

NAVSTAR

Global Positioning System

GPS III Program: Goals and Status



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Overview of GPS III

- **Path to GPS III**
- **Civil and Military Goals**
- **Program Status**
- **Schedule**
- **Summary**

GPS Civil and Military Capabilities

DoD Space

Improved Sensor Accuracy

ISR

Improved TLE

Navigation

*Improved Accuracy,
Availability & Integrity*

Civil Space/ Scientific

Weapon Guidance

Fewer, Smaller Weapons

For Same Effect

Improved Anti-Jam

Transportation

*Collision Avoidance/
Precision Approach*

Infrastructure/ Power Grids

Comm Networks

Surveying

Comm Network

Timing

*Assured timing/comm in
Jammed environment
Increased Comm Capacity*

Recreation

Commerce

Force Deployment/ Location

Situational Awareness in Jammed Environment

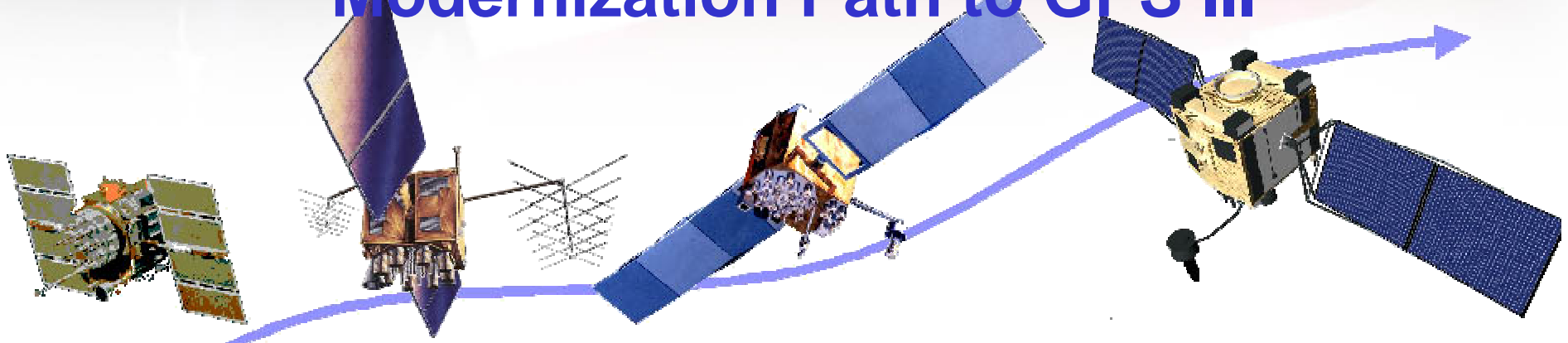




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Modernization Path to GPS III



Increasing System Capabilities ♦ Increasing Defense/ Civil Benefit

Block IIA/IIR

Block IIR-M, IIF

Block III

Legacy GPS Program:

- Basic GPS
- Standard Service
 - Single frequency (L1)
 - C/A code navigation
- Precise Service
 - Two frequencies (L1&L2)
 - P-code navigation

IIR-M: IIA/IIR capabilities plus

- 2nd Civil Signal on L2
- Military Code
- 1st Launch 1QFY05

IIF: IIR-M capability plus

- 3rd Civil Signal on L5
- 1st Launch 4QFY06

OCS: System Upgrades

- Arch. Evolution Plan (AEP)
- Accuracy Imp. Initiative (AII)
- Launch/ Early Orbit, Anomaly & Disposal Ops (LADO)
- Alt. Master Control Station

Evolutionary Acquisition:

