National Security Space Office

Turning Architectures into Capabilities

National Security Space Policy and Architecture Symposium

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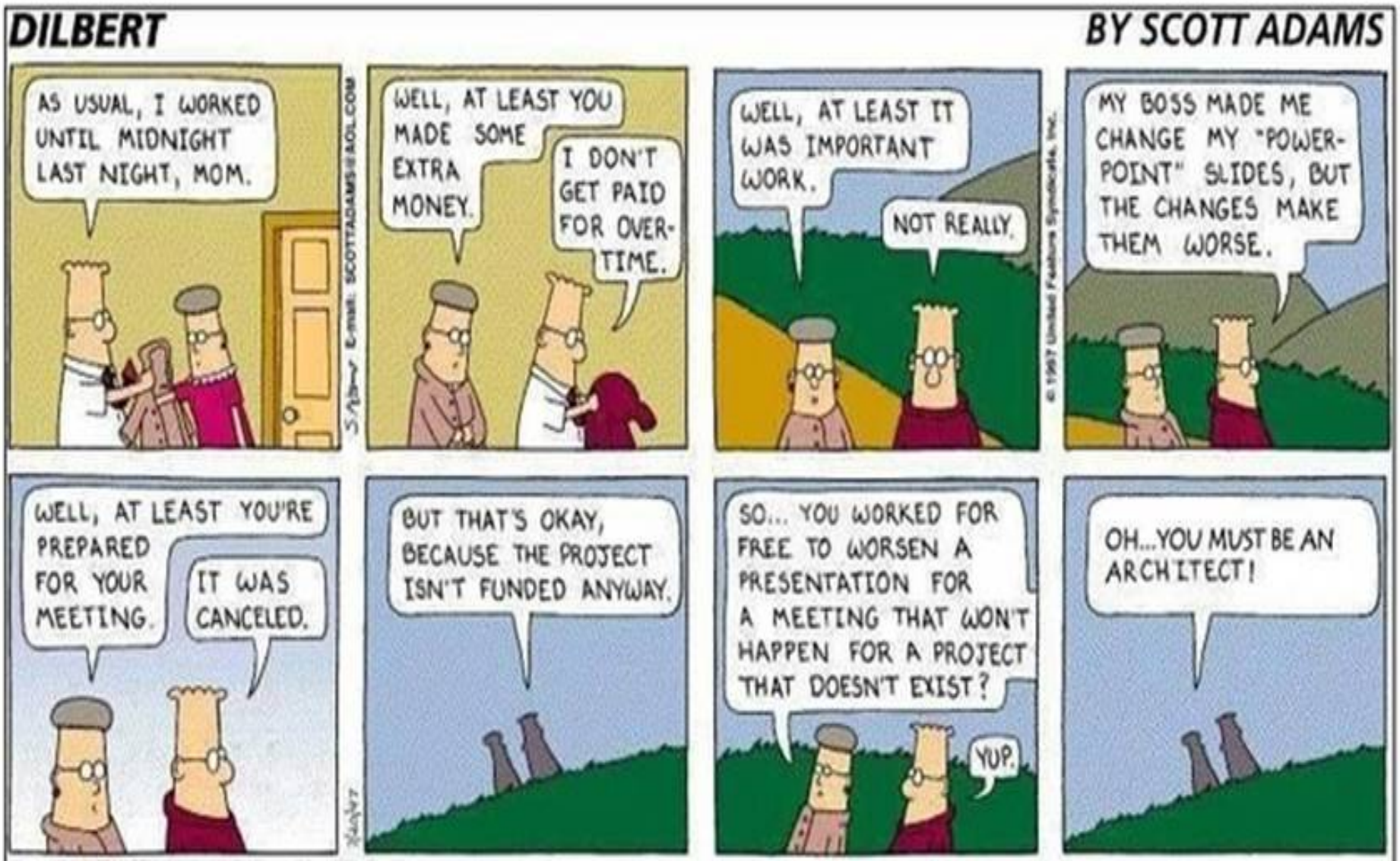
1 February 2007

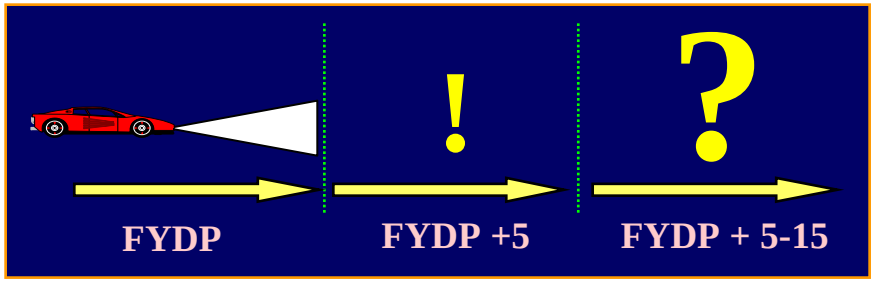


National Security Space Office (NSSO) Background

- NSSO primary roles:
  - Staff Support to DoD Executive Agent for Space
  - NSS Architect (NSSA)
- NSSA established by 1998 MOU for NSS Management between SecDef (Cohen) and DCI (Tenet)
  - “Ensure activities are closely coordinated and architectures are integrated to maximum…”
- Support Decision-making

