Military Communications & Positioning, Navigation, and Timing Overview

Civil GPS Service Committee

20 September 2022

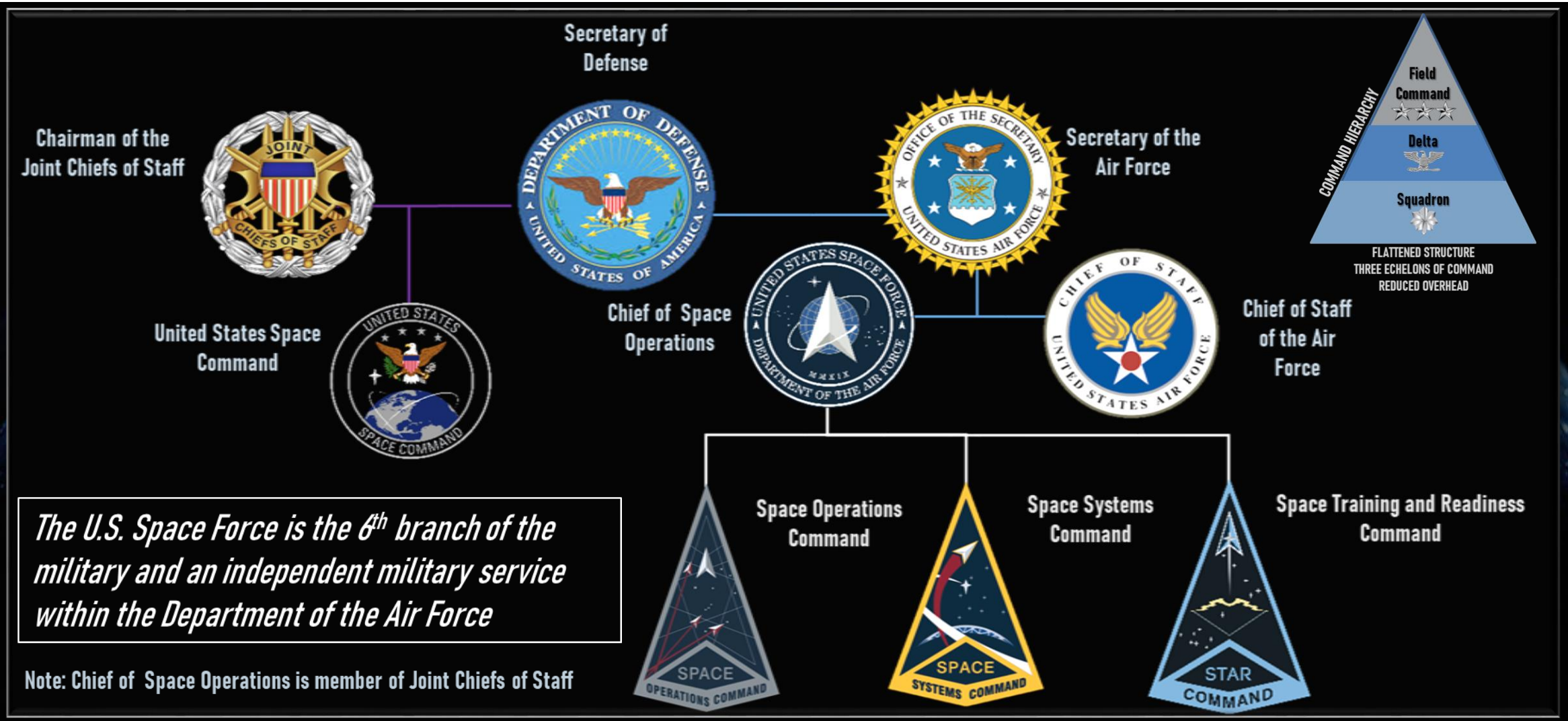
Mr. Cordell DeLaPena Jr., SES, USSF
Program Executive Officer for MilComm & PNT