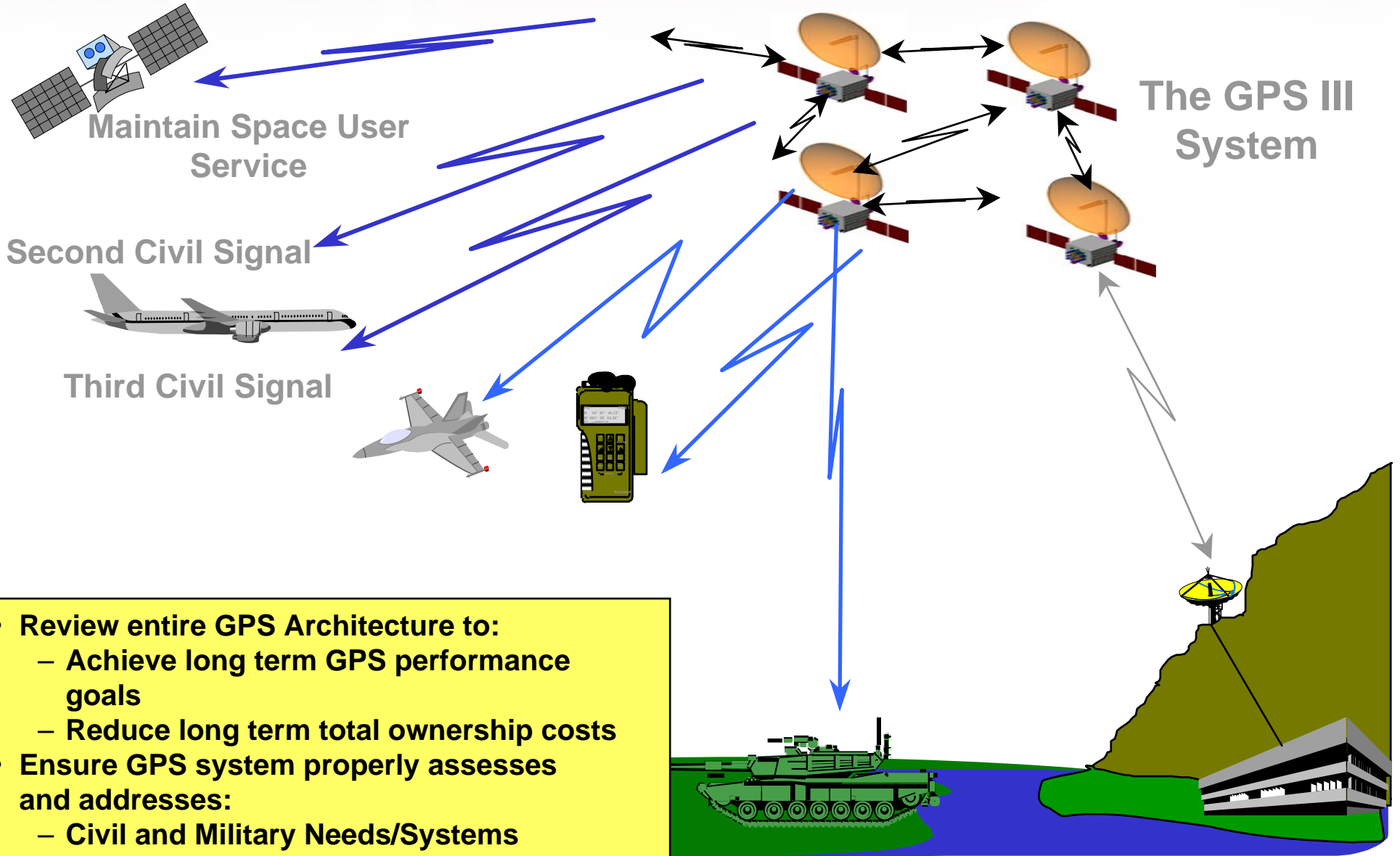
- Increased power/security accuracy/availability
- Controlled Integrity
- System Survivability
- Improved CONOPS
- Future signals (e.g., L1C)
- 1st Launch FY12



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GPS III Concept



The GPS III System

- Review entire GPS Architecture to:
 - Achieve long term GPS performance goals
 - Reduce long term total ownership costs
- Ensure GPS system properly assesses and addresses:
 - Civil and Military Needs/Systems
 - Possible augmentation opportunities
- Ensure best GPS system for next 30 years



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GPS III Civil and Military Goals

- **Increased system accuracy**
- **Assured and improved level of unaugmented integrity**
 - Compliments other sources (WAAS, EGNOS, MSAS, LAAS, RAIM)
- **Improved availability of accuracy with integrity**
- **Backward compatibility** with existing receivers
- **Support for new signals** in combination with IIR-M & IIF satellites
 - L2C, L5, M-code
 - Future options (e.g., L1C, nav msgs and power levels)
- **Smooth transition** from **GPS Block II to Block III**



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Additional GPS Military Goals

- **Protection** of friendly use
- **Prevention** of adversary exploitation
- **Preservation** of civil use outside of military area of operations

**Spectral separation of civil and military signals
and controlled increases of signal power**



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GPS III Accuracy Goals (2002)

	2000 Operational Requirements Document		Draft Systems Specification	
	Threshold	Objective	Threshold	Objective
Accuracy (95%)				
Horizontal	6.3 m	1.0 m (civilian) 2.1m (military)	2.5 m	0.5 m
Vertical	13.6 m	4.0 m	4.5 m	1.1 m
Timing	20.0 nsec	10.0 nsec	5.7 nsec	1.3 nsec

2002 Draft Systems Specification includes the effects of receivers

- Threshold is for low-cost/low-performance receiver
- Objective is for high-cost/high-performance receiver