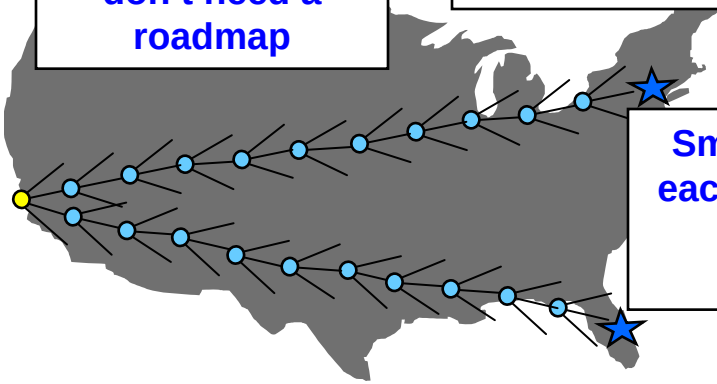
Architectures: What they are and aren't

- **Provide framework and context**
  - Much like city planning
  - Versus designing a specific building
- **Recommendations that guide long term actions**
  - Focus on ultimate destination
  - Versus the next exit & meal stops or what's within range of the headlights
- **Characteristics or objectives that influence decisions**
  - Allows flexibility in moving towards objective
  - Versus specific system implementations



If all we want to do is go east, we don't need a roadmap

However if we have a preference for destination, then...

