



**MEMORANDUM**  
**OFFICE OF ENGINEERING AND TECHNOLOGY**

*Manage the spectrum  
and provide technical leadership  
to create new opportunities  
for competitive technologies and services  
for the American public.  
— Mission Statement —*

**Date:** September 4, 1997

**To:** Secretary

**From:** Michael J. Marcus, Associate Chief *MJM*

**Subject:** Ex Parte Filing MM Docket 87-268

*SEP 11 1997*  
*87-268*

Today a group of FCC staffers met with staffers from other agencies to discuss possible interference to Global Positioning System (GPS) and Global Navigation Satellite System (GNSS) from FCC-regulated systems in the present UHF television broadcasting spectrum. The attendees are listed in Attachment I.

The Department of Transportation handouts are given in Attachment II and include the matters discussed. It was decided that the parties present would continue discussions at a lower level to develop technical options for controlling possible interference to GPS and GNSS.

No. of Copies rec'd 02  
List ABCDE

Spectrum Meeting Fletcher Room, Sept. 4th 1:00-3:00 pm

Department	Name	Title	Telephone	Fax	email
DOC	Keith Calhoun-Senghor BYRON WHITEMAN	Director of the Office of Air and Space Commercialization	202-482-6125	202-482-5173	kcalhoun@doc.gov bwhitema@doc.gov
DOC/NTIA ✓	Richard Parlow	Associate Administrator of the Office of Spectrum Management	202-482-1850	202-482-4396	rparlow@ntia.doc.gov
DOC/NTIA	Jim Vorhies		202-482-3590		jvorhies@ntia.doc.gov
DoD ✓	Cindy Ratford <sup>Bob Mar</sup>	<del>AIR FORCE</del> <sup>FMA</sup> Deputy Director for Communications	703-697-1029 <sup>696 0824</sup>	703-693-4396	
DOT ✓	Frank Kruesi	Assistant Secretary for Transportation Policy	202-366-4544	202-366-7127	Frank.Kruesi@ost.dot.gov
DOT ✓	Joe Canny	Deputy Assistant Secretary for Transportation Policy	202-366-4540	202-366-7127	Joesph.Canny@ost.dot.gov
DOT ✓	Sally L. Frodge	Radionavigation and Positioning Staff	202-366-4894	202-366-3393	Sally.Frodge@ost.dot.gov
DOT/FAA ✓	Gerald Markey	Director, FAA Spectrum Policy and Management	202-267-9710	202-267-5901	gmarkey@faa.dot.gov
DOT/FAA ✓	Bob Frazier	FAA Spectrum Policy and Management	202-267-9710	202-267-5901	<del>Robert.Frazier</del> frazier@faa.dot.gov
DOT/USCG ✓	Joe Hersey	Chief, Spectrum Management Division	202-267-1358	202-267-4106	jhersey@comdt.uscg.mil
FCC ✓	Richard Smith	Chief, Office of Engineering and Technology	202-418-2470	202-418-1944	rsmith@fcc.gov
FCC ✓	Mike Marcus	Office of Engineering and Technology	202-418-2418	202-418-0765	mmarcus@fcc.gov
FCC ✓	Fred Thomas	Office of Engineering and Technology	202-418-2449	202-418-1918	Fthomas@fcc.gov
FCC ✓	Harold Ng	International Bureau	202-418-0752	202-418-0765	HNG@FCC.GOV
FCC ✓	Martin Liebman	Wireless Telecommunications Bureau	202-418-1310		
FCC ✓	Steven Weingarten	Wireless Telecommunications Bureau	202-418-1322 <sup>0609</sup>		
FCC ✓	John Clark	Wireless Telecommunications Bureau	202-418-7370		
FCC ✓	Gordon Godfrey	Mass Media Bureau	202-418-2193		
DOT	KENNETH LAMM	RADIONAVIGATION AND POSITIONING STAFF	202-366-6766	202-366-3353	KEN.LAMM@OST.DOT.GOV

Attachment I

## GPS: the Utility for the New Millennium

- the Global Positioning System (GPS) has become a ubiquitous utility for society, both domestic and foreign
- GPS has driven direct export sales to an estimated \$8 billion by the Year 2000
- GPS is an *ENABLING TECHNOLOGY* with growth potential for new industries and applications, limited only by the imagination

## GPS: the New Utility

- Private sector stake in the continued reliable operation of GPS is extremely high
- Industry applications are extremely diverse
  - limited only by the imagination
    - precision farming, lo-jack, GIS, real time mobile mapping, telecommunications timing, time transfer, robotics manufacturing and mining, etc..

