.

4.5 MITIGATION MEASURES

As addressed previously in this EA, the procurement of commercial-like WGS satellites will occur within established private and military systems where policies and procedures are in place for compliance with local, state and federal regulations. As a result, existing measures are utilized to control potential impacts associated with hazardous materials and waste management, radiation and air quality, and deorbiting debris. Based on the characteristics of the WGS Program, which involves use of in-place facilities and systems and compliance with existing regulations, mitigation measures are not required.

4.6 CUMULATIVE IMPACTS

The manufacture and transport of the WGS satellites will occur within facilities and systems that have already been established to accommodate them. As a result, no cumulative impacts are expected to occur. The processing of the WGS satellites also will occur within systems that are established to accommodate those specialized functions. As a result, no cumulative impacts are expected to occur.

The hazardous materials used for WGS satellite processing are routinely used by various commercial and DoD contractors for these and other uses. The quantities used for the Proposed Action are within ongoing demand for these materials. Their use and safe disposal as hazardous waste also are within the capabilities of existing systems where they will be utilized. As a result, cumulative impacts will not occur.

The Proposed Action could increase by six the number of satellites in geosynchronous Earth orbit. This increase in the number of satellites will not result in a significant cumulative impact. Based on operational procedures, the Proposed Action will not result in any significant cumulative impacts to deorbiting debris.

4.7 NO ACTION ALTERNATIVE

CCAS accommodates other programs unrelated to the Proposed Action. These programs will continue for the foreseeable future, with or without implementation of the Proposed Action. The activities associated with these programs have environmental consequences that are considered as baseline conditions.

Under the No Action Alternative, the WGS satellites would not be procured. However, other activities at CCAS would continue. These include satellite and launch vehicle processing operations, and space launches related to numerous other, ongoing and planned programs.

5.0 REGULATORY REVIEW AND PERMIT REQUIREMENTS

As discussed in Chapter 2.0, the WGS Program will be processed and implemented at existing facilities. Therefore, conditions for the processing of up to six new commercial-like WGS satellites is considered to be part of baseline environmental conditions. Any permits required for transport of the satellites will be the responsibility of the selected contractor. No additional regulatory review or permits are required.

Hazardous materials used for WGS satellite processing will be transported, stored and dispensed in accordance with OSHA, AFOSH, federal, state and local regulations and standards. The selected WGS contractor will be responsible for compliance with existing air quality regulations during manufacture and processing of the WGS satellites.

For the orbital satellite, design and operational procedures will be consistent with USSPACECOM Satellite Disposal Procedures (UPD 1000-39) and the Draft Federal Orbital Debris Mitigation Practices.

6.0 PERSONS AND ORGANIZATIONS CONSULTED

The following individuals or organizations were consulted or provided information during preparation of this EA:

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7.0 REFERENCES AND SOURCES OF INFORMATION

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