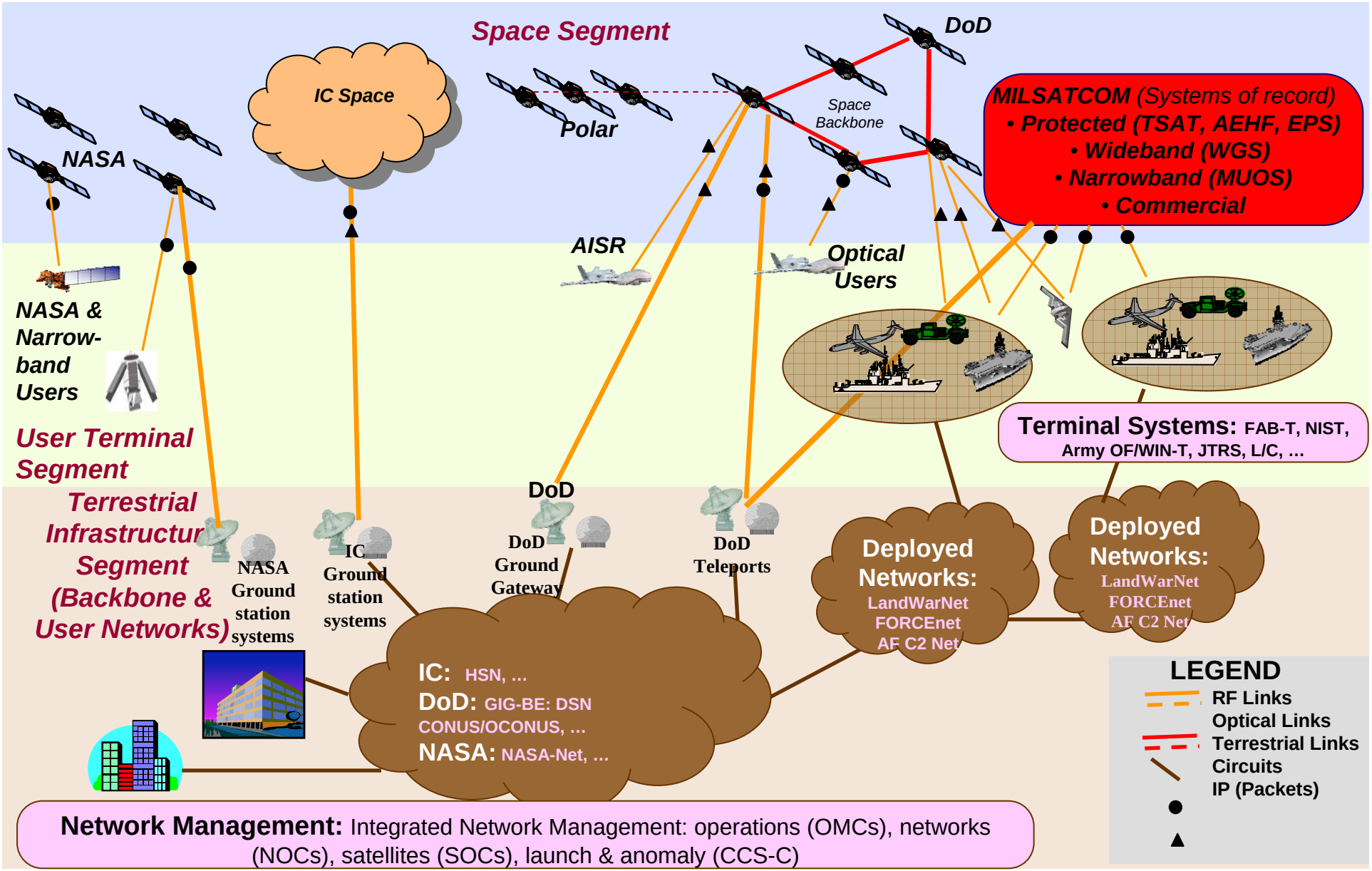


Small adjustments at each intersection have a big impact at journey's end

Architectures: What makes them successful

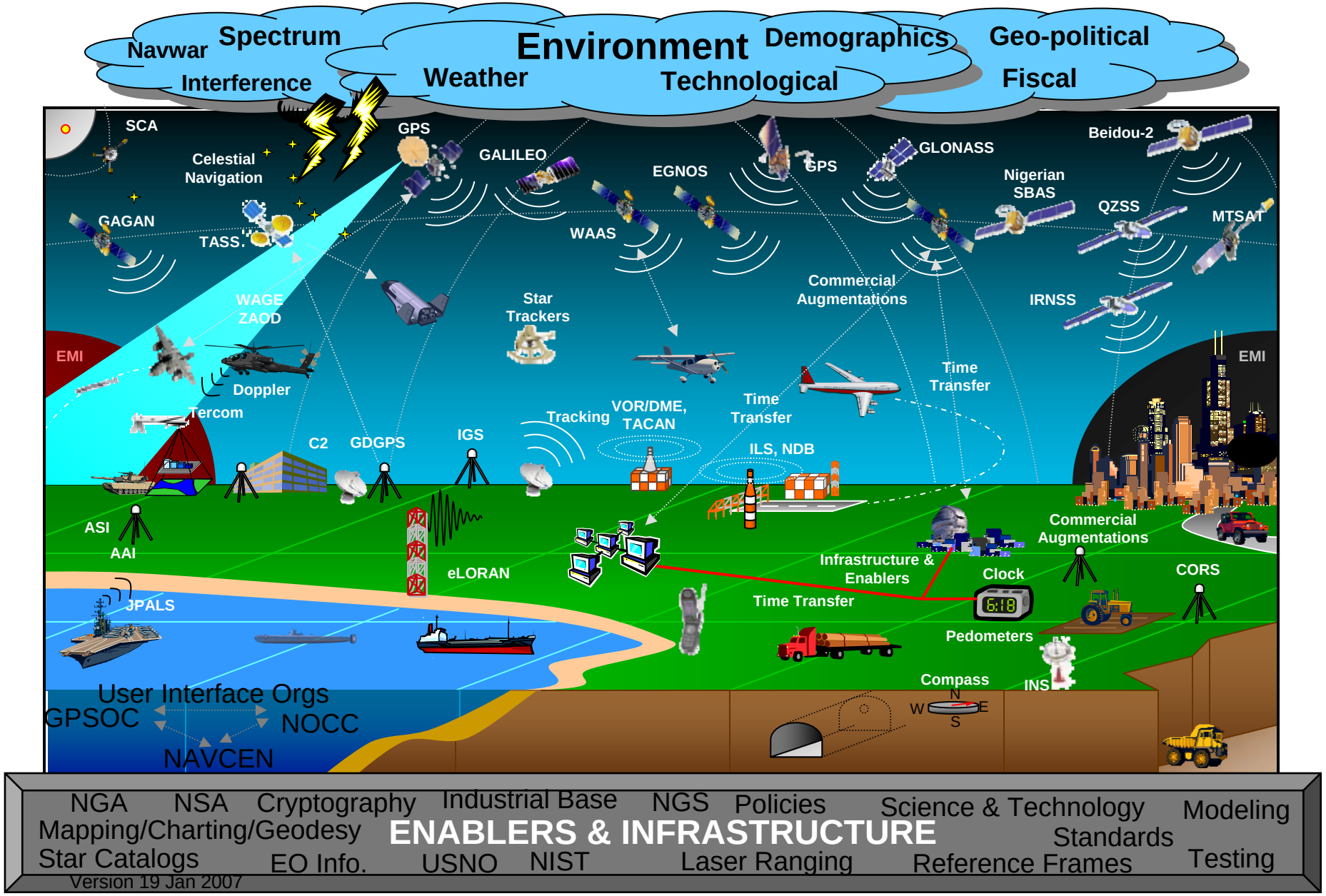
- Context
  - End to end mission, all platforms
  - Interfaces with other missions and mediums
- Dynamic
  - Continuous assessment to address “facts of life”
- “Enforceable”
  - Enough detail to support implementable decisions
- Transparent
  - Impartial build of “should be” architecture
- Senior leadership participation
  - Agreed evaluation criteria
  - Organizational data sharing

SATCOM Architecture
TCA Version 2.0



Position, Navigation, and Timing (PNT)