## GPS: a Utility

- GPS is not yet a mature technology -- prognosis is continued direct and spin-off growth in market share for the U.S.
- the United States currently has the lead and technological advantage
  - the Europeans and Japanese are planning systems, currently compatible with GPS but they could become competitive systems
  - to maintain the lead and this edge, the U.S. must promote GPS operations

## GPS: Balance Sheet Considerations--Private and Public

- Savings through
  - Reduced capital costs
  - Reduced operational costs
  - Reduced time -- efficiency savings
  - Reduced staffing -- automation of processes possible
  - Reduced litigation costs -- better positioning and timing leads to fewer disputes

## GPS: Balance Sheet Considerations - cont'd

- Regulatory response and monitoring efforts are more timely, efficient, & accurate
- Disaster response, search and rescue more efficient and accurate
- Integration of national and international systems possible in a seamless and cost-effective manner is possible -- in fact is in practice in very successful cooperative efforts
  - reuse of facilities, data/databases, expertise

## GPS: Public Stake

- National Defense and Security
- Public Safety
- Cost Savings
- Efficiency -- in time and money
- Disaster recovery
- National Systems
- International Systems

## Private Sector

- Differential GPS
- Phones
  - Cellular
  - Long Distance Lines
- Power Companies
- Pipeline Transit

## National Federal Systems

- Fielded:
  - USCG Differential GPS System
  - National Geodetic Survey Continuously Operations Reference System (CORS)
- Soon to be fielded:
  - FAA WAAS
  - NOAA Weather System based upon GPS
- Planned
  - LAAS

## International Systems

- Canadian Active Control System
- Australian and New Zealand System
- Japanese MTSAT
- European EGNOS
- IGS
- Major base mapping networks worldwide

## GPS

- Presidential Decision Directive (PDD)
- White House Commission Report on Aviation Safety (Gore Commission Report)
- Public Safety Wireless Advisory Committee (PSWAC)
- Federal Radionavigation Plan (FRP)
- Presidential Commission on Critical Infrastructure Protection (PCCIP)

## Protection of GPS: Interference Issues -- Domestic

- 1997 Budget Act
- The transition from analog to digital television (TV) broadcast

## Protection of GPS: Interference Issues -- Domestic

- Channels 60-69 (746-804 MHz)
  - Public safety interest in use of some of these channels
  - FCC Docket
  - Second and third harmonic interference to GPS
  - Mobile vs fixed services
- Protection of GLONASS as part of the GNSS

## Protection of GPS: Interference Issues -- Domestic

- The transition from analog to digital TV broadcast
  - potential interference of digital TV broadcasts with the basic GPS signal
    - FCC standard for digital broadcast vs operational standard of today
    - Potential solution: filter TV transmitter sites
      - Effective levels of transmissions
      - Need to measure GPS/DTV protection ratios
        - Practical harmonic monitoring for broadcasters to use
        - Responsibilities

## Protection of the Global Navigation Satellite System (GNSS)

- Movement towards the future -- towards a robust GNSS and a worldwide seamless navigation system
- Protection of GPS
- Protection of GLONASS
- U.S. International positions
- U.S. Domestic positions

## International Seamless Navigation

- GNSS: ICAO adopted GPS and GLONASS as two potential systems that could be used to support GNSS
- Current U.S. leadership in this area, both technically and in international fora
- PDD
- INMARSAT U.K. proposal

## Future Frequency Considerations

- Levels of protection needed
- Coordination
- GPS additional frequency considerations
- Other



# DGPS Status





# Current Coverage



**THE WHITE HOUSE**

**Office of Science and Technology Policy  
National Security Council**

---

EMBARGOED FOR RELEASE ON  
March 29, 1996

Contact: (202) 456-6020

**FACT SHEET**

**U.S. GLOBAL POSITIONING SYSTEM POLICY**

The President has approved a comprehensive national policy on the future management and use of the U.S. Global Positioning System (GPS) and related U.S. Government augmentations.

Background

The Global Positioning System (GPS) was designed as a dual-use system with the primary purpose of enhancing the effectiveness of U.S. and allied military forces. GPS provides a substantial military advantage and is now being integrated into virtually every facet of our military operations. GPS is also rapidly becoming an integral component of the emerging Global Information Infrastructure, with applications ranging from mapping and surveying to international air traffic management and global change research. The growing demand from military, civil, commercial, and scientific users has generated a U.S. commercial GPS equipment and service industry that leads the world. Augmentations to enhance basic GPS services could further expand these civil and commercial markets.