Agenda

- United States Space Force
- Global Context
- Space Systems Command
- Military Communications & PNT Directorate Overview
- GPS: Beyond Defense

SEMPER SUPRA

U.S. Space Force Organization



Complementary Functions And Streamlined Layers Of Command In The Deliberate Pursuit Of Speed And Agility

Space Force Capabilities *"Today"*

SEMPER SUPRA

UNITED STATES SPACE FORCE

GEO
Geostationary Earth Orbit
22,000 miles
Optimal for Continuous Earth Coverage

MEO
Medium Earth Orbit
1,200 – 22,000 miles
Optimal for Global Positioning, Navigation and Timing

LEO
Low Earth Orbit
1,200 miles
Optimal for Earth Sensing

HEO
Highly Elliptical Orbit
1,200 – 22,000 miles
Optimal for Extended Polar Coverage

Global Communications
AEHF
MILSTAR
WGS
DSCS
Commercial Communications

Space Domain Awareness
GSSAP

Position, Navigation and Timing
GPS-IIR
GPS-IIRM
GPS-IIF
GPS-III

Weather
ORS-6

Space Domain Awareness
ORS-5

DMSP

SBSS

EPS

Missile Warning and Battlespace Awareness
SBIRS HEO
DSP
SBIRS

CSpOC
Executes the operational command and control of space forces to achieve theater and global objectives

Cyber MDTs
Provide specialized cyber defense to space weapon systems throughout the portfolio

Global Satellite Control
Satellite Control Network
BOSS — New Boston SFS
LION — RAF Oakhanger
COOK — Vandenberg SFB
POGO — Thule AB
GUAM — Micronesia
REEF — Diego Garcia
HULA — Hawaii

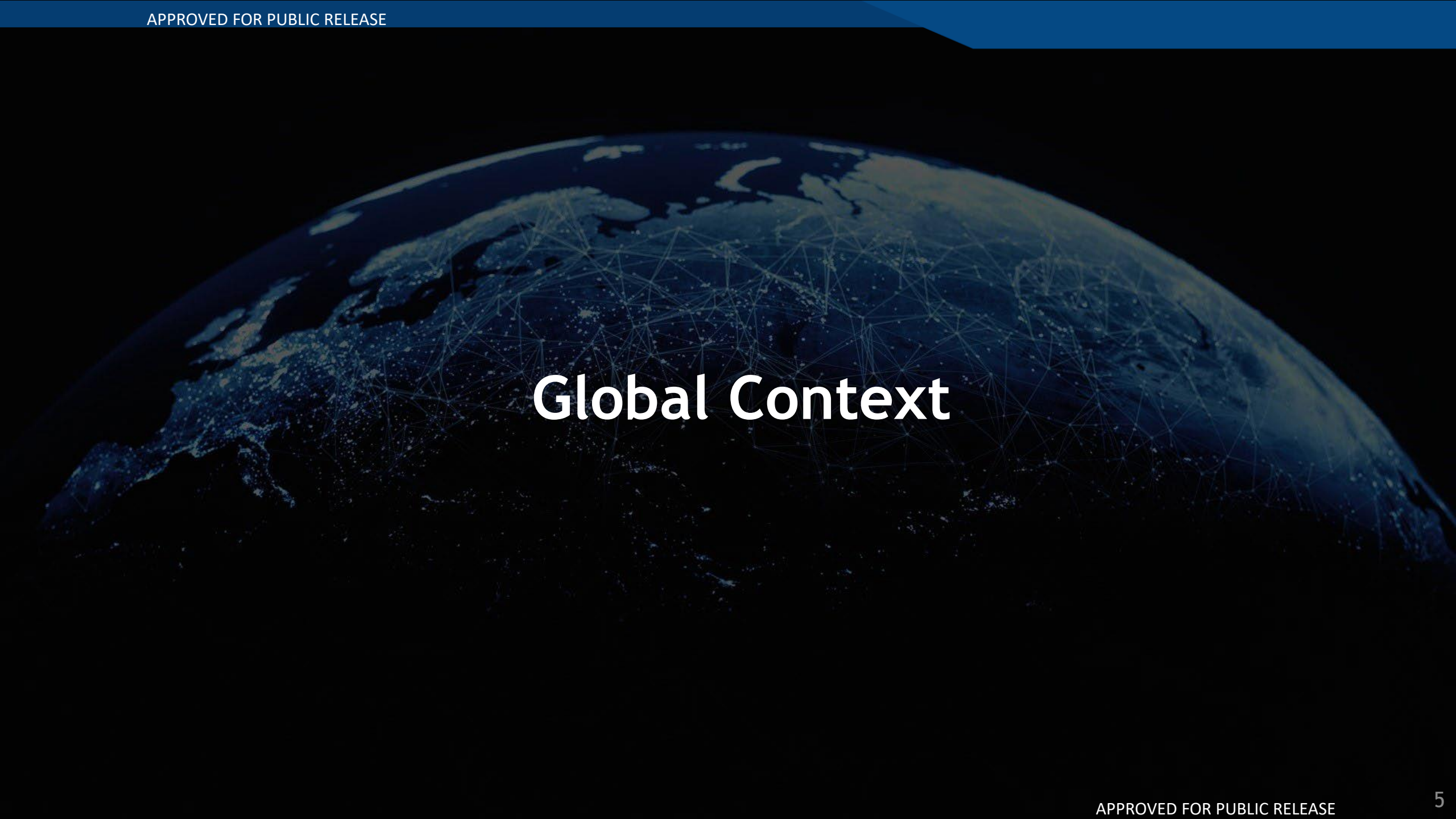
Ground-Based Space Domain Awareness
GEODSS — Diego Garcia, Maui, Socorro
Eglin Radar — Eglin AFB
Space Fence — Kwajalein Atoll
Space Surveillance Telescope — Australia
C-Band Radar — Australia