Evolved Baseline (2025) - Operational View



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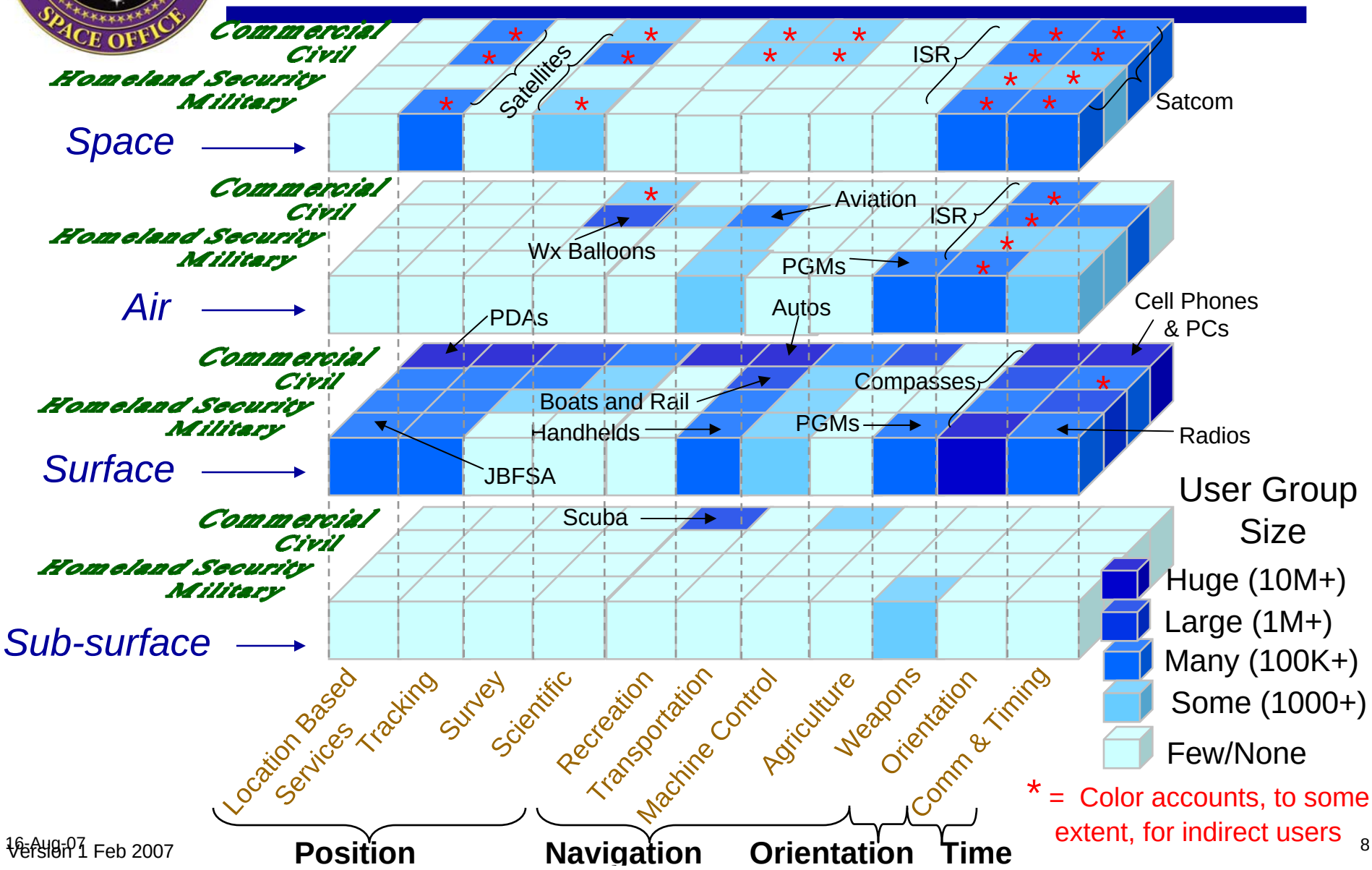
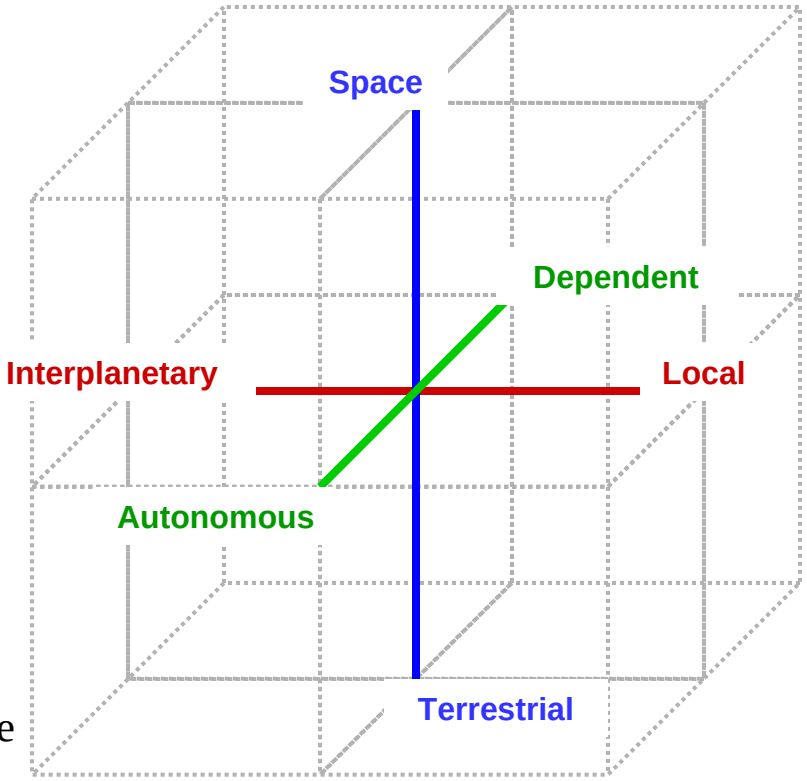
PNT User Perspectives (2025)