The "basic GPS" is defined as the constellation of satellites, the navigation payloads which produce the GPS signals, ground stations, data links, and associated command and control facilities which are operated and maintained by the Department of Defense; the "Standard Positioning Service" (SPS) as the civil and commercial service provided by the basic GPS; and "augmentations" as those systems based on the GPS that provide real-time accuracy greater than the SPS.

This policy presents a strategic vision for the future management and use of GPS, addressing a broad range of military, civil, commercial, and scientific interests, both national and international.

Policy Goals

In the management and use of GPS, we seek to support and enhance our economic competitiveness and productivity while protecting U.S. national security and foreign policy interests.

Our goals are to:

- (1) Strengthen and maintain our national security.
- (2) Encourage acceptance and integration of GPS into peaceful civil, commercial and scientific applications worldwide.
- (3) Encourage private sector investment in and use of U.S. GPS technologies and services.
- (4) Promote safety and efficiency in transportation and other fields.
- (5) Promote international cooperation in using GPS for peaceful purposes.
- (6) Advance U.S. scientific and technical capabilities.

#### Policy Guidelines

We will operate and manage GPS in accordance with the following guidelines:

- (1) We will continue to provide the GPS Standard Positioning Service for peaceful civil, commercial and scientific use on a continuous, worldwide basis, free of direct user fees.
- (2) It is our intention to discontinue the use of GPS Selective Availability (SA) within a decade in a manner that allows adequate time and resources for our military forces to prepare fully for operations without SA. To support such a decision, affected departments and agencies will submit recommendations in accordance with the reporting requirements outlined in this policy.
- (3) The GPS and U.S. Government augmentations will remain responsive to the National Command Authorities.
- (4) We will cooperate with other governments and international organizations to ensure an appropriate balance between the requirements of international civil, commercial and scientific users and international security interests.
- (5) We will advocate the acceptance of GPS and U.S. Government augmentations as standards for international use.
- (6) To the fullest extent feasible, we will purchase commercially available GPS products and services that meet U.S. Government requirements and will not conduct activities that preclude or deter commercial GPS activities, except for national security or public safety reasons.

- (7) A permanent interagency GPS Executive Board, jointly chaired by the Departments of Defense and Transportation, will manage the GPS and U.S. Government augmentations. Other departments and agencies will participate as appropriate. The GPS Executive Board will consult with U.S. Government agencies, U.S. industries and foreign governments involved in navigation and positioning system research, development, operation, and use.

This policy will be implemented within the overall resource and policy guidance provided by the President.

#### Agency Roles and Responsibilities

The Department of Defense will:

- (1) Continue to acquire, operate, and maintain the basic GPS.
- (2) Maintain a Standard Positioning Service (as defined in the Federal Radionavigation Plan and the GPS Standard Positioning Service Signal Specification) that will be available on a continuous, worldwide basis.
- (3) Maintain a Precise Positioning Service for use by the U.S. military and other authorized users.
- (4) Cooperate with the Director of Central Intelligence, the Department of State and other appropriate departments and agencies to assess the national security implications of the use of GPS, its augmentations, and alternative satellite-based positioning and navigation systems.
- (5) Develop measures to prevent the hostile use of GPS and its augmentations to ensure that the United States retains a military advantage without unduly disrupting or degrading civilian uses.

The Department of Transportation will:

- (1) Serve as the lead agency within the U.S. Government for all Federal civil GPS matters.
- (2) Develop and implement U.S. Government augmentations to the basic GPS for transportation applications.
- (3) In cooperation with the Departments of Commerce, Defense and State, take the lead in promoting commercial applications of GPS technologies and the acceptance of GPS and U.S. Government augmentations as standards in domestic and international transportation systems.

- (4) In cooperation with other departments and agencies, coordinate U.S. Government-provided GPS civil augmentation systems to minimize cost and duplication of effort.

The Department of State will:

- (1) In cooperation with appropriate departments and agencies, consult with foreign governments and other international organizations to assess the feasibility of developing bilateral or multilateral guidelines on the provision and use of GPS services.
- (2) Coordinate the interagency review of instructions to U.S. delegations to bilateral consultations and multilateral conferences related to the planning, operation, management, and use of GPS and related augmentation systems.
- (3) Coordinate the interagency review of international agreements with foreign governments and international organizations concerning international use of GPS and related augmentation systems.

#### Reporting Requirements

Beginning in 2000, the President will make an annual determination on continued use of GPS Selective Availability. To support this determination, the Secretary of Defense, in cooperation with the Secretary of Transportation, the Director of Central Intelligence, and heads of other appropriate departments and agencies, shall provide an assessment and recommendation on continued SA use. This recommendation shall be provided to the President through the Assistant to the President for National Security Affairs and the Assistant to the President for Science and Technology.

# # #