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Assured Service

- **GPS III system infrastructure is important component for assuring accurate, reliable and flexible capabilities**
 - Support for new signals and services: frequencies, power, nav messages -- future flexibility
 - Expanded ability to monitor, maintain and command navigation services -- assured accuracy and integrity, reduced Age of Data
 - Increased availability of services -- management of constellation size, DOP, satellite maintenance & anomalies

GPS III is more than just a military spot beam



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GPS III Status

- **Government & Industry Conducting a Study of Civil & Military Architectures**
 - System Architecture and Requirements Definition phase on-going with two follow-on study contracts awarded in January 04
 - Requirements Definition continues in preparation for a System Requirements Review in the 2nd quarter of FY05
- **Key Decision Point to enter Risk Reduction/Design Development phase is currently scheduled for 3rd quarter FY05**
- **Interagency Forum for Operational Requirements is considering civil GPS III “capabilities” and is reviewing the GPS III Capabilities Definition Document (CDD)**
 - Analysis of Alternatives of civil space-based positioning, navigation, and timing requirements is underway
- **Joint Requirements Oversight Council (JROC) scheduled to meet in July 04 to approve the CDD**



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GPS Modernization Schedule

Activity	Implementation Date
SA set to zero	May 2000
GPS IIR-M Enhancements <ul style="list-style-type: none">- New L2 Civil (L2C) Signal- M-code on L1 & L2	1 st launch March 2005
GPS IIF Enhancements <ul style="list-style-type: none">- New L2 Civil (L2C) Signal- M-code on L1 & L2- L5	1 st launch 2006
GPS III Enhancements <ul style="list-style-type: none">- New L2 Civil (L2C) Signal- M-code on L1 & L2 with greater power- L5- Future Capabilities	1 st launch ~ 2012
OCS Enhancements	On-going