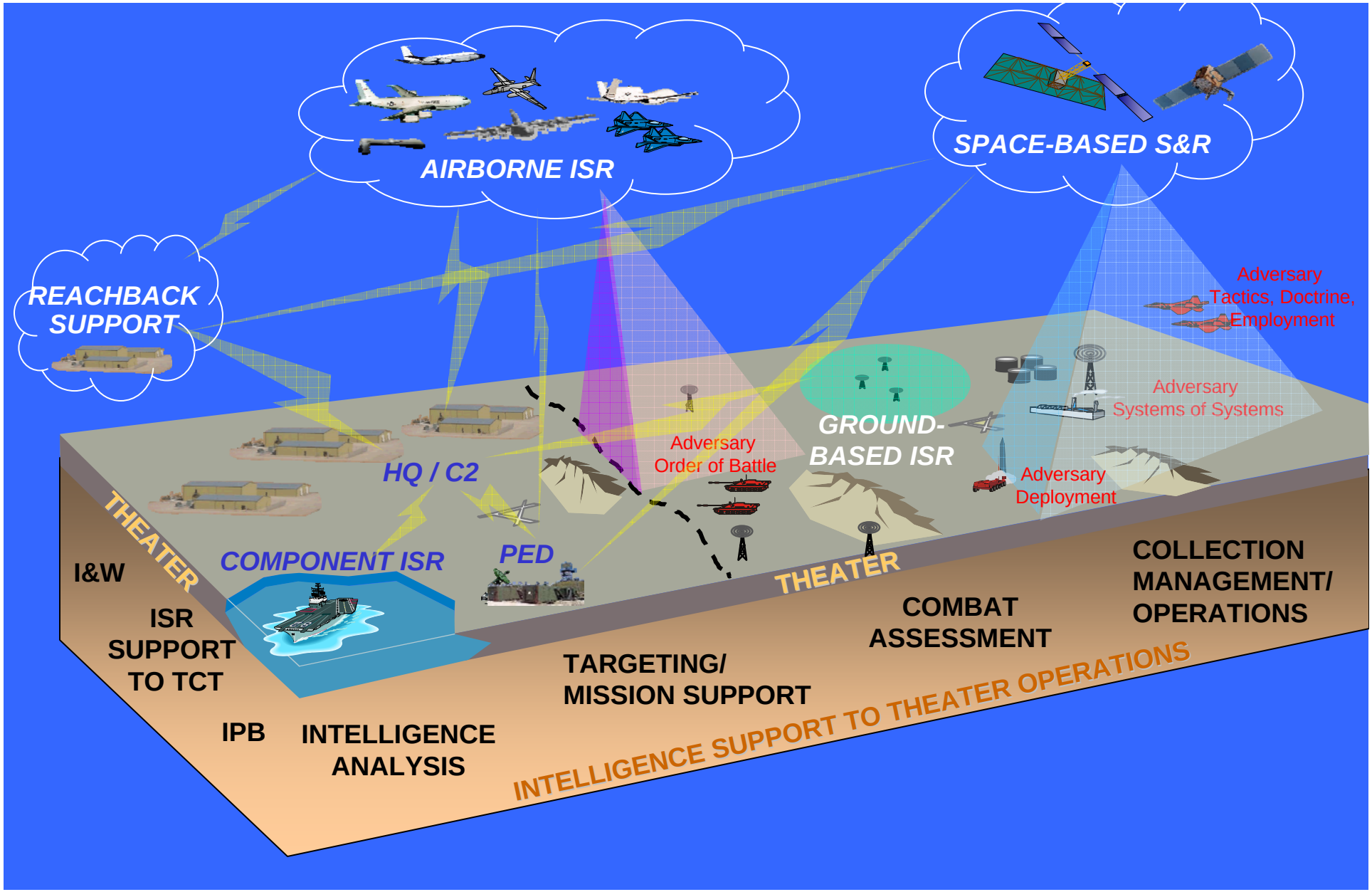
PNT Architecture Trade Axes

- **Source Location** (of the service provider)
  - Terrestrial: concept provides service from, near, or beneath the surface of the earth
  - Space: concept provides service from space
- **Service Volume** (of the service provided)
  - Local: concept provides a meaningful service only at a fixed point
  - Interplanetary: concept provides a meaningful service throughout the solar system
- **Autonomy** (of the user)
  - Dependent: concept requires frequent refresh of information from external sources to provide a meaningful service
  - Autonomous: concept, once initialized, is self-contained; requires no refresh of info from external sources to provide meaningful service

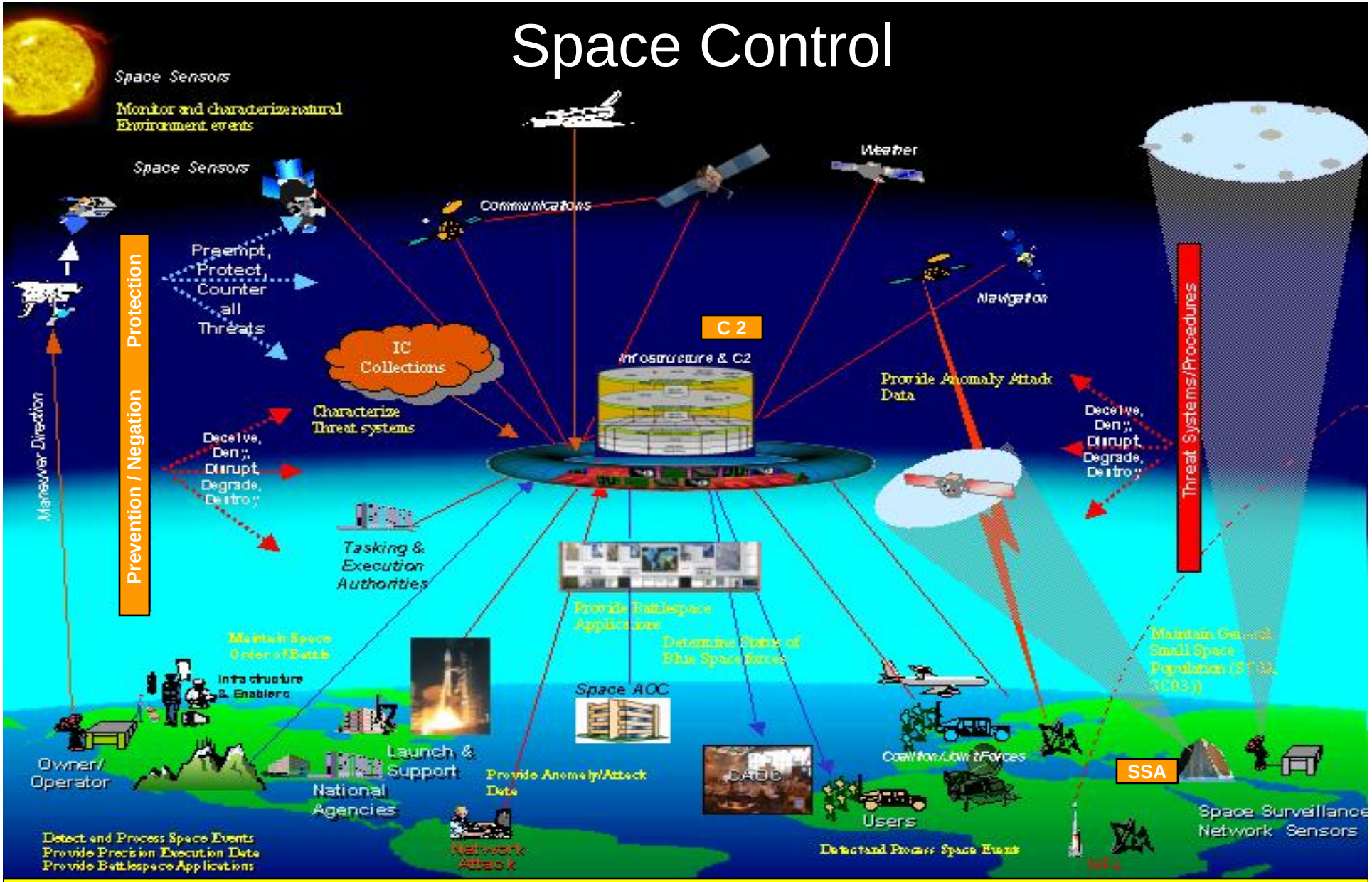


TRADE AXES ENSURE CONSIDERATION OF A FULL RANGE OF ARCHITECTURAL OPTIONS

Intelligence, Surveillance, and Reconnaissance (ISR) Architecture



Space Control



Assuring access to Space for US & Allied Forces
Denying access to our Adversaries

Summary

- Vision and planning across the community is needed to maintain US preeminence

- Build the bridge from both sides



It's time to stop acting "systems" and start acting architectures

Backup Slides

Space Architectural Vectors

- Decision-makers demanding capability-based architecture context to make individual system choices
  - Can't think single mission – multiple missions, multiple platforms, multiple orbits
  - Can't think statically – architectures must be continually assessed to address new "facts of life"

NSSO Enterprise Architectures

- Mission areas
  - Transformational Communications Architecture (TCA 2.0)
  - Position, Navigation, & Timing (PNT)
  - Intelligence, Surveillance, & Reconnaissance (ISR)
  - Space Control, Including Space Situational Awareness (SSA)
- Responsive Space Operations
  - Policy Definitions
  - STRATCOM Tiers
  - Congressional Language