Missile Warning / Defense Radar
UEWR — Cape Cod SFS
UEWR — Thule AB
UEWR — Beale AFB
UEWR — Clear SFS
PARCS — Cavalier SFS
UEWR — RAF Fylingdales
Cobra Dane — Eareckson AS

Space Electronic Warfare
CCS 10.2
Multi-Mission Platform 2.0
Bounty Hunter 2.0

Launch Operations
Space Launch Delta 30 — Vandenberg SFB
Space Launch Delta 45 — Cape Canaveral SFS
Atlas V
Delta IV
Falcon 9
Falcon Heavy

Superior and Exquisite Array of Space Capabilities Built for a Benign Space Domain…Things Have Changed

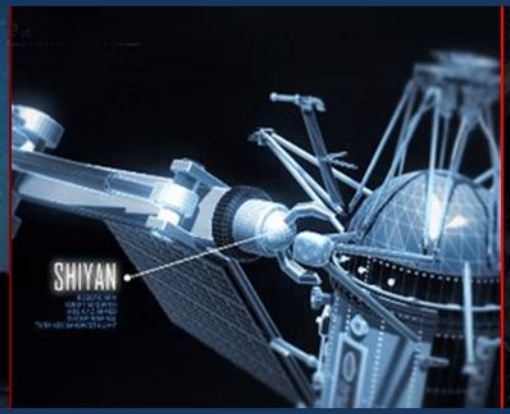


Global Context

What motivates us?

Top U.S. general calls China's hypersonic weapon test very close to a 'Sputnik moment.'

China launches world's first quantum communications satellite.



China is launching 'kidnapper' satellites, with grappling arms capable of plucking satellites out of orbit.

Russian direct-ascent anti-satellite missile test creates significant, long-lasting space debris.

Russia has a new weapon that USSF dubs the 'Nesting Doll.' It opened up and another satellite came out. And it opened up and a projectile came out. That projectile is designed to kill U.S. satellites.

