



CIVIL GPS SERVICE INTERFACE COMMITTEE
28th Meeting Agenda



Place: Kansas City Marriott, 200 West 12th Street, Kansas City, Missouri 64105

Monday, 16 September

- 08:00 Registration
- 08:45 Meeting Opening..... George Wiggers, Chair
- 08:55 Status of the CGSIC..... CAPT James Doherty
Deputy Chair
- Policy**
- 09:10 GPS Management Structure Changes George Wiggers, OST/P-7
- 09:20 The DOD Perspective..... Mike Shaw, OUSD
- 09:35 Update on FRP Development..... Mike Shaw, OUSD
- 09:55 Status of International Agreements..... Henry Baird, DOS
- 10:10 Break
- 10:30 GPS Interagency Advisory Council, Bill Strange, NGS
- 10:45 European Commission Statement Luc Tytgat, European
Commission
- GPS General**
- 11:15 Constellation Status LCOL Mike Cimafonte,
AFSPCOM
- 11:30 Block IIR/ Block IIF Status GPS JPO Representative
- 12:00 Lunch
- 13:10 Selection of the GPS Second Civil Frequency.. Sally Frodge, OST/P-7
- 13:25 System Testing Interference Hank Skalski, OST/P-7
(at AFSPCOM)
- Augmentation Updates**
- 13:35 WAAS Update..... Dave Peterson, FAA
- 13:55 LAAS Update..... Ray Swider, FAA
- 14:15 USCG Differential System Status LCDR Gary Shenk, USCG
- 14:25 National Differential Coverage, Jim Arnold, FHWA
- General Topics**
- 14:45 Industry Concerns..... Mike Sweik, US GPSIC
- 15:10 Break
- 15:30 GPS Charting Concerns David Simpson, UK
Hydrographic Office
- 15:50 FIG Activities..... Larry Hothem, USGS
- 16:20 Positive Train Control Update..... Dick Shamberger, FRA
- 16:45 Open Discussion..... Attendees
- 17:15 Summary of Meeting Day..... George Wiggers, Chair
- 17:30 Meeting day ends

Tuesday, 17 September

General Topics (cont.)

- 09:00 CEI Activities..... Dr. Sledzinski, University of
Poland
- 09:30 GLONASS Update..... Dr. Peter Daly, University of
Leeds

Subcommittee Reports

- 10:00 International Information Subcommittee George Preiss, Orbit Comm.
- Country Reports
- 11:00 Timing Subcommittee David Allan, Allan's TIME
Dr. W. Lewandowski, BIPM
Attendees
- 11:30 Open Discussion
- 12:00 Full committee meeting end
Lunch (on your own)
- 13:00 International Information Subcommittee
- 13:00 Timing Subcommittee
- 13:00 US States and Municipalities Subcommittee (proposed committee)
- 13:00 GPS Interagency Advisory Council (closed meeting)
- 17:00 Meeting day ends

Issues: GPS issues may be raised in the open discussion period. This time does not need to be prearranged, but if you would like to arrange time for an issue, please contact the CGSIC at address or phone numbers below.

Country Reports: Attendees from outside the U.S. are requested to prepare a brief (five minute) presentation summarizing activities in their country. Members who are unable to attend may send a written summary to the address below prior to the meeting.

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Civil GPS Service Interface Committee

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Executive Business Plan

1996

Prepared By:

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July 1996

CGSIC Executive Business Plan Overview

The CGSIC Executive Business Plan (EBP) is designed to support the CGSIC Executive Board in making decisions about where to invest CGSIC efforts and resources. The EBP enables the Executive Board to look at ongoing activities and new initiatives within the CGSIC and answer the questions:

- What goals do we intend to achieve?
- How do we intend to achieve these?
- How will we measure our success?

The EBP is also designed to help CGSIC sub-committees and working groups translate top level CGSIC goals into tangible accomplishments.

The EBP is structured in the following sections:

- I. **Background & Authority:** The reason for the CGSIC, and the limits of its authority.
- II. **Vision Statement:** The desired future state of the CGSIC.
- III. **Guiding Principles:** The operating philosophy of the CGSIC. Our shared beliefs.
- IV. **Mission:** Identifies the need filled by the CGSIC.
- V. **Goals:** The directions and strategies the CGSIC should take to support its Mission.
- VI. **Objectives:** Statements of desired condition or achievement in each Goal.
- VII. **Milestones:** Measurable, quantifiable accomplishments necessary for each Objective.

The hierarchy of planning levels within the EBP is outlined as follows:



The CGSIC EBP should be read with this hierarchy in mind. Background & Authority and Guiding Principles apply to all planning levels and all activities of the CGSIC.

The CGSIC EBP will be revised at least every two years. Its format and structure are not rigid, and can change as necessary to reflect new directions.

I. CGSIC Background and Authority

The **Global Positioning System (GPS)** is a **United States space system operated by the U.S. Air Force**. Its **signals can be used in positioning, navigation, precise timing, and other applications**. A **basic level of GPS service is available unencrypted, free of charge, worldwide**.

Although developed as a **U.S. military system**, the utility of **GPS in the civil sector** has long been recognized by the **U.S. Government**. **GPS** was first offered for global use in civil aviation through a **1983 Presidential Statement**. This position was reiterated in a **1995 Presidential Statement** and in a **1996 Presidential Decision Directive**. The **U.S. policy towards civil GPS use** is also reflected in the **U.S. Federal Radionavigation Plan (FRP)**, a biennial planning document published jointly by the **U.S. DOT and DOD**. **GPS** has been offered to both the **IMO and ICAO** for global civil use as a **radionavigation system**.

In keeping with the philosophy of promoting civil use, the **U.S. DOT and DOD** entered into a **1993 Memorandum of Agreement (MOA)** regarding the civil use of **GPS**. In support of this **MOA**, the **Civil GPS Service Interface Committee (CGSIC)** was chartered to exchange information with civil **GPS** users and those who otherwise benefit from **GPS**. The **CGSIC's** authority stems from this **Charter**. The **CGSIC** operates within the policy **framework** defined by the documents listed above, and reports to the **Interagency GPS Executive Board (IGEB)**.

For definition of "users" and other terms in this Business Plan, see Appendix 1.

II. Vision Statement of the CGSIC

The vision of the **CGSIC** describes the desired future state of the **organization**.

The **Civil GPS Service Interface Committee** is the recognized world forum for effective interaction and information flow between civil **GPS** users and the **U.S. government service providers of GPS and GPS related services**. This interaction and information flow contributes to the development and use of **GPS applications** that benefit the world's **civil GPS users**.

III. Guiding Principles

The **CGSIC** is **governed** by a set of guiding principles and **expectations**. These guiding principles are filters that should be prevalent when we conduct **CGSIC business**. These are:

- To conduct business in an **open**, and flexible forum for those who have an interest in **GPS**.
- To facilitate the sharing and transfer of **GPS** information and knowledge without taking on an advisory role in **GPS issues**.
- To encourage the maximum exchange of **information possible**, subject to **U.S. law** regarding technology **transfer**.
- To regularly inform the **IGEB** of civil **GPS** issues and **requirements**.
- To review **CGSIC** organization and **effectiveness** on a regular basis and continuously improve **CGSIC** service.

IV. Mission of the CGSIC

The **mission identifies the need** filled by the **CGSIC**.

To achieve the **full** potential of **GPS** in the **civil sector**, both service providers and users of **GPS** need an effective channel for the exchange of **information**. The **Civil GPS Service Interface Committee** serves as the **primary** link between worldwide civil **GPS** users and the **U.S. government service providers**. The **CGSIC**:

- Provides a forum for the two-way exchange of **GPS** technical information and needs between civil **GPS** users and **U.S. service providers**.
- Identifies **information requirement and methods to distribute this** information to the **civil GPS user community**.
- Identifies **GPS** issues that may need resolution by the **U.S. service providers** or by the **Interagency GPS Executive Board**.

V. Strategic Goals

The **goals** are defined as the directions and strategies the **CGSIC** should take to support its mission.

Goal 1 - Align the information made available through the **CGSIC with the needs of **GPS users, U.S. government service providers, and policy makers**.**

Goal 2 - Achieve CGSIC membership and participation that reflects the diversity of **civil GPS users and service providers.**

Goal 3 - Promote the image and standing of the **CGSIC as a recognized world forum.**

Goal 4 - Organize the CGSIC business procedures to support the mission.

Goal 5 - Establish effective CGSIC lines of communication within the **U.S. Government.**

VI. Objectives

Objectives are statements of desired conditions or achievements in the direction of each goal.

Goal 1 - Align the information made available through the CGSIC with the needs of civil GPS users, service providers, and policymakers.

OBJECTIVE 1.1: An improved understanding of the **needs of users and service providers**.

MILESTONE 1.1.A: User information sheets are prepared to record needs of users and providers.

MILESTONE 1.1.B: Results are **analyzed** and conclusions recorded in **report to CGSIC Advisory Panel. Information** is used in Objective 1.2.

OBJECTIVE 1.2: Effective and **economical** means are used to provide the right information to the users and **service providers**.

MILESTONE 1.2.A: **Analyze the media available to** users and **providers**.

MILESTONE 1.2.B: Establish the proper **mix** of distribution and **communication** media to support the user and supplier **needs**.

MILESTONE 1.2.C: Establish feedback mechanisms to keep **service providers** in **alignment** with users **needs**.

Goal 2 - Achieve CGSIC membership and participation which reflects the diversity of all GPS users and service providers.

OBJECTIVE 2.1: The CGSIC membership is aligned with the sectors of **GPS civil users**.

MILESTONE 2.1.A: Establish a database to track membership applications and **GPS user applications/sectors**.

MILESTONE 2.1.B: Take a pro-active role in extending invitations and brochures to groups that could be interested.

Goal 3 - Promote the image and standing of the CGSIC as a recognized world forum.

OBJECTIVE 3.1: The world recognizes the value and functions of the CGSIC as the best place to get/exchange **civil GPS information**.

MILESTONE 3.1.A: Encourage recognized **GPS experts** to contribute to the CGSIC.

MILESTONE 3.1.B: Prepare professional marketing **literature**.

MILESTONE 3.1.C: Advertise in professional journals.

MILESTONE 3.1.D: Produce a **CGSIC Annual Report**.

OBJECTIVE 3.2: The CGSIC has **established contact with all interested** nations.

MILESTONE 3.2.A **Identify strategy and methods** for interaction between CGSIC and international **contacts**.

MILESTONE 3.2.B: Establish guidelines for exchange of **information**.

MILESTONE 3.2.C: Encourage contacts to follow **guidelines**.

MILESTONE 3.2.D: Identify the **GPS "main players"** in each interested **nation**.

Goal 4 - Organize the CGSIC business procedures to support the mission.

OBJECTIVE 4.1: The CGSIC is structured to effectively **conduct** its **business**.

MILESTONE 4.1.A: Review the purpose and intent of the **Subcommittees**.

MILESTONE 4.1.B: Review the need for industry support to the **subcommittees**.

OBJECTIVE 4.2: Standard Operating Procedures (**SOP**) govern **CGSIC processes**.

MILESTONE 4.2.A: **Determine/list** recurring business **practices**.

MILESTONE 4.2.B: Develop individual **procedures; draft document**.

OBJECTIVE 4.3: The CGSIC measures its **performance**.

MILESTONE 4.3.A: Identify **performance parameters**.

MILESTONE 4.3.B: Develop feedback **procedures**.

MILESTONE 4.3.C: Incorporate measurement and feedback into business **procedures**.

Goal 5 - Establish effective CGSIC lines of communication within the U.S. Government.

OBJECTIVE 5.1: CGSIC communicates formally with its chartering authority.

MILESTONE 5.1.A: Review **CGSIC Charter**.

MILESTONE 5.1.B: Formalize reporting **methods**.