Architectures

- What makes a successful architecture?
  - Senior leadership participation and buy-in
  - Examples
    - SATCOM
    - ISR
    - PNT
    - ORS

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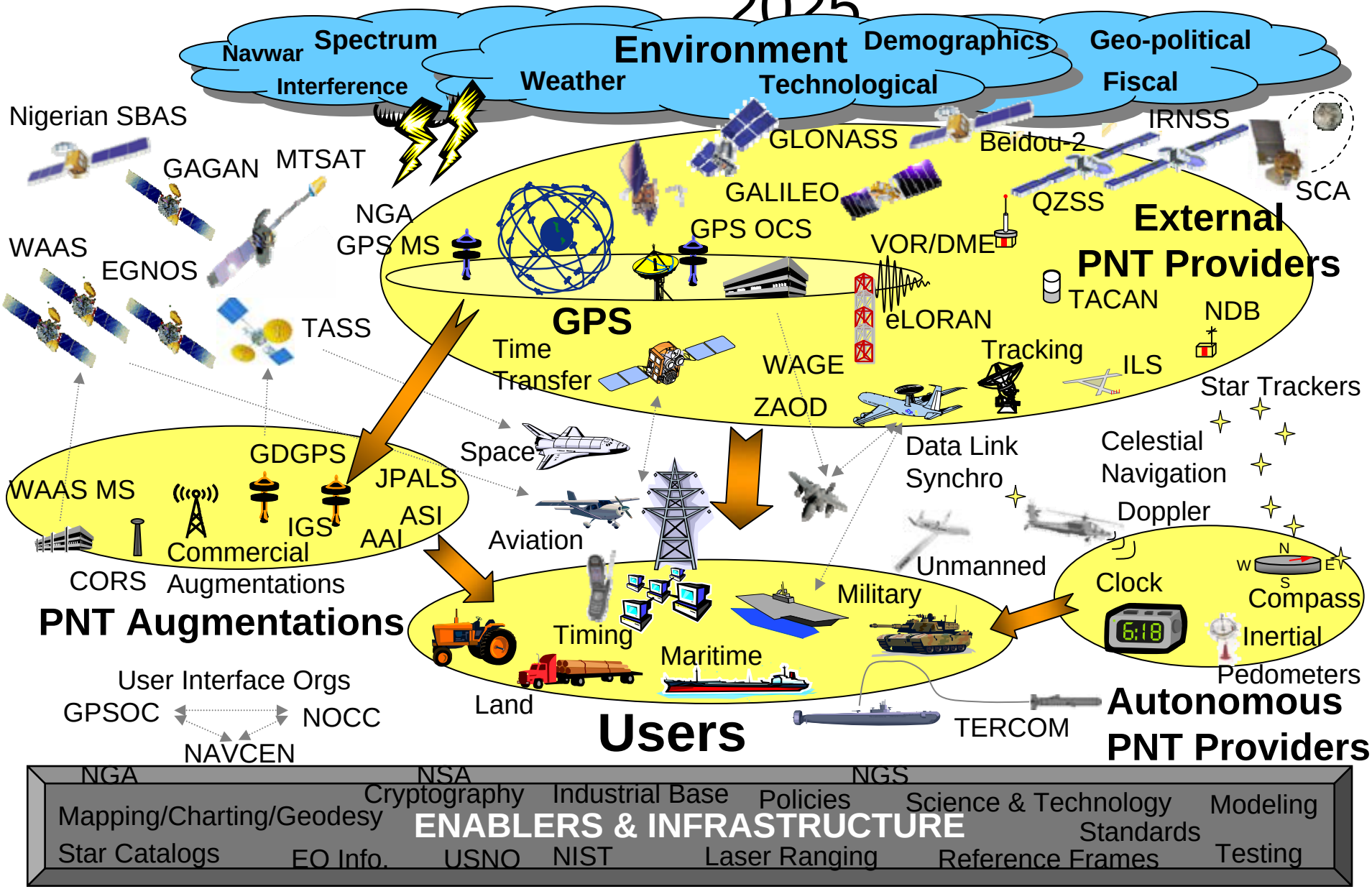
Draft PNT Evolved Baseline Architecture, 2025



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Conclusion

- Need SecDef-DNI MOU (Good)
- NASA Agreement (Better)
- NSC-SSG Buy-In (Best)

National Security Space: Past the Tipping Point

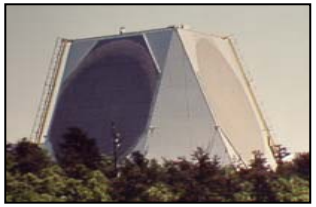
- Growing dependence, expanded missions
- Contested domain
- Small satellite and responsive technology coming of age
- New leadership continuing recovery from 90's acquisition reform
- Institutional changes – DNI and DHS
- Resource crunch
- Information age impact: increasing inter-dependence

Space Control

Space Policy (DoDD 3100.10, 1999)

SSA

- Provide Situational Awareness of Space Events & Activities
- Worldwide
  - Ground Radar
  - Optical Telescopes
  - Space Sensors

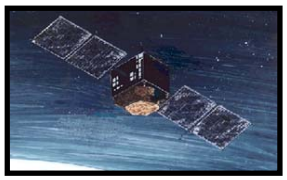


Protection

- Detect, Identify, Report, Characterize, and Assess Attacks
- Enhance Survivability
  - Maneuver
  - Hardening
  - Redundancy

Negation

- Negate the Ability for Adversaries to Exploit Their Space Forces



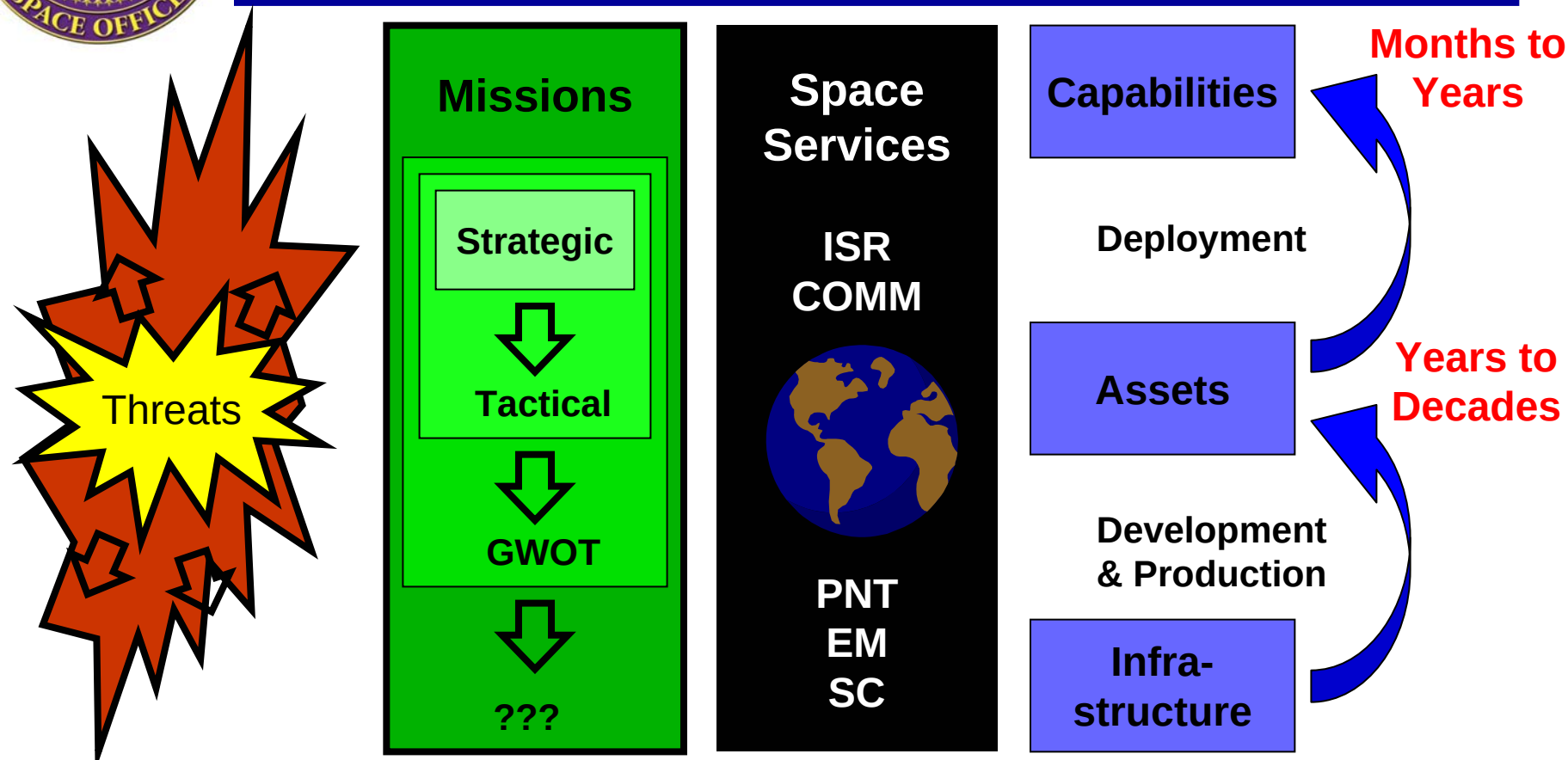
Prevention

- Prevent Adversaries from Exploiting US or 3rd Party Space Systems & Services
  - NAVWAR
  - Shutter Control

Battle management, command, control communications, and intelligence (BMC3I)

Operationally Responsive Space

RSO Architecture Scope



ISR: Intelligence Surveillance & Reconnaissance
PNT: Position Navigation & Timing
GWOT: Global War on Terrorism
EM: Environmental Monitoring
SC: Space Control

Evolving & Unpredictable Threat

Expanding Range of Missions