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Summary

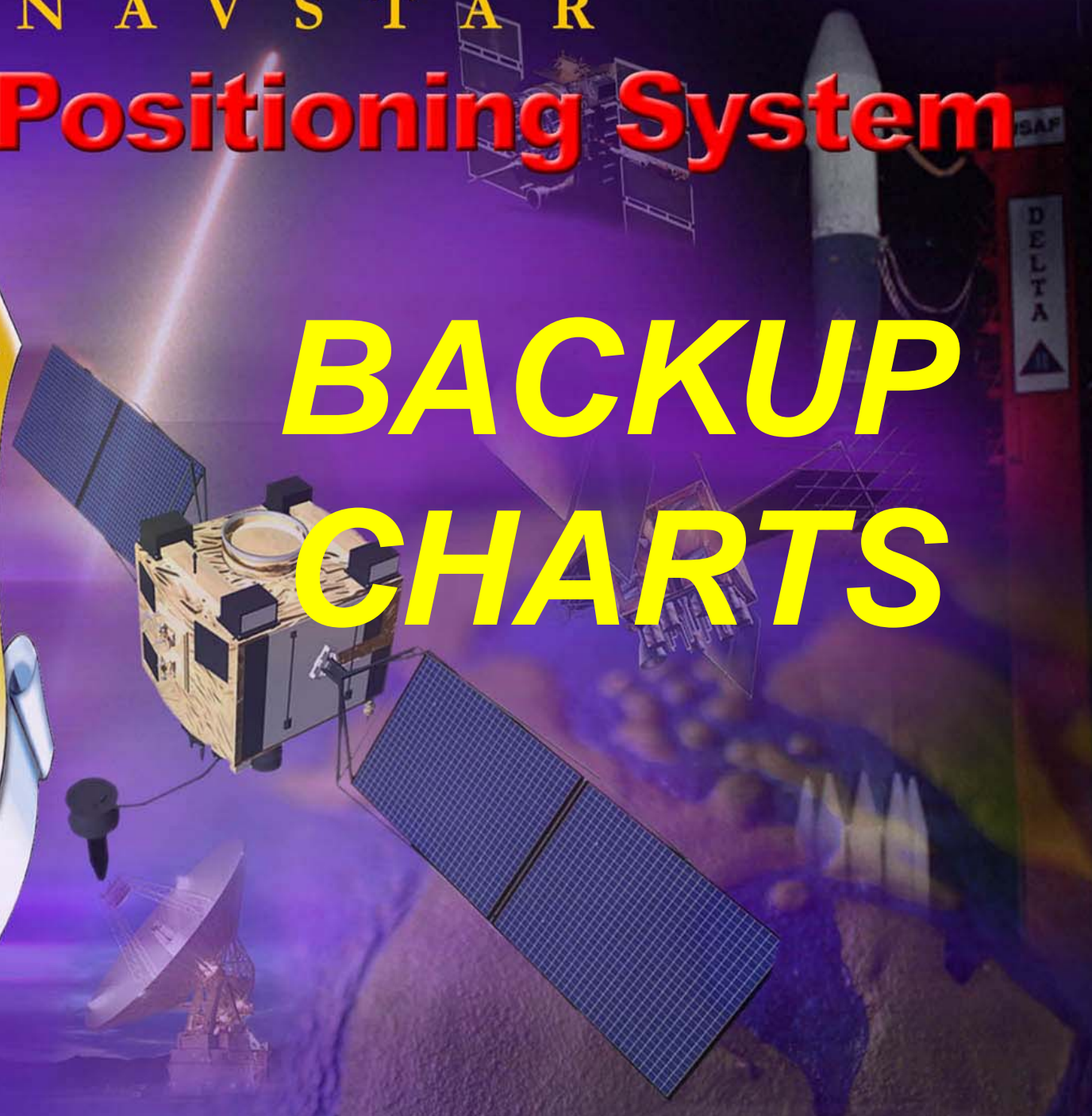


- **GPS III is a step in the continuing modernization of GPS service for civil and military users worldwide**
- **Goal is improved and assured service via space segment and control segment enhancements**
- **Program review for KDP-B planned for FY05**

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BACKUP CHARTS

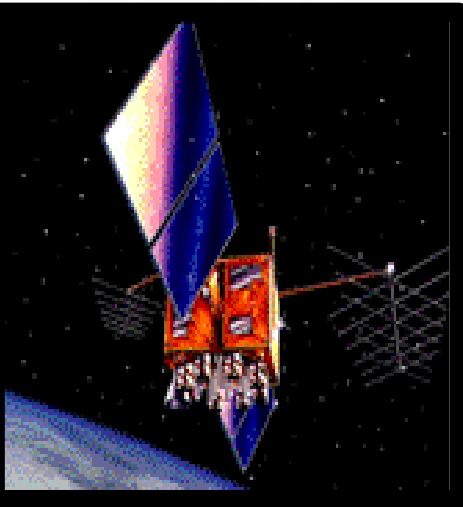




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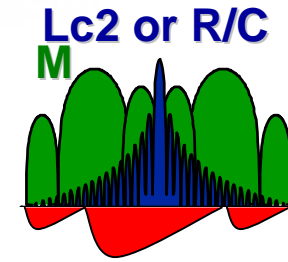


Summary of Signal Modernization

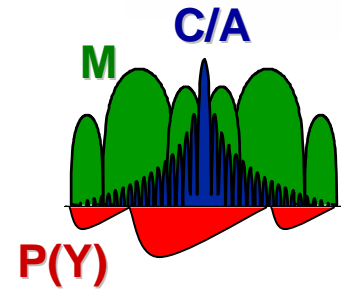


Block IIR-M (8 SVs)

- Adds L2C
- Adds new military M-Code



L2
1227.6MHz

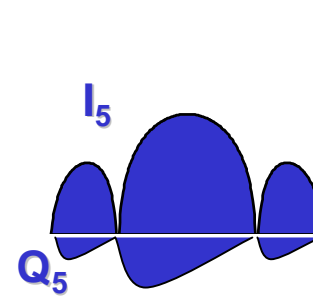


L1
1575.45MHz

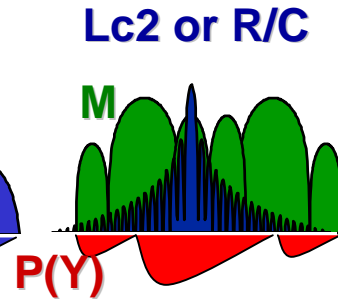


Block IIF (16 SVs)

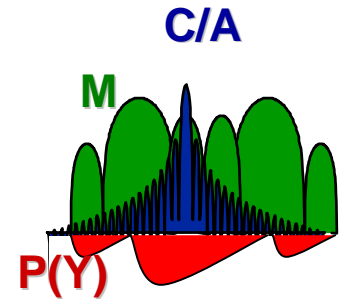
- Adds civil L5



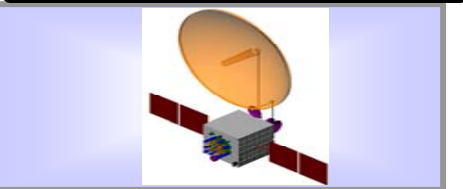
L5
1176.45MHz



L2
1227.6MHz



L1
1575.45MHz



- GPS III
- Architecture studies underway to define capabilities
 - Satellite launches to begin in 2012 timeframe