MILESTONE 5.1.C: Seek guidance as necessary from chartering **authority**.

OBJECTIVE 5.2: CGSIC communicates with appropriate authorities to convey international issues/concerns.

MILESTONE 5.2.A: Establish Department of State Point of Contact.

MILESTONE 5.2.B: Seek Department of State representation at CGSIC meetings.

Appendix 1

Definitions

Goals: Directions and strategies the CGSIC should take to support its mission.

Membership: The CGSIC is open to all with a sincere interest in sharing information about GPS for the mutual benefit of the U.S. Government service providers and the users. Membership in the CGSIC is offered to those who: 1) register for and attend a Full Committee meeting or 2) submit a request for membership to the CGSIC.

Milestones: Significant points of development and/or accomplishments toward meeting goals and objectives. A milestone represents incremental accomplishments within a structure plan that contributes to attainment of the goals and objectives. At least one and not more than four milestones are tied to the accomplishment of each objective.

Mission: A statement of what the CGSIC is and what its functions are. The mission specifies the business of the CGSIC -- "what" needs we are filling for "whom," and "how" we do this.

Objectives: Statements of desired condition or achievement. An objective reflects the conditions/achievements that need to be realized over the next year or two to accomplish and/or move towards the vision, mission, and goals.

Service Provider: Any U.S. Government organization that has a role in providing GPS, augmentation to GPS, or other services/information relating to GPS.

User: Any person or organization, U.S. or international, who benefits from or has an interest in GPS. This could be a direct user of GPS equipment or applications, or a person or organization who derives a benefit from GPS without directly using GPS related equipment or applications.

Vision: A description of the future state for the CGSIC, as determined by its leadership. The vision aligns the CGSIC so that all can work in the same direction, with shared expectations.

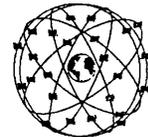
Presidential Decision Directive

U.S. Global Positioning System (GPS) Policy

March 28, 1996



Presidential Decision Directive



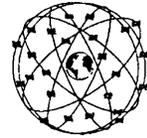
U.S. Global Positioning System Policy

Overview

- Goals
- Guidelines
- Roles and Responsibilities
- Selective Availability



GPS Policy Goals

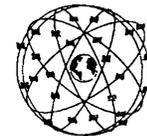


- Strengthen and Maintain U.S. National Security
- Encourage the Worldwide Acceptance and Integration of GPS
- Promote Transportation Safety and Efficiency
- Promote International Cooperation in Using GPS, for Peaceful Purposes
- Advance U.S. Scientific and Technical Capabilities

3



GPS Policy Guidelines

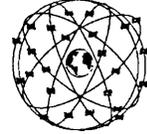


- Provide GPS Standard Positioning Service free of User Charges
- Discontinue use of GPS, Selective Availability (SA) Within a Decade
- GPS and Augmentations Remain Responsive to National Command Authorities
- Advocate Acceptance of GPS and Augmentations as International Standards
- Inter-agency GPS Executive Board (Jointly Chaired by the DOD and DOT)
- To the Fullest Extent Possible, U.S. Will Purchase Commercially Available GPS Products and Services

4



Agency Roles and Responsibilities



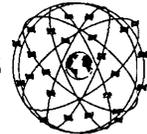
Department of Defense (DOD) will:

- Continue to Acquire, Operate, and Maintain the Basic GPS System
- Maintain a Standard Positioning Service (SPS) on a Continuous, Worldwide Basis
- Maintain a Precise Positioning Service (PPS) for use by the U.S. Military, Allies and Other Authorized Users
- Assess the National Security Implications of the use of GPS
- Develop Measures to Prevent the Hostile use of GPS and its Augmentations

5



Agency Roles and Responsibilities (Cont'd)



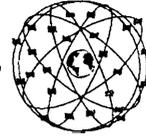
Department of Transportation (DOT) will:

- Serve as the Government's Lead Agency for all Federal Civil GPS Matters
- Develop and Implement U.S. Government Augmentations
- Advocate GPS and U.S. GOV'T Augmentations as World Standard
- Promote the Commercial Applications of GPS Technologies
- Minimize Duplication of GPS Civil Augmentation Systems

6



Agency Roles and Responsibilities (Cont'd)



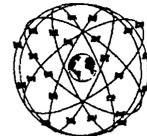
Department of State (DOS) will:

- Assess Feasibility of Bilateral or Multilateral GPS Agreements
- Coordinate Instructions to U.S. Delegations Tasked to Plan, Operate, or Manage GPS Services
- Coordinate Interagency Review of International GPS Agreements

7



Selective Availability (SA)



Beginning in 2000, the President will make an Annual Determination on the Continued use of GPS Selective Availability (SA). SA will be Turned Off in 10 Years.

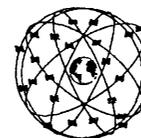
Assessments of SA will be Provided to the President from:

- Secretary of Defense
- Secretary of Transportation
- Director of Central Intelligence
- Assistant to the President for Science and Technology
- Assistant to the President for National Security Affairs
- Other Agency and Department Heads as Appropriate

8



SUMMARY



- Provides a Comprehensive National Policy on the Future Management and use of the Global Positioning System (GPS) and Related U.S. Government Augmentations
- Supports the Continued Growth of GPS as the Standard for all Modes of Transportation and Other Civil Uses.
- Provides Highest Level of U.S. Government Support for GPS



GPS INTERNATIONAL CONSULTATIONS STATUS

Col. Henry H. Baird, USAF
State Department, OES/STH
(202) 647-2842 Voice 7-2432 Fax
E-mail: HBaird @ state.gov



OVERVIEW

- ▶ US GPS Policy
- ▶ FDD NSTC-6
- ◆ Consultation Strategy
 - Japan, Europe, Russia
- ◆ Japanese Trip - August 7 & 8, 1996
 - A Case of Thousands
- ◆ What's Next
 - Japan, Europe, Russia

U.S. GPS POLICY

Overview

- ◇ Presidential Decision Directive NSD/C-6
 - Provides a Comprehensive National Policy on the Future Management and Use of the U.S. GPS and Related U.S. Government Augmentations
- ◆ Provides Highest Level of U.S. Government Support
 - DOT/FOD, DOS, DOC, other Agencies

U.S. GPS POLICY

Goals

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

U.S. GPS POLICY

Goals

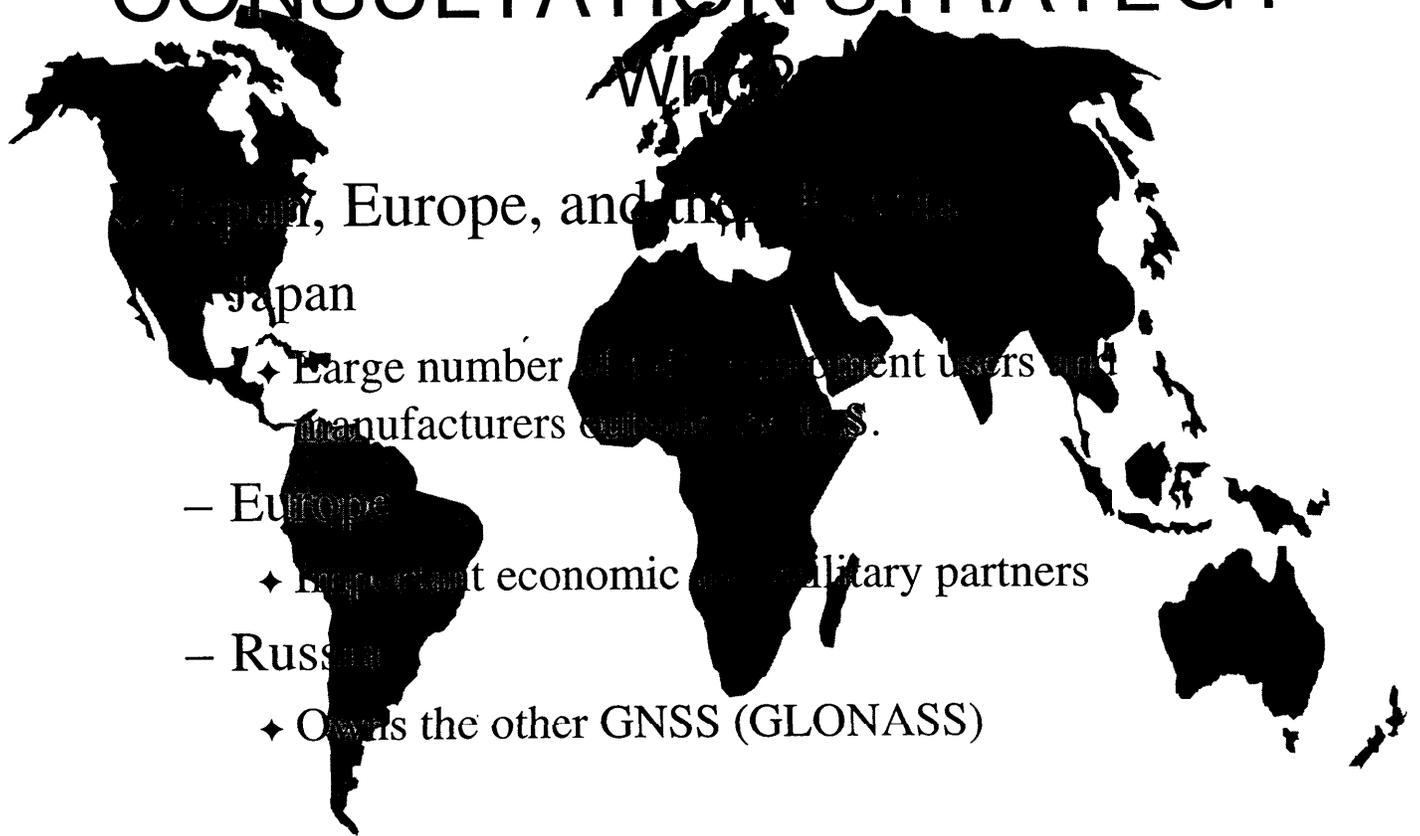
- Strengthen and Maintain U.S. National Security
- Encourage Worldwide Acceptance and Integration of GPS
- ◆ Encourage Private-Sector Investment in GPS
- ◆ Promote Transportation System Efficiency
- ◆ Promote International Cooperation in Using GPS for Peaceful Purposes
- ◆ Advance U.S. Scientific and Technical Capabilities

U.S. GPS POLICY

State Department Role

In cooperation with other appropriate USG departments and agencies, to 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.

CONSULTATION STRATEGY



CONSULTATION STRATEGY



CONSULTATION STRATEGY

What?

- Stress US commitment to provide GPS for civilian use on a continuous, worldwide basis
- ◆ Advocate acceptance of GPS and USG augmentations as international standards
- ◆ Invite other governments to cooperate with the US to ensure an appropriate balance between the requirements of civilian users and international security interests

JAPANESE TRIP

August 7-19, 1996

- Large Japanese contingent
- Approx. 70, headed by Hiroshi Kaname
- ◆ Almost all GPS-concerned ministries
 - MOFA, MOT, MITI, MIPT, MOC, JDA, NPA, NSA
- ◆ First time all Japanese GPS-concerned groups together in the same room

WHAT'S NEXT

1996 and 1997

- Continuation of talks with Japanese in Washington D.C. in October
- ◆ European consultations in Brussels (EU, Eurocontrol, ESA, and NATO), London, Bonn, Paris, and Rome early next year
 - Lower level talks in mid September
- ◆ Russian discussions requested in early December

ANY QUESTIONS?

Lt. Col Henry D. Baird, USAF

State Department OES/STH

(202) 647-2842 Voice 7-2432 Fax

E-mail: HBaird@state.gov

GPS INTERAGENCY ADVISORY COUNCIL

On September 12, 1995, the GPS Interagency Advisory Council (GIAC) was chartered within the Federal Geodetic Control Subcommittee (FGCS), under the Federal Geographic Data Committee (FGDC) which is chaired by Interior Secretary Bruce Babbitt.

On September 11, 1996, Secretary Babbitt presented the 14 Federal agencies represented on the FGDC with Vice President Al Gore's Hammer Award at Department of the Interior headquarters in Washington, D.C. The group was honored for its vision and efforts toward creating a national, readily accessible source of accurate geospatial data. The Hammer Award is Vice President Al Gore's special recognition for contributions in support of the President's National Performance Review principles. Those principles are: putting customers first, cutting red tape, empowering employees, and getting back to basics.

As Director of the National Geodetic Survey, Captain Lewis A. Lapine, NOAA, chairs FGCS and represents GIAC on the permanent interagency GPS Executive Board, jointly chaired by the Departments of Defense and Transportation. This Board manages GPS and U.S. Government augmentations, with other departments and agencies participating as appropriate. The Department of State coordinates with departments and agencies, foreign governments, and international organizations to assess the feasibility of developing standards and guidelines on the provision and use of GPS services worldwide.

The GIAC concentrates its interests and efforts on the timing and positioning issues of GPS and related navigation issues. The minutes of meetings, action items, and general information about FGCS and GIAC are provided on the Worldwide Web over Internet at the following address:

<http://www.ngs.noaa.gov/FGCS/fgcs.html>.

Since its creation last year, the GIAC has addressed the following issues and topics.

GIAC Activities

1. PDD - Department of State - International Working Group
 - US - Japan Bilateral Negotiations
 - Fair Trade Policy
 - Standardization Issues for Navigation, Spectrums and Positional Accuracy
2. Spectrum Allocation Issues
 - DOD/DOT Spectrum Allocation for L5 Carrier Phase Tracking
 - Theater Denial Consequences for Civil Users
 - System Interference Testing
3. Federal Radionavigation Plan
 - Open Meeting in Boston
 - Formal Review
4. DOT Study for Full Implementation of USCG Differential Beacons
5. L5 Informational Presentations Prepared for:
 - Federal Geodetic Control Subcommittee
 - Civil Applications Committee

GIAC Activities (continued)

6. GIAC News Flash Service Initiated on Internet
7. USCG Improved Correctors
8. Interagency Questionnaire
9. Continuously Operated Reference Stations
75 Sites Operated by 10 Federal and State
Agencies
Interpolation Algorithm
10. GIAC Agency Demonstrations
NGS, NSF and USACE
11. L2 Full Wavelength Carrier Phase Tracking versus
L5

RETRIEVING CORS DATA

To access CORS data files one **must** use the Internet and the File Transfer Protocol (**FTP**) or the World Wide **Web**.

Accessing CORS Data via FTP

```
ftp cors.ngs.noaa.gov
Login: anonymous
Password: your complete e-mail address
```

The following sub-directories contain additional files and information.

| | |
|--------------------|---|
| coord | files with NAD 83 and ITRF coordinates for the CORS sites |
| itrf | Files with information about the ITRF |
| rinx | RINEX formatted data files |
| station_log | Files with station information , antenna specifications , and site contacts |
| utilities | Programs for manipulating the RINEX files |

Accessing Via WWW

NGS has developed a home page on the Internet World Wide Web (**WWW**) for online access to its **products**, **services**, and program **activities**. The **CORS** products and data are available through **NGS'** home page which is accessible by typing in the **URL (Uniform Resource Locator)**:

```
http://www.ngs.noaa.gov
```

when using a browsing tool such as Mosaic or **Netscape** for **DOS** or **UNIX computers**.

Click on **NGS Products and Services**; then **CORS DATA**; then **CORS**.

4 ; GPS INTERAGENCY ADVISORY COUNCIL (GIAC)

Last Updated September 9, 1996 at 11AM EST

■ CHARTER

■ ANNOUNCEMENTS

■ PREVIOUS MEETINGS

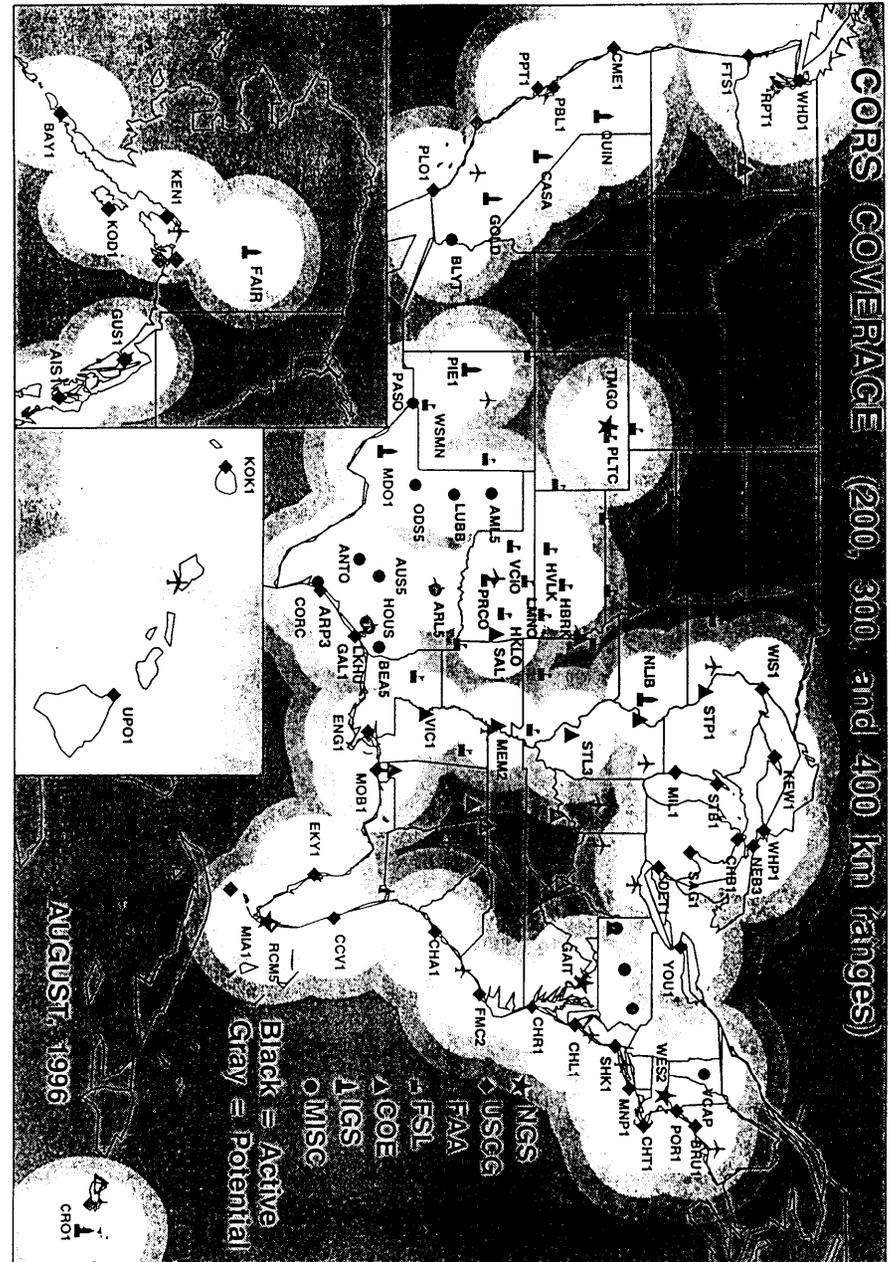
- June 13, 1995 Minutes
- March 21, 1996 Minutes
- June 14, 1996 Minutes

■ NEXT PLANNED MEETING(S)

FGCS Federal Geodetic Control Subcommittee

SUBJECT: GPS Interagency Advisory Council (GIAC)
Meeting Agenda
Date: September 17, 1996
Time: 1:00 - 5:00
Place: Kansas City Marriott
200 West 12th Street
Kansas City, Missouri

1. Attendee introductions and Opening remarks - Captain Lewis A. Lapine, NOAA
2. FGCS previous meeting overview/minutes - John Spencer, NOAA
3. GIAC previous meeting overview/minutes - M. K. Miles, USACE
4. Status Reports IWG on International GPS Issues - Captain Lapine, NOAA
Interagency GPS Survey (questionnaire) - Ken Lamm, DOT
New Civilian Frequency, L5 - Sally Frodge, DOT
Continuously Operating Reference Stations - Bill Strange, NOAA
GPS Interference Testing Authority - Bill Strange, NOAA
5. GPS Demonstration Project Inland Waterway Navigation System - Bill Bergen, USACE
6. New business Submeter Real-time GPS- Captain Lapine, NOAA
7. Meeting review, assignments and closure - Captain Lapine, NOM





CIVIL GPS Service Interface Committee - 28th Meeting

Presentation of the EC GNSS activities

Luc TYTGAT
European Commission

Kansas City, 16 September 1996

CGSIC 28th (sl. 1)



E.C. STATUS

- E.C. activities (ETG)
- E.U. GNSS High Level Group
- European Radio Navigation Plan

CGSIC 28th (sl. 2)



E.C. ACTIVITIES (ETG)

1 E.U.-U.S. Action Plan

2 European GNSS Office in Brussels

3 Studies

- Cost-benefits analysis
- Strategic study
- GNSS2 architecture
- Certification
- Examination of policy issues concerning Satellite based Navigation and Communication Systems (CTP)

4 Education and Awareness programme in Luxembourg

CGSIC 28th (sl. 3)



E.U. GNSS High Level Group

- 5th meeting: 25.10.96
- Action Plan - institutional + technical activities
- Council of Ministers of Transport: Spring '97

CGSIC 28th (sl. 4)



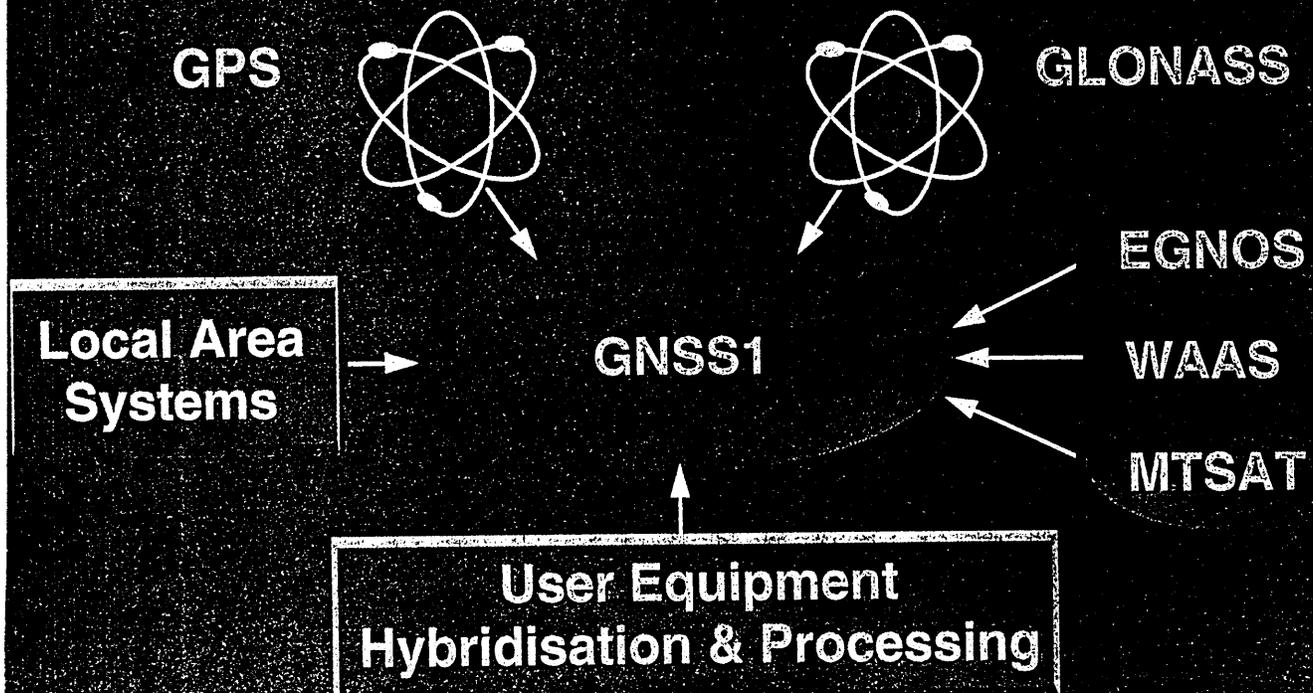
EUROPEAN RADIO NAVIGATION PLAN

- Ministerial Decision of 25.2.1992
- It shall:
 - indicate the future needs in Europe for navigation systems
 - set recommendations for future policies
 - contribute to the operation of the T.E.N.
- Preparatory study terminated; report under approval procedures
- Next step

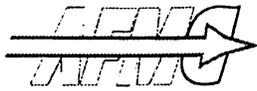
CGSIC 28th (sl. 5)



THE RAAS AS PART OF GNSS1



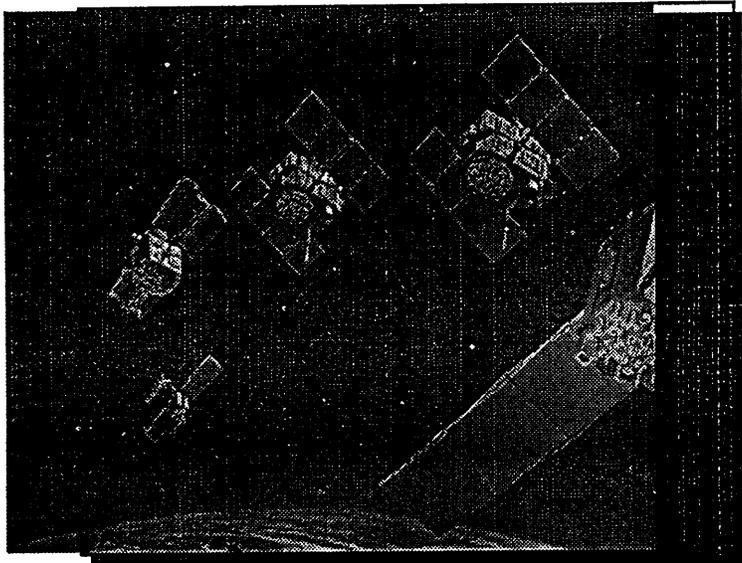
Singapore, 4-6 June 96 Slides



UNCLASSIFIED



GPS ION CONFERENCE
16 SEPTEMBER 1996
FOR INFORMATION ONLY

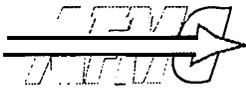


GPS BLOCK IIF

PROGRAM STATUS

LT COL AL MOSELEY
BLOCK IIF
PROGRAM MANAGER

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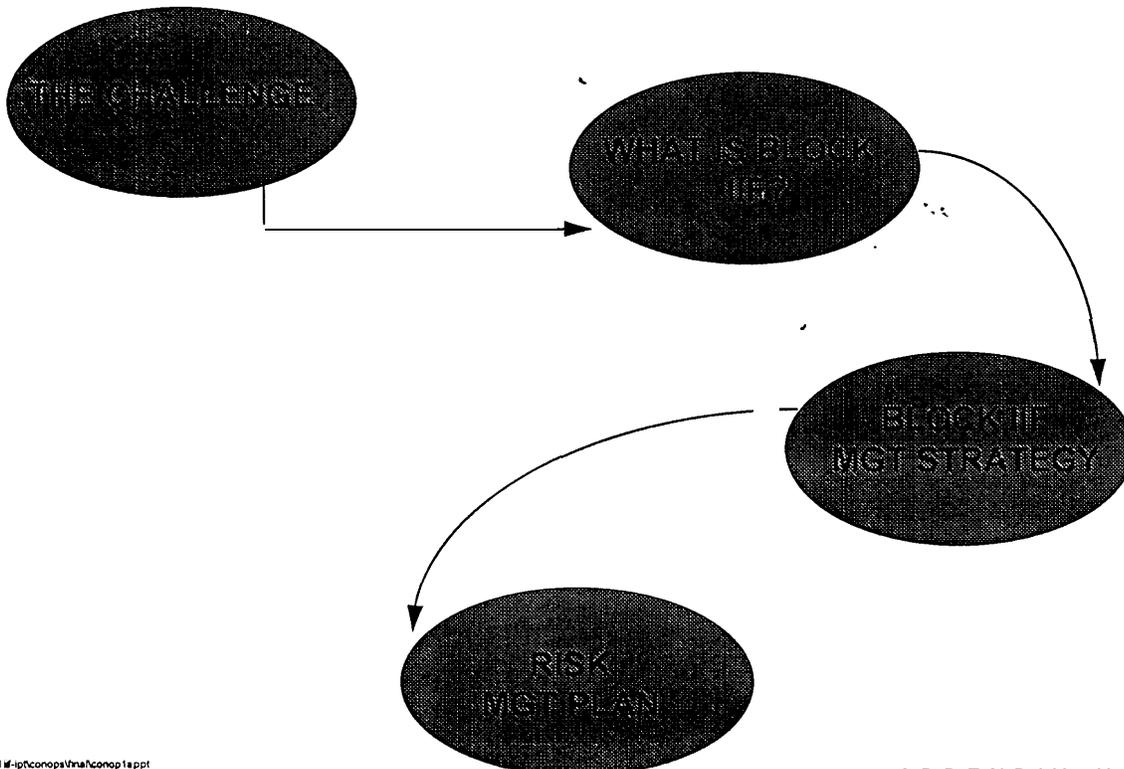


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SLIDE 1
8/13/96



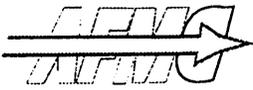
OVERVIEW Briefing Roadmap



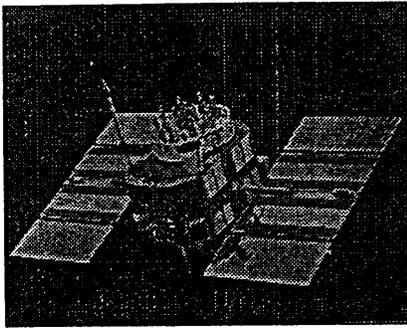
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APPENDIX H

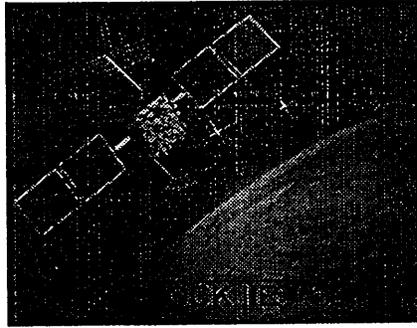
SLIDE 2
8/26/96



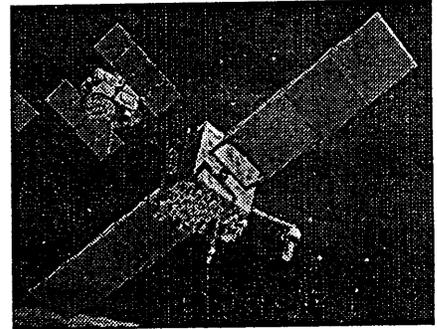
What is Block IIF? Block IIF Sustains the Constellation



FIRST LAUNCH: 14 APR 89
28 SVS PROCURED



FIRST LAUNCH: 1997
21 SVS IN PRODUCTION



FIRST LAUNCH: 2001
ACQUIRING 33 SVS

EVOLUTIONARY CHANGE

- IMPROVED ACCURACY
- IMPROVED CRYPTOGRAPHY
- INCREASED REPROGRAMMABILITY
- LONGER SERVICE LIFE
- NEW CAPABILITIES & FUNCTIONS (MINOR)
- RESERVE AUXILIARY PAYLOAD (RAP)

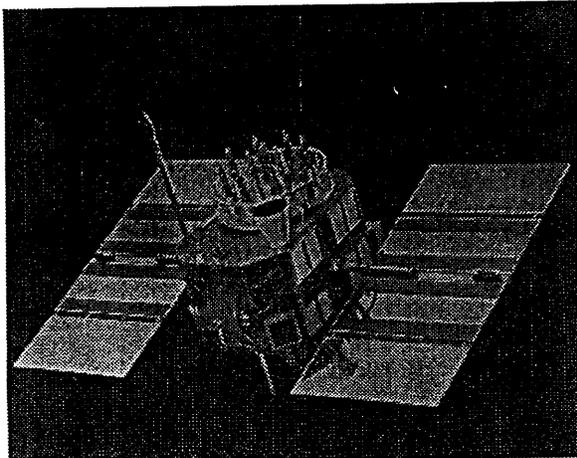
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SLIDE 6
8/25/96



Block II/IIA Satellites Constellation Information

- First launch: 14 Apr 89; FOC: Jul 95
- Three successful FY96 replenishment launches
- One Block HA satellite in storage
- Design life: 7.5 yrs
- Payloads:
 - Primary: Navigation
 - Secondary: NDS
 - Optical, X-ray, EMP* sensors



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9113196

* Block IIA only



Block IIR Satellite Program Information

- 21 satellite procurement
- Contractor
 - Prime: Lockheed Martin, Valley Forge, PA
 - Major Sub: ITT, Clifton, NJ
- Contract Value
 - Satellite production \$694M
 - Launch/orbit support \$101M
- On-orbit incentives
- First delivery / launch: 12 Sep 96 / 16 Jan 97

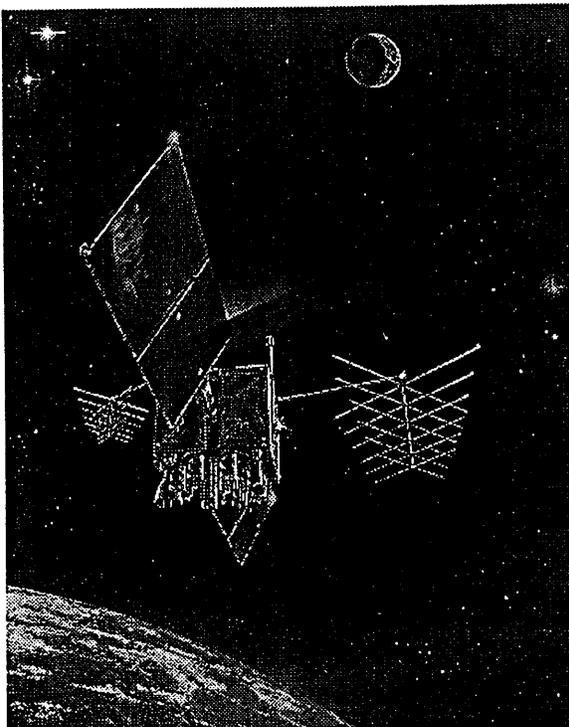
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3



Block IIR Satellite Information



- Design life: 10 yrs
- Payloads:
 - Primary: Navigation
 - Secondary: NDS
 - Optical, X-ray, EMP sensors
- Autonomous navigation capability
- Reprogrammable processors

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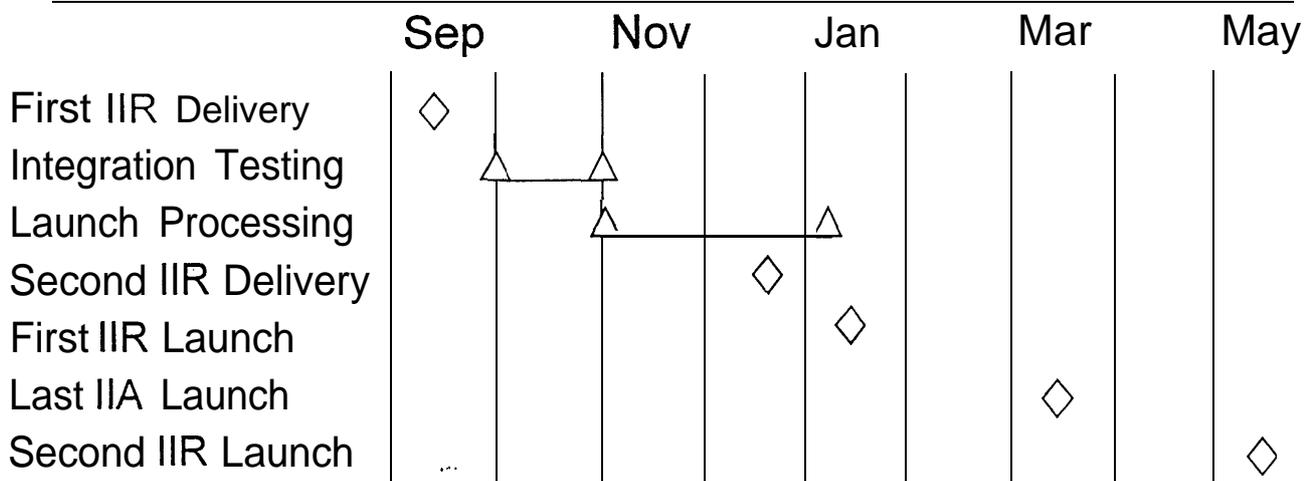
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Block IIR

Status / Schedule

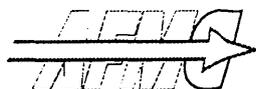
- First IIR factory testing completed 6 Sep
- Delivered to Cape Canaveral 12 Sep
- Post-ship functional testing in progress



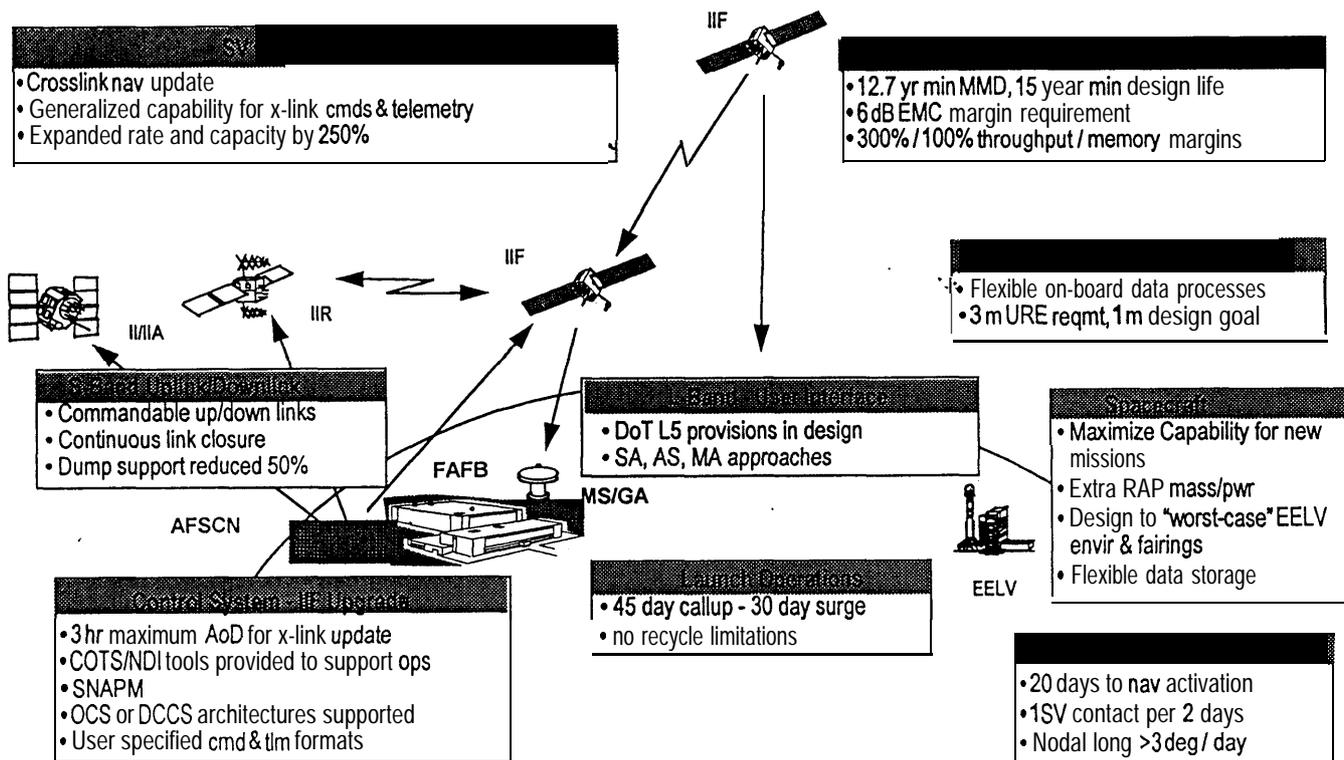
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5



IIF System Design Overview





Space Vehicle

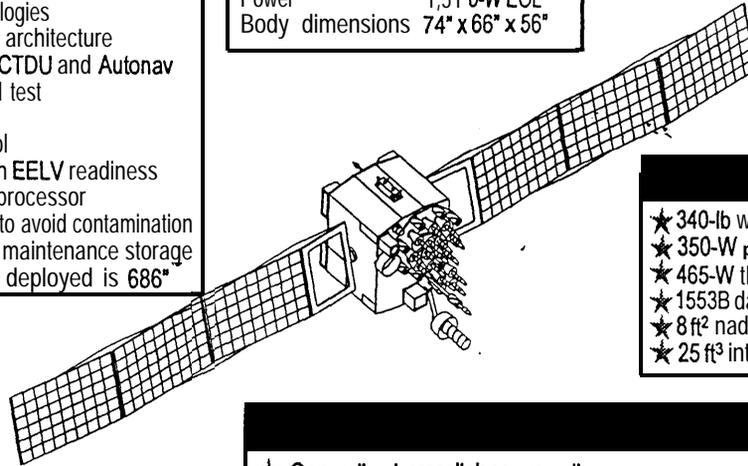


Key Features

- Spin/3-axis stabilized
- State of the art technologies
- Updated Block IIA Nav architecture
- Interoperability via IIRCTDU and Autonav
- Modular assembly and test
- EM/EMC designed in
- Passive thermal control
- MLV-III compatible with EELV readiness
- ★ 32 bit Loral RAD6000 processor
- Solar array configured to avoid contamination
- ★ Designed for minimum maintenance storage
- Wingspan with array deployed is 686"

Performance

- Lifetime ★ 12.7 MMD
- ★ 15-yr design
- Reliability 0.724 @ 15 yr
- Nav Accuracy ★ 3-m URE
- ★ 1-m goal
- Weight 4710 lb
- Power 1,51 0-W EOL
- Body dimensions 74" x 66" x 56"

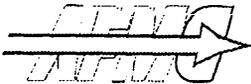


- ★ 340-lb weight margin
- ★ 350-W power margin
- ★ 465-W thermal margin
- ★ 1553B data bus for plug and play
- ★ 8 ft² nadir bulkhead
- ★ 25 ft³ interior volume

- ★ Generalized crosslink commanding
- ★ Increased autonomy and reduced contact requirements
- ★ Ease of launch processing

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SLIDE 4
8/13/06

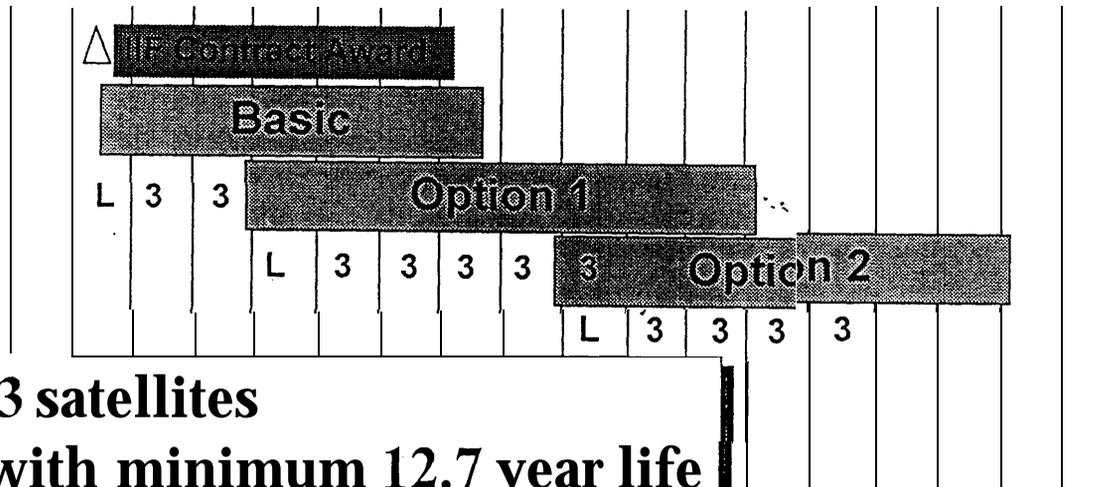


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What Is Block IIF? What We're Buying



FY 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12

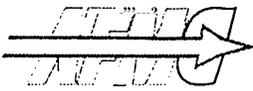


**33 satellites
with minimum 12.7 year life**

- IIF unique ground control and simulator software
- Launch and on-orbit operations support
- Option for full OCS sustainment responsibility in '00

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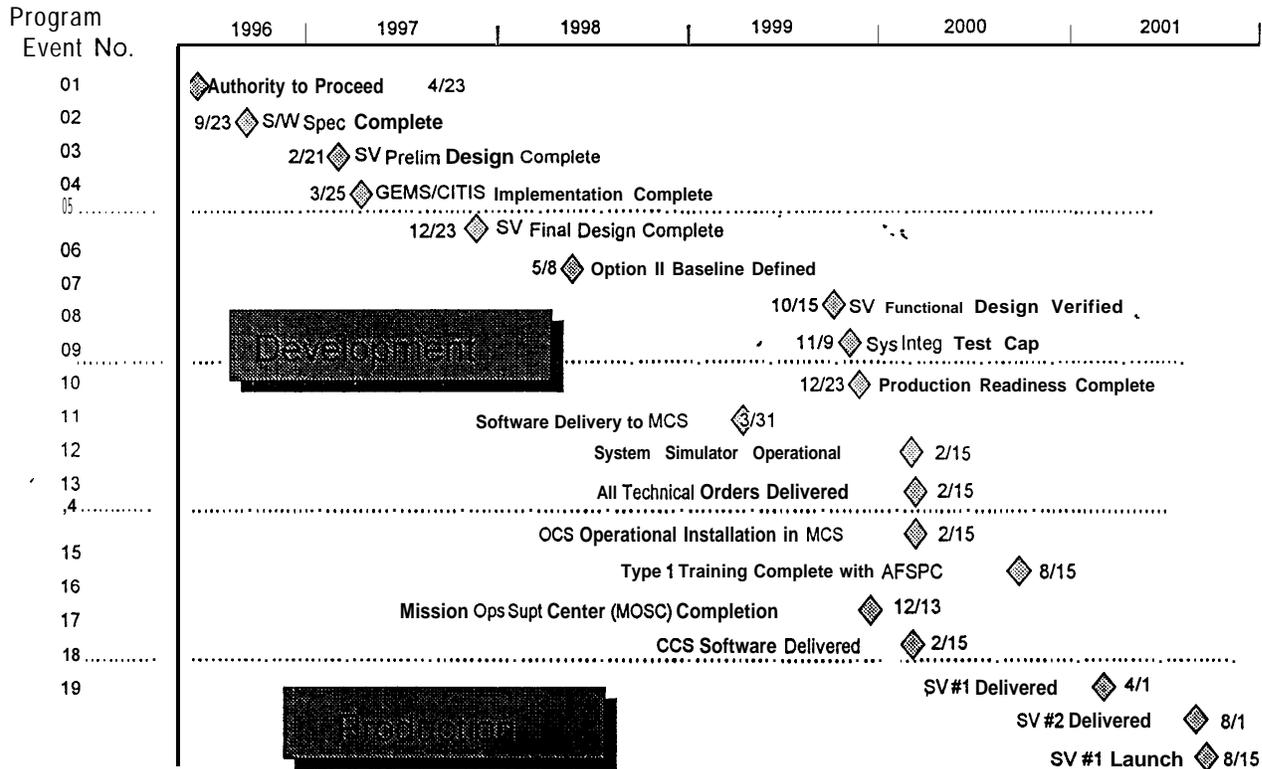
SLIDE 6
8/26/06