"Our entire way of life depends on space and our ability to protect our assets."

Gen. John Raymond, Chief of Space Operations, U.S. Space Force

* VIDEO CREDIT AGI

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China's Long Game

China is projected to surpass the United States economically by 2030

- *"There are a growing number of areas in which Xi's China is a formidable, authoritarian adversary. China is working to methodically strengthen its capabilities to steal intellectual property, repress its own people, bully its neighbors, expand its global reach, and build influence in American society."*

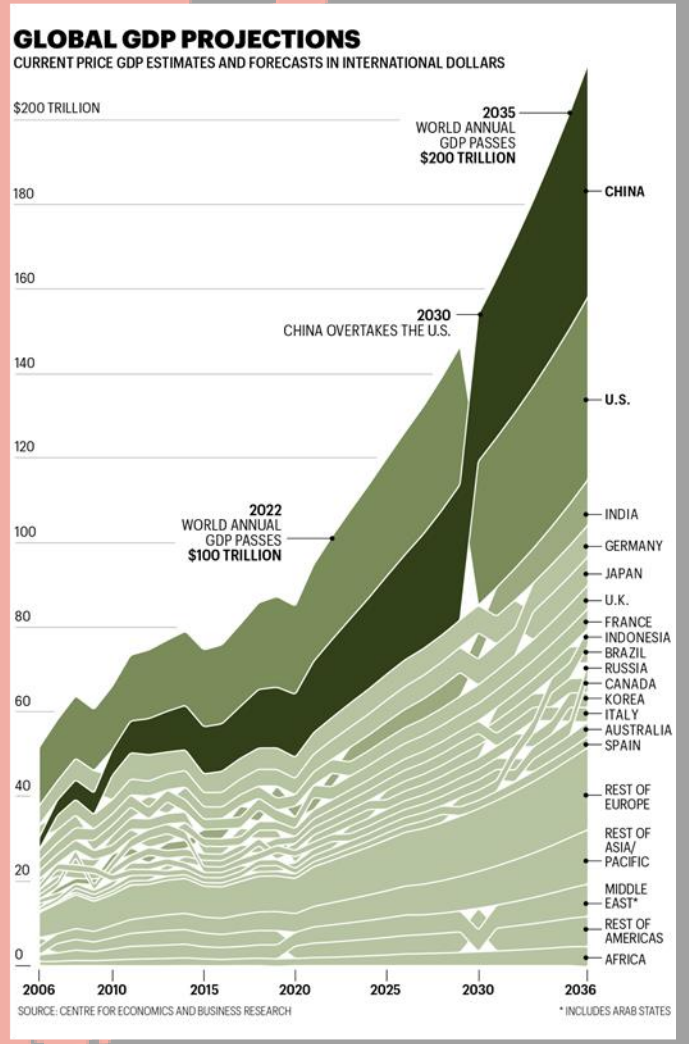
  CIA Director William Burns April 2021

- *"China's military, the People's Liberation Army, plans to match or exceed U.S. capabilities in space to gain the military, economic, and prestige benefits that Washington has accrued from space leadership."*

  Office of the DNI April 2021

- *"China's aggressive pursuit of advanced technologies is "the most immediate threat" to U.S. satellite capabilities and ground infrastructure. "*

  Lt. Gen. B. Chance Saltzman



Military Communications (MilComm) & Positioning, Navigation and Timing (PNT) Directorate Overview

Acquisition & Integration Priorities

Deliver U.S. Space Force's programs quickly, on schedule, and on budget

- Drive speed in acquisitions
- Improve resiliency
- Integrate space with other domains
- Improve project management
- Integrate space and ground systems for delivery

Mr. Frank Calvelli
Assistant Secretary of the Air Force for Space Acquisitions and Integration

Speed in Acquisition

What is SPEED in ACQUISITION?

Management Excellence

- Baseline schedules and hold stakeholders accountable
- Address cost, schedules, staffing, issues/risks proactively
- Add cost/schedule realism as part of our proposal evaluation

Critical Analysis

- Know/verify and track stakeholder capabilities
- Apply existing technology to reduce NRE & shorten development schedules

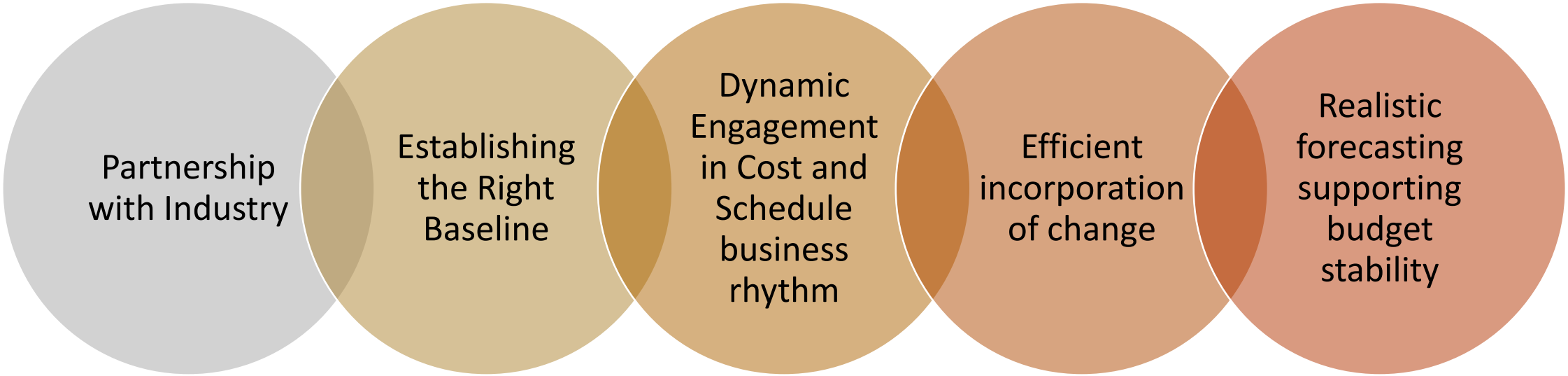
Process Improvement

- Minimize internal acquisition coordination; bureaucracy
- Rapidly definitize contracts and set program baselines
- Think longer term – especially with the budget

WHY DOES IT MATTER?

Getting Back to Basics

Acquisition challenges require shifting **back to basics** with government leadership at ALL levels



"Department of Defense, Interagency, and Industry essential"

MilComm & PNT Mission & Vision

Mission

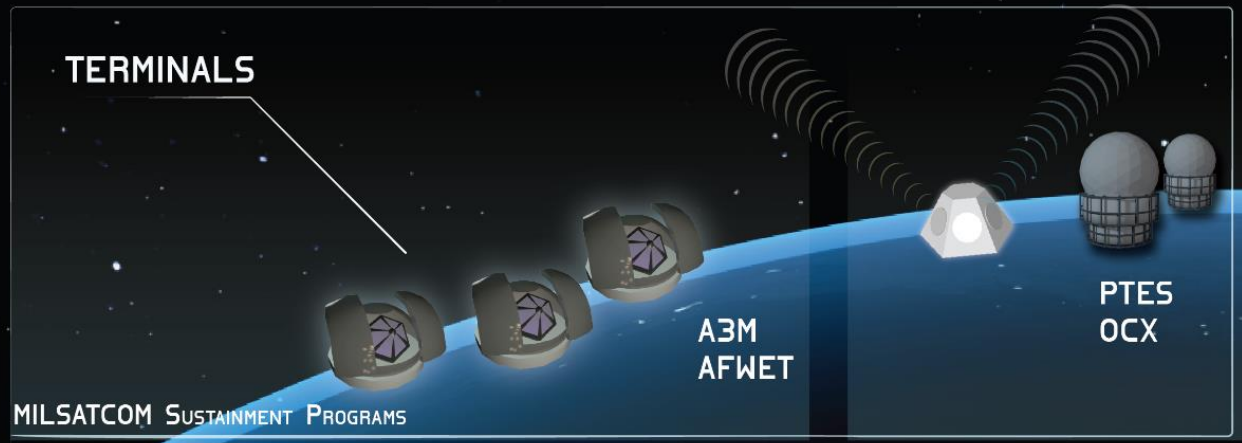
Rapidly deliver premier MilComm and PNT capabilities resilient to the threat by the relentless pursuit of warfighter needs and acquisition excellence