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What is Block IIF Major Milestones--Through SV1



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SLIDE 7
8/26/96



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What is Block IIF? Multiyear Contract Includes

Fixed Price Award Fee

- SV Development & Production
- DoD Civil Use Frequency (Dev. & Prod.)
- System Test & Evaluation

Cost Plus Award Fee

- Operational Control System (OCS) & Mission Operation Support Center (MOSC) Development
- IIF AFSCN Development
- System Simulation Development
- Launch Operations Support
- On-Orbit Operations Support
- OCS & MOSC Sustainment
- OCS/MOSC DoD Civil Freq. Dev.

Firm Fixed Price

- Economic Order Quantity
- Support Equipment

Cost Plus Fixed Fee

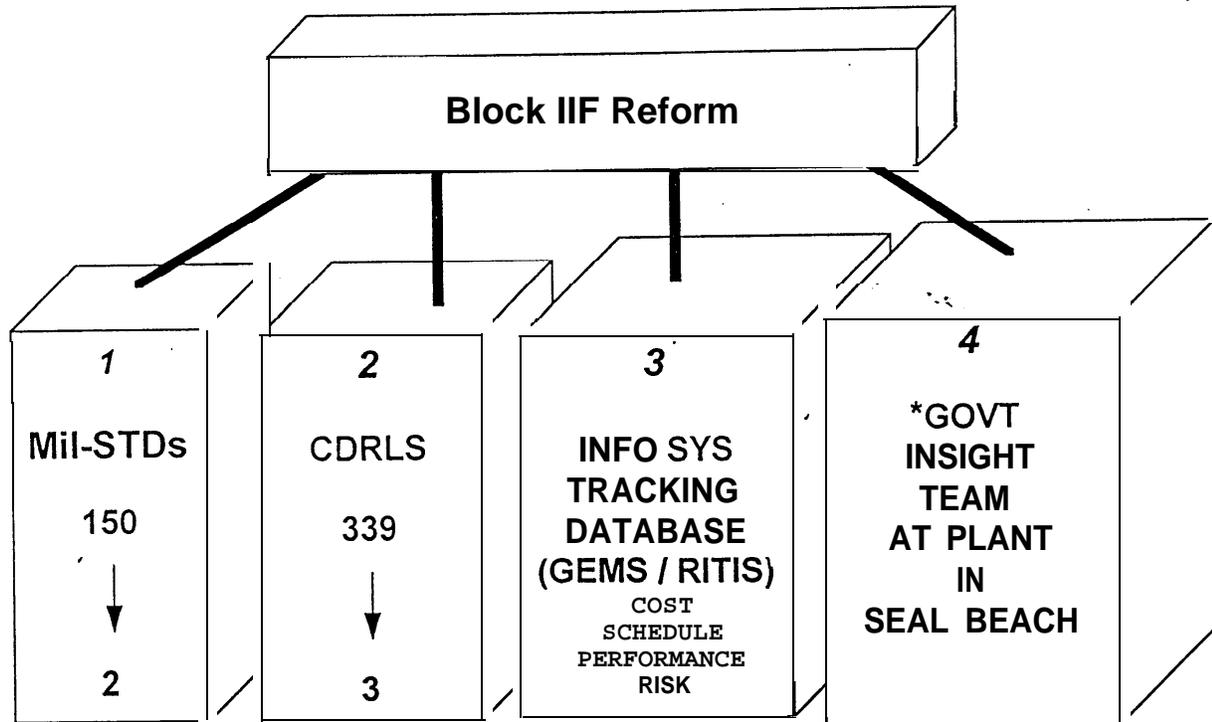
- Advanced Integration Studies

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SLIDE 8
8/26/96

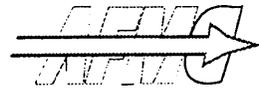


What is Block IIF?

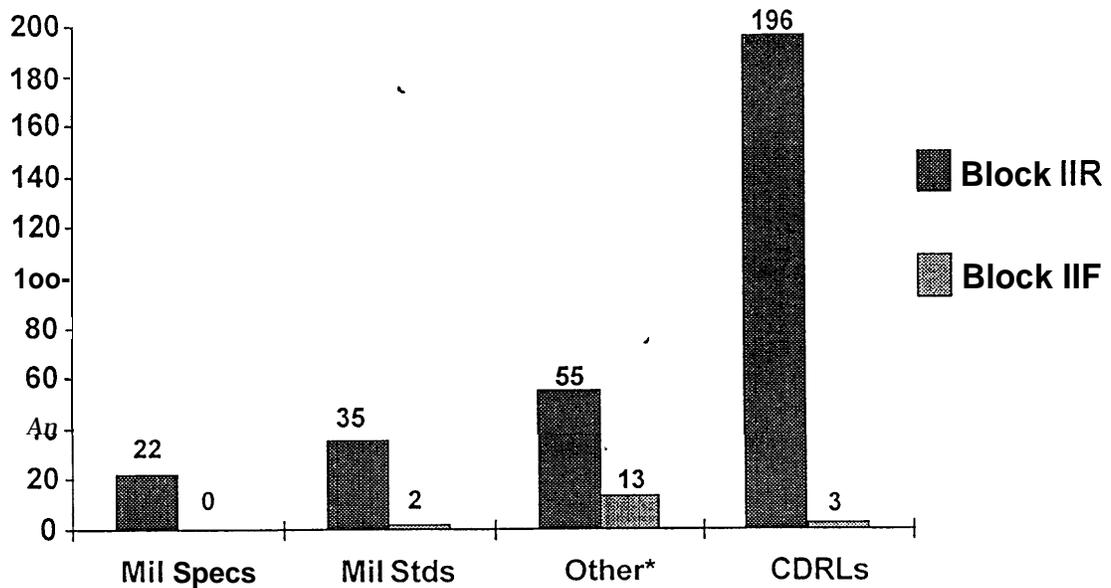


- * Insight Involves Day-to-Day Interaction Between the Gov't & Rockwell
 • Gov't Shall Not Direct Rockwell; Gov't Advises Only

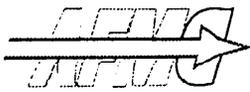
SLIDE 11
9/13/96



MILITARY SPECIFICATION, STANDARDS & CDRLS



Unproven Approaches Leave Potential for Some "Broken Glass"



Block IIF Management Strategy

- Contractual acquisition reform elements--complete
- Daily *flexible* execution approach incorporates
 - Integrated Master Plan & Master Schedule (IMP/IMS)
 - GPS Engineering Management System (GEMS)
 - Collocated Integrated Product Teams (IPT)
 - Clear Accountability in Design (CAID)
 - Space Vehicle Warranty--Required On-Orbit Life (ROOL)
 - Risk Management Plan

BASIC TENETS OF IIF PROGRAM STRATEGY ARE CAPTURED IN IIF SINGLE ACQUISITION AND MANAGEMENT PLAN (SAMP)

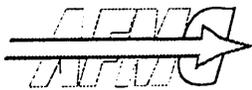
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SLIDE 12
8/26/96

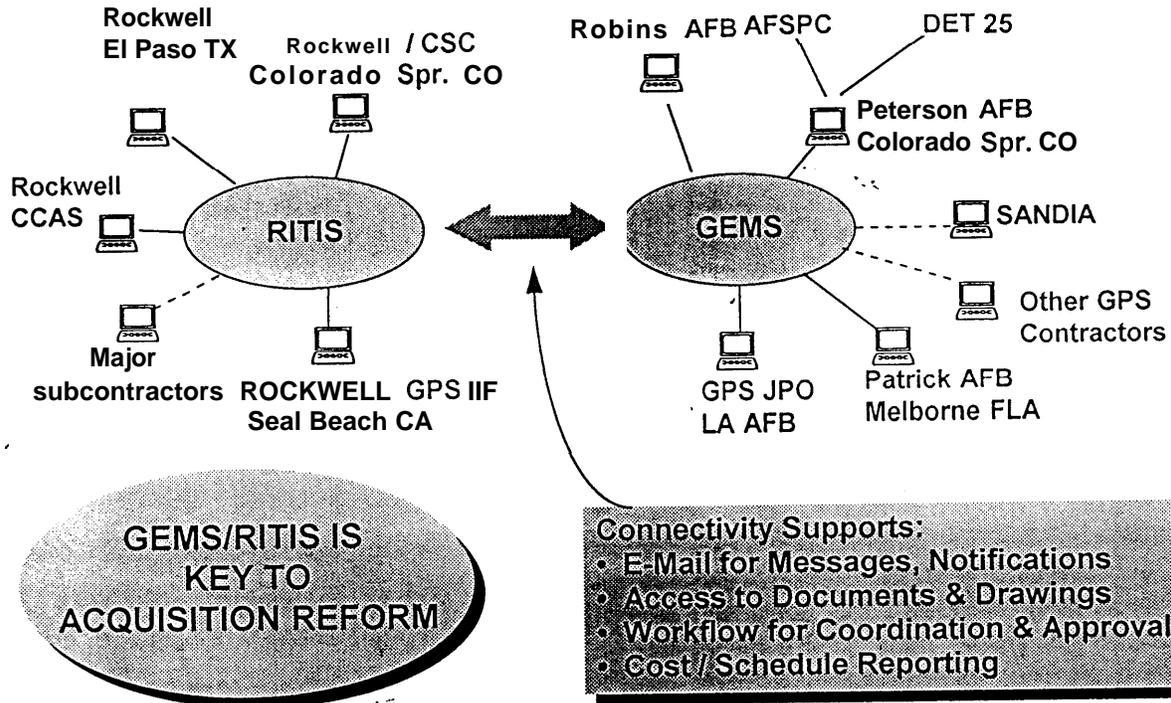
Integrated Master Plan (IMP) Integrated Master Schedule (IMS)

- Defines Program From Start to Finish As Discrete Activities and Processes
- Consistent With Tenets of Integrated Product Development (IPD)
 - Focus on the product and its work breakdown structure (WBS)
- Effective Management Tool for Day-to-Day Use and Long-Term Planning and Program Control
- Guides Daily Work and Provides Sound Baseline for Assessing Changes

THE IMP/IMS IS THE KEY MANAGEMENT TOOL DESCRIBING ROCKWELL'S CORE ACTIVITIES AND PROCESSES NECESSARY TO EXECUTE THE BLOCK IIF PROGRAM.

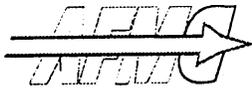


Data Access Provided Using GEMS/RITIS



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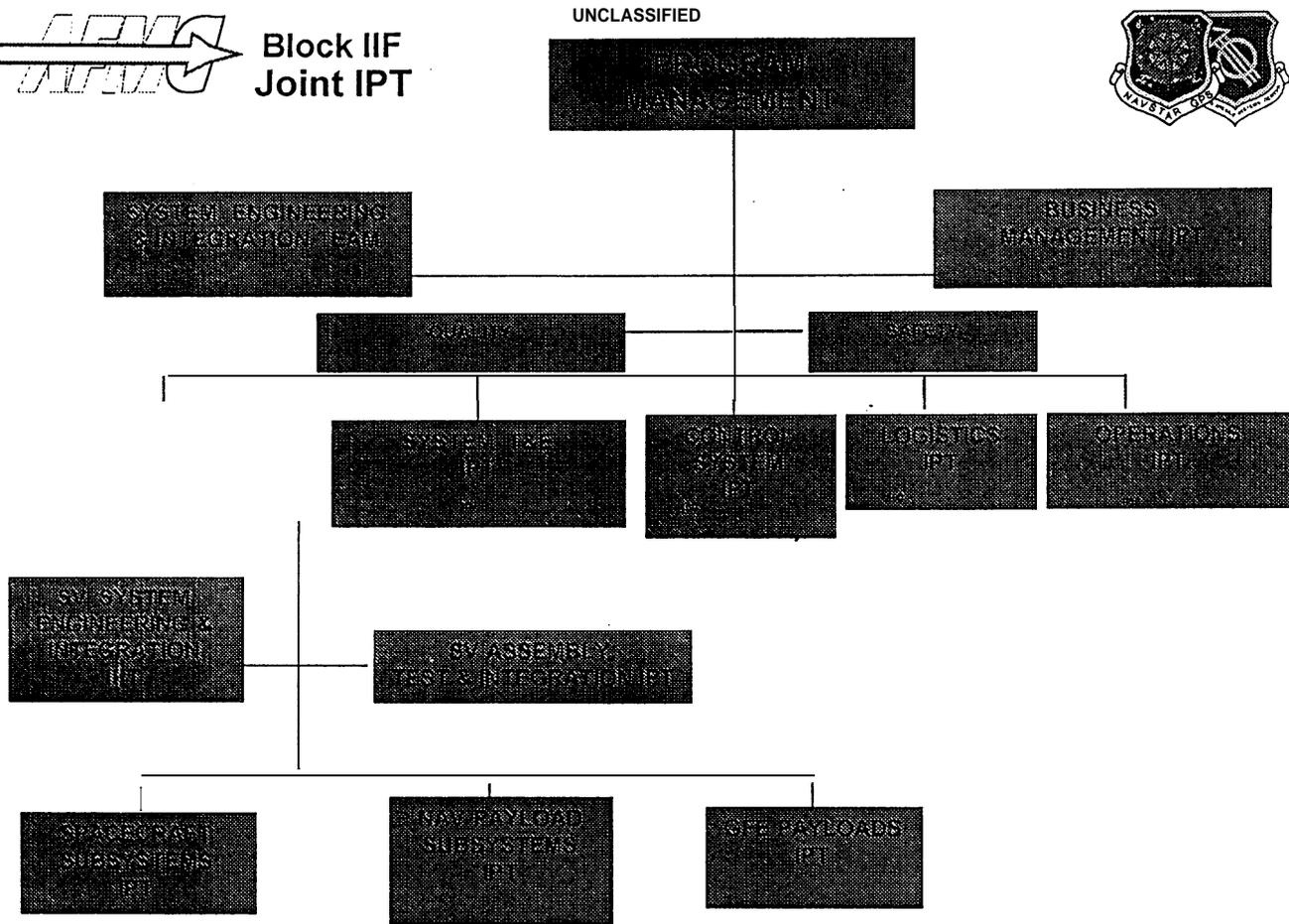
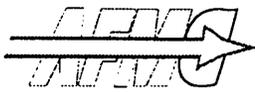
SLIDE 14
8/26/96



Block IIF Joint Integrated Product Team (JIPT)

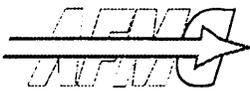
- **Single JIPT Collocated in Plant**
 - Headed by contractor
 - Members from Rockwell, Aerospace, JPO and DCMC
- **JIPT Concept Is Key to Block IIF Success**
 - Facilitates better communication between all players
- **Team Solves Issues Internally Through JIPT**
- **Team Has System Level Perspective (Consider How Their Decisions Will Impact Others Like AFSPC, 2SOPS, Etc.)**

GOVERNMENT TEAM MEMBERS EXIST TO ENSURE ROCKWELL SUCCEEDS!



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SLIDE 16
8/26/96



Clear Accountability In Design (CAID)

(As Tailored For IIF)

- CAID¹ Defines:
 - Level of government involvement in requirements allocation and configuration management processes
- JPO
 - Controls requirements allocation to the segment *B-Spec level only*
 - Participates with Rockwell in its SRA process and authenticates system and segment "A" and "B" Specs
 - Controls configuration much later in the program (FCA/PCA)
- Rockwell
 - Controls design and is clearly accountable for all decisions
 - Responsible and accountable for system performance, contract price and estimated cost
- Concept Works in Concert With the ROOL

¹ Final Report Govt./Industry Acquisition Process Review Team, CAID, October 1991



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Required On-Orbit Life (ROOL)

- Warranty Incentive for Contractor to Produce Quality SVs
- Describes Minimum On-Orbit Performance Responsibility with Associated Replacement Requirements--Contractor Accountable
- SV Replacement Requirement -- Against ROOL of 12.7 Years
 - Full Replacement -- if first 2 SVs fail within first 4 years or if remaining SVs fail within 1st year
 - Partial Repl'ment -- total performance pool < performance period (monetary compensation to U.S. treasury)
 - No Repl'ment -- total performance pool > performance period or when production period complete

**CORNERSTONE OF IIF ACQUISITION
MEMBERS MUST PROTECT THE ROOL--ADVISE, NOT DIRECT!**

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SLIDE 19
8/26/96



Risk Management Plan

- In-Plant Insight Team Involved in Day-to-Day Issues
- IIF IPT Engages Rockwell's Weekly Status Reviews
 - Program Risk Issues Briefed Once a Month
 - Risk List Rolled Up Into Rating Summary
- Follow up Team Assessment with Feedback to Rockwell
- IIF IPT Participates in GPS Ops Working Gp (GOWG)
 - Early Involvement/Lessons Learned Management
- Strong Cross Fertilization Between IIR & IIF IPTs
- IIF Risk Mitigation Plan

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SLIDE 20
8/26/96



Summary

- Challenging Acquisition/Contractual Reforms
- Strong Program Strategy
- Creative, But Aggressive Management Approach

BLOCK IIF ON TRACK!

OUR GOAL IS
TO GET IT ON ORBIT!

Kim -- Hand copy of slides plus some notes

The diskette contains the 'soft copy' of

Sally 703-971-3171

L5 Frequency Selection

Sally L. Frodge
Department of Transportation
CGSIC Meeting, September 1996

Background on L5

- * Mentioned within the community
- * National Research Council Report - Committee on the Future of the GPS, Chair, Laurence J. Adams
The Global Positioning System: A Shared National Asset -- Recommendations for Technical Improvements and Enhancements, 1995
 - Recommended addition of a second civilian frequency (L4)
- * Block IIF GPS Satellites contract has option built into it that can be exercised to implement an L5 frequency

Background on L5

- * A civilian industry has grown utilizing the L1 and L2 frequency; L1 is the only frequency that has been agreed to for civilian use by the DOD
- * We are entering into a period of high solar activity
- * The first Block IIF SV will be up -2002, with 4 + by -2004-2006
- * Action taken at January, 1996, meeting of the Joint DOD/DOT Positioning and Navigation (POS/NAV) Working Group

L1 = 1575.42 MHz

L2 = 1227.6 MHz

L5 = ??????? MHz

Oversight and Tiger Team: Multi-agency team

- * Department of Commerce
 - * National Telecommunications and Information Administration (NTIA)
 - * National Oceanic and Atmospheric Administration / National Geodetic Survey (NOAA/NGS)¹
- * Department of Transportation (DOT)
 - * Federal Aviation Administration (FAA)¹
 - * Federal Highway Administration (FHWA)
 - * United States Coast Guard (USCG)
 - * Office of the Secretary (OST)¹
- * Department of Defense (DOD)
 - * Joint Spectrum Center
 - * Air Force Frequency Management Agency (AF FMA)
 - * GPS Joint Program Office (JPO)¹
 - * SPACECOM¹
 - * DUSD SPACE¹
- * National Aeronautics and Space Administration (NASA)

¹ Oversight

Tiger Team Goals

- * Pre-coordinate L5 selection with the CCB and DOD/DOT Pos/Nav Working Group
- * Collect and compile the technical and operational features of L5 to meet the civil user community requirements for a second frequency consistent with military needs for spectrum protection
- * Review L5 frequency candidates
- * Analyze why specific candidate L5 frequencies are either acceptable for the final list or should be excluded, and develop a ranking matrix based on these factors
- * Recommend a list of potential L5 frequencies, including risk assessment of success or failure to complete L5 approval at the international level
- * Prepare a detailed notional time line of the frequency selection process to the international level for the selected L5 frequency (or final candidate frequencies)

Consideration Factors

- * Requirements based: utility to civilian community as dual frequency L1/L5 or L5-only
 - * Different Users: Different -- often contradictory -- requirements
 - * Filet Mignon is required if someone else is paying
- * Technical feasibility
 - * Space platform, user platform, signal characteristics, band characteristics
- * Direct Costs to implement and indirect costs
- * Impact to Block IIF satellite design, schedule and cost
- * Technical benefits
 - * ionospheric correction eg sufficient separation from L1 ~ 200 MHz or greater
 - * tracking improvements eg reduction in multipath, RF,
 - * accuracy improvements to users
 - * etc listed previously
- * International acceptability and use
- * Interference to other existing systems

Time Line Driven By Block IIF Contract

- * Frequency selection date set at October, 1996, or miss the first Block IIF SV
- * Frequency coordination / approval process nationally and internationally, most likely 1999

Cost Estimate

- * Direct costs estimated to be around \$28. \$ M over 11 years

Reasons: Why an L5?

- * Reduction of ionospheric error (7.0 m to 0.01 m 1 sigma)
- * Reduction in stand alone accuracy from approximately 30 m to 21.2 m 2drms
- * Assists short and long baseline differential users, including Category III approach and landing, mapping, surveying, precision farming and earth science applications by calibrating the spatially uncorrelated components of the ionosphere seen across the baseline and by speeding up ambiguity resolution
- * Benefits from an additional signal for receivers capable of codeless operation
- * Reduces civilian receiver's probability of RF interference ie use of L5 if L1 is interfered with

Reasons: Why an L5?

- * Wide-band (L4) would aid in emerging commercial markets where reception is susceptible to intermittent multipath and signal blockage with success or failure due to quick recovery of pseudorange measurements once the signal is restored
- * Reduction of receiver noise and multipath errors
- * Military perspective: Separation of civilian and military systems in space; Provides flexibility in jamming to selectively deny civilian services while not disrupting Y-code on L2 ie broadband jamming of L1 and (L4)

Three Primary User Applications for L5 and Associated Requirements

- * As a replacement for the L1 signal
 - alternative single frequency applications in case of severe interference on L1
- * For ionospheric delay measurements
- * For wide-lane carrier phase measurements
 - resolve carrier phase ambiguities for L1 (and L5)

L5 As A Replacement for L1

- * L5 far enough away from L1 so that RF interference won't also affect L5
- * Different Options:
 - * L5 without 50 bits per second (bps) data on L5
 - the L5 C/A code only option
 - interference resistance better without 50 bps data
 - * L5 with 50 bps data on it

L5 For Ionospheric Delay Measurements

- * Separation from L1 must be enough, 200 MHz or greater
 - the more separation, the better accuracy
 - for the same separation, lower L5 is better
- * L5 should be "code trackable" ie standard C/A-code
 - codeless operation not a requirement, otherwise L2 would be adequate

L5 For Wide-lane Carrier Phase Measurements

- * L5 must have great enough separation from L1 for a "good" wide lane width
 - L1/L2 wide lane width is 86.2 cm
 - "good" wide lane widths for L1/L5 and L2/L5 are half or double L1/L2 wide lane

L5 Signal Characteristics

- * 50 bps not required, but desirable based on requirements
- * Must be code trackable, ie C/A-code
- * Must be carrier phase coherent with both L1 and L2

Frequencies Considered

- * Used NRC and known work as a departure point
 - * NRC analysis frequency range: 960 MHz - 1930 MHz
 - * Input and work of experts (Hatch, Klobuchar, MacDonald, Remondi etc) and organizations CGSIC, ICAO, etc
 - * Analyses by Aerospace, MITRE and ARINC
- * List narrowed by Systems Requirements Document (SRD) generating contractual language
 - * Greater than 20.46 MHz from L2 but no more than 102.3 MHz
 - * Replicate L1 on L5
 - * Multiple of 10.23 MHz
 - * Options for:
 - * L5 both without 50 bps data and 6 dB less
 - * with 50 bps data and identical to L1

Narrow List Considered

1196. xxx
1207. xxx
1210. XXX
1216. xxx
1227.6 (Put C/A code on L2)
1258. xxx
1841. xxx

Short List

* L5 = 1207.14 MHz

- * In the 960-1215 MHz AERONAUTICAL RADIONAVIGATION service band, already a "clean" band around the world suitable for aviation purposes, as well as all other modes and promotes international acceptance
- * Interference with but least impact in this band on JTIDS, a NIB system
- * Protected aeronautical radionavigation band in all 3 ITU regions
- * Although FAA has no requirement, it would support this through the ITU process as a footnote
- * TACAN and DME systems are being phased out over the next decades
 - * 1 impact on expensive SV real estate
- * Minimal impact on user end equipment
- * Sufficient spacing from L1 to gain ionospheric corrections and wide-laning benefits
- * Would probably cause this band to be cleaned around 1207.14 MHz, thus potentially benefiting L2 ie performance would be comparable to better than what is currently used

and this spectrum will be freed

*Rockwell has now stated that impact could be significant
The costs of such impacts must be determined, scrubbed
and considered in the decision*

Short List

*** L5 = 1309.19 MHz**

- * In the 1248-1328 MHz radar band
- * Does not interfere with JTIDS
 - no re-engineering costs to JTIDS/MIDS
 - delays fielding of some DOD systems
 - recurring costs for retro-fitting the JTIDS terminals
 - new certification testing required

Radar interference would not make this usable for aviation safety purposes although it could be useful for less dynamic applications of land and marine modes

CBD Announcements for the cost benefit study for technical input were published and are available on the CGSIC web site

Sally L. Frodge

Dept. of Transportation, OST, Radionavigation & Positioning Staff

Tel: 202-366-4894

Fax: 202-366-7206

Sally.Frodge@ost.dot.gov

Ken.Lamm@ost.dot.gov

CBD Announcement

Keynote speaker:

**Assistant Secretary for Transportation
Policy, Mr. Frank Kruesi**

GPS
INFORMATION DISSEMINATION COORDINATION
TEAM

STATUS REPORT

HANK SKALSKI

CIVIL GPS LIAISON

DOT / HQ AIR FORCE SPACE COMMAND

September 16, 1996



GPS IDCT

STATUS REPORT

- WORK PLAN TASKS

1. IN-BAND TESTING/DISRUPTION OF GPS SERVICES

- a. COORDINATION

- 1) DoD/CIVIL FOCAL POINTS

- 2) PROCESS (AFR 55-44) ⇒ **DOD ACTIVITIES**

- 3) CIVIL COORDINATION (POLICY/PROCESS)

- ⇒ **DOT ACTIVITIES**



b. INFORMATION DISSEMINATION

1) DISTRIBUTION/USER GROUPS

2) PROCESS/SYSTEM

2. STRATEGIC GPS OPERATIONAL INFORMATION

a. SUSTAINMENT/ENHANCEMENTS

3. CATALOG/PUBLISH DOCUMENTATION



PDDNSTC-6 DESCRIBED DOD ROLES & RESPONSIBILITY TO:

“DEVELOP MEASURES TO PREVENT THE HOSTILE USE OF GPS AND ITS AUGMENTATIONS TO ENSURE THAT THE UNITED STATE RETAINS A MILITARY ADVANTAGE

... WITHOUT UNDULY DISRUPTING OR DEGRADING CIVILIAN USES.”



- TASKS COMPLETED

- 1. IN-BAND TESTING/DISRUPTION OF GPS SERVICES

- a. COORDINATION

- 1) DoD/CIVIL FOCAL POINTS

- ↳ DoD FOCAL POINTS: AIR FORCE/NAVY/ARMY FMA'S
- ↳ CIVIL FOCAL POINT: FAA SPECTRUM MANAGEMENT



- 2) PROCESS (AFR 55-44)

- ↳ AFR 55-44 IS OUT DATED AND DOES NOT ADDRESS GPS
- ↳ JOINT CHIEF OF STAFF MANUAL TO REPLACE AFR 55-44
- ↳ INTERIM MESSAGE ISSUED
- ↳ JOINT CHIEFS STAFF COORDINATING INTERNAL DOD ACTIVITIES
- ↳ NAVWAR ACTIVITIES



- TASK IN PROGRESS

□3) CIVIL COORDINATION (POLICY/PROCESS)

↪ **GITA (GPS INTERFERENCE TESTING APPROVAL) AD-HOC WORKING GROUP**

↪ **TWO COMMITTEES FORMED**

☐ **POLICY**

☐ **PROCESS**



- TASKS ON THE STARTING BLOCKS

□2. STRATEGIC GPS OPERATIONAL INFORMATION

□a. SUSTAINMENT/ENHANCEMENTS

↪ INTERNATIONAL INFORMATION PROCESS

↪ FUTURE REQUIREMENTS/ENHANCEMENTS



**CGPSIC - September 16, 1996
Kansas City, MO**

Dave Peterson
WAAS Project Manager

FAA 260-13



WAAS Overview



- **Project Objective**
- **WAAS Description**
- **Cost Benefits**
- **Key Events**
- **Contract Status Summary**
- **Issues**



Background



Program Objective

Establish, Operate and Maintain a Satellite-Based Navigation Capability for All Phases of Flight, Including Oceanic, En Route, Terminal, Non-Precision, and Precision Approach

Sponsor: Flight Standards

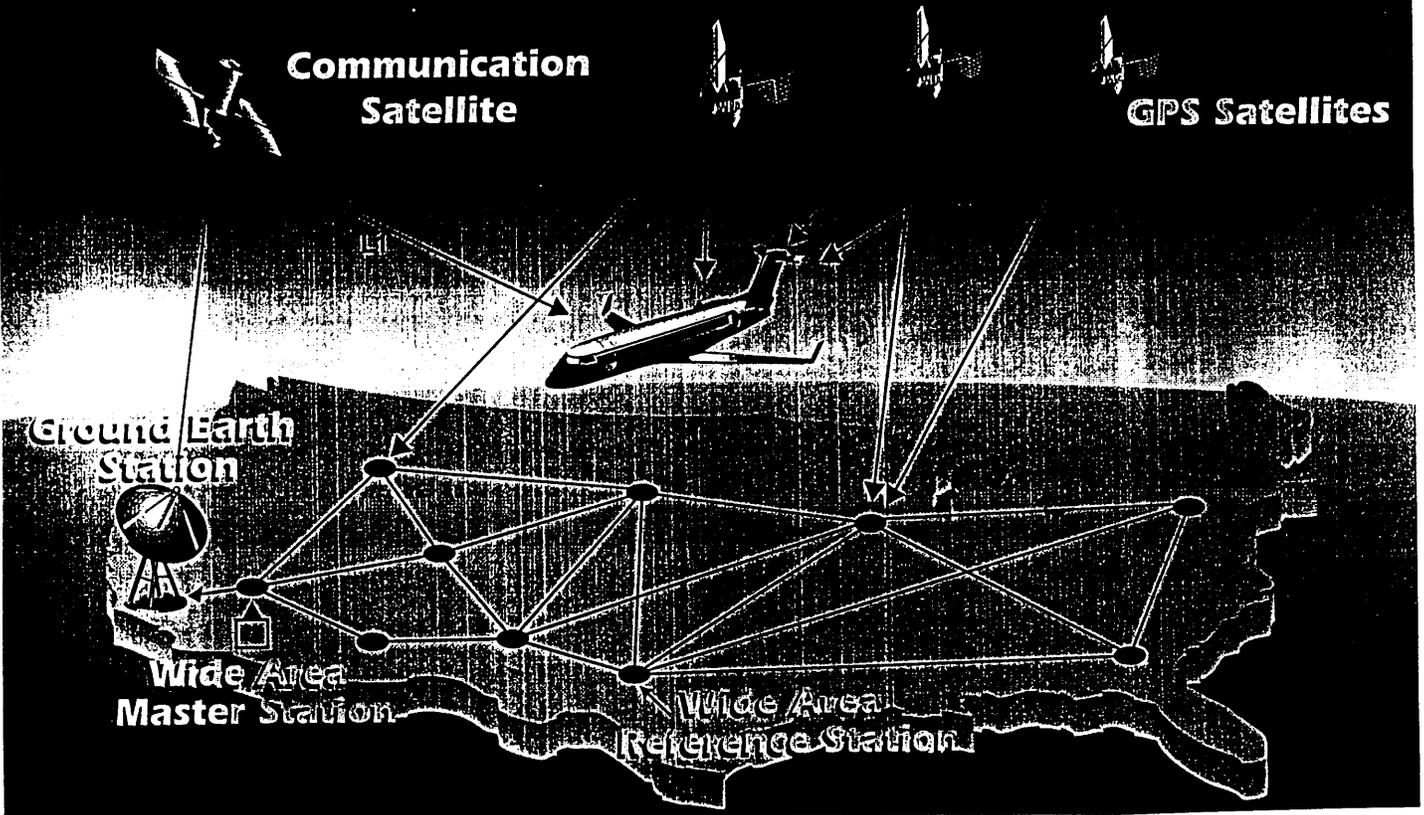


FAA Corporate Commitments

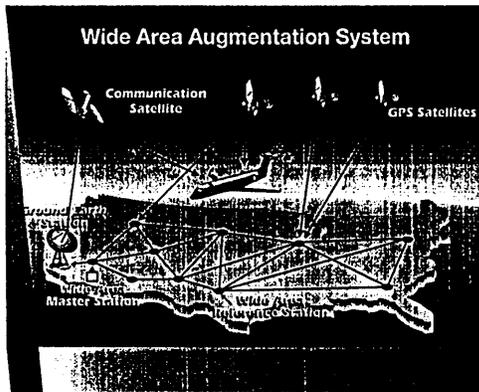


- **Deliver Operational WAAS CY 1998**
- **Cost/Schedule Targets Maintained**
- **No Air Navigation Service or Safety Degradation**

Wide Area Augmentation System



WAAS Components



| Components | Acquisition Category | Acquisition Risk | Current |
|------------------------------------|----------------------|------------------|---------|
| Communications Satellites (COMSAT) | Leased | Low | Medium |
| Terrestrial Communications (GFE) | GFE | Low | Low |
| System Hardware (Hughes) | COTS | Low | Low |
| Software (Hughes) | Developmental | Medium | Medium |