Vision

World-class space professionals connecting people and systems, any time any place, to enable unity of effort across all warfighting domains

Programs in Sustainment

Programs in Development/Production



MILSATCOM Sustainment Programs

Airborne Integrated Terminal Group
Global Broadcast Service
Ground Multi-band Terminal

Aircrew Alerting Communications EMP (AACE)
Air Force Command Post Terminal (AFCPT)
Dual Modem Upgrade (DMU)

EMP Hardened Dispersal Communications (EHDC)
Minuteman MEECN Program (MMP)
Single Channel Anti-Jam Man Portable (SCAMP)

Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)
Family of Advanced Beyond Line of Sight Terminals (FAB-T)
Presidential National Voice Communication (PNVC)

Major GPS Operational Components

Master Control Stn (MCS)
Alt MCS
6 Monitor Stations (MSS)

4 Ground Antennas (GAS)
Architectural Evolution Program (AEP) Software
Positional Training Emulator (PTE)

GPS Information Network (GIN)
SAASM Mission Planning System (SMPS)
Launch, Anomaly, and Disposal Operations (LADO)

Red Dragon Cyber Security Suite (RDCSS)
GPS Interference and Navigation Tool (GIANT)
Telecommunications Simulator Test Station (TSTS)
Consolidated Test Environment (CTE)

MilComm & PNT (SSC/CG)

as of September 2022

PEO
MilComm & PNT
Mr Cordell DeLaPena, Jr.

Executive Officer
MilComm & PNT
Mr David Myung

Deputy Director
MilComm & PNT
Col Cillford Sulham

Deputy PEO
MilComm & PNT
Ms Barbara Baker

IMA to PEO
MilComm & PNT
Col Christopher Jordan

Photo not available

Chief of Staff
MilComm & PNT
Maj Eric Lum

Acq Delta-Tactical SATCOM
Ms Charlotte Gerhart

Protected Tactical SATCOM (PTS)
Mr Justin Bruner

Protected Tactical Enterprise Services (PTES)
Lt Col David Bates

Wideband Global SATCOM
Lt Col Andrew Garcia

Acq Delta-Strategic SATCOM
Col Robert Davis

Evolved Strategic SATCOM (ESS) Ground
Lt Col Paul LaTour

Evolved Strategic SATCOM (ESS) Space
VACANT

Enhanced Polar System Recapitalization
Lt Col Justin Deifel

Acq Delta-Narrowband SATCOM
CAPT Peter Sheehy

Mobile User Objective Baseline Space
Mr Ramin Heshmati

Mobile User Objective Baseline Ground
Mr David Hartzog

Mobile User Objective SLE Space
Mr John Hurthere

Acq Delta – GPS
Col Jung Ha

GPS III
Mr Scott Thomas

GPS IIIF
Ms Katherine Coens

Acq Delta-GPS User Equipment
Col Matthew Spencer

MGUE Inc 1
Lt Col Gregory Smith

MGUE Inc 2
Lt Col David Edsen

Foreign Military Sales
Mr Eddy Emile

GPS Certifications
Lt Col Patrick Spencer

Acq Delta-GPS Ground C2
Lt Col Mark Cooper, Deputy

OCX
Lt Col Matthew Schmunk

OCX 3F
Lt Col Jacob Hempen

Product Support Delta-MILSATCOM
Mr George Gonzales

Product Support Delta GPS
Mr Bruno Mediate

Engineering
Mr Marcus McInnis

Finance
Mr Lucas Sprenger

Acquisition Logistics
Mr Marvin Lucas

Mission Services
Mr John Traversa

Ops Transition
Col Heather Anderson

Contracting
Mr Roy Lee

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MILITARY COMMUNICATIONS & PNT BY THE NUMBERS

1800+
active duty, civilian and contractor employees

4 GPS
Monitoring Stations, Mission Planning Systems,
& primary/backup Control Stations --antennas

17 *17 Satellites/Payloads in production*

- WGS 11+ (1)
- GPS III (5)
- GPS IIIF (7)
- MUOS (2)
- EPS-R (2)

FY22-27
FY22-27 total budget $20.9 billion

26 *Active Programs*

9 *Systems in Sustainment*

- 7 ACAT I Programs
- 1 ACAT II Program
- 4 ACAT III Programs
- 5 MTAs
- 9 AML Exempt

Over 2Million Units
of GPS User Equipment (UE) fielded with next-gen Military GPS UE starting to field

8 Ground Systems

satellite systems in sustainment

GPS satellites

- 12 GPS IIR
- 8 GPS IIR-M
- 12 GPS IIF
- 5 GPS III

satellite systems in sustainment

34 SATCOM satellites

- 6 AEHF
- 6 DSCS
- 2 EPS
- 5 MILSTAR
- 5 MUOS
- 10 WGS

400,000
Over 400,00 GPS User Equipment (UE) sold through GPS Foreign Military Sales (FMS)

More than **75** GPS FMS cases in work and active engagement with 59 allied nations

2600+ **2600+ SATCOM Terminals**

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GPS: Beyond Defense

High precision GPS enables greener infrastructure

MUNICIPAL SERVICES

GPS can be used for real-time tracking of **garbage trucks, snowplows,** and **buses,** leading to substantial savings in **dollars, fuel,** and **time.**

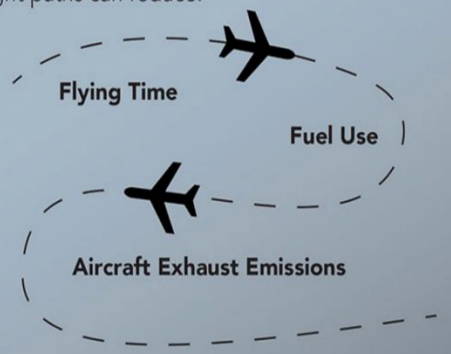
In Niles, IL, the Department of Public Works used GPS to optimize the routing of snowplows, leading to:[3]

40% Reduction in the use of salt

700+ Tons of salt saved

TRANSPORTATION

GPS is at the heart of the FAA's Next Generation Air Transportation System. GPS enabled optimized flight paths can reduce:



AGRICULTURE

By **2030**, GPS-enabled precision agriculture can save **180 billion cubic meters of water.**[1]

The use of GPS guidance systems on 10% of planted acres in the U.S. each year would reduce:[2]

- Fuel use by **16 million gallons**
- Herbicide use by **2 million quarts**
- Insecticide use by **4 million pounds**

CONSTRUCTION

High-precision GPS is used to support the building of roads, bridges, and other infrastructure projects.

Projects utilizing GPS can:

- Reduce wetland impacts
- Reduce impact to sensitive species
- Reduce landslide risks
- Reduce residential displacement
- Minimize impact on existing utilities

Autonomous Vehicles

Public Safety

Finance

- All financial services use GPS to timestamp financial transactions, match trading orders, and synchronize financial computer systems
- Since the 1980s, GPS has provided $1.4 trillion in US economic benefits. If a GPS outage were to occur, it is estimated to be as costly as 1 billion USD per day. ***Up to $45 Billion if a 30-day outage were to occur***

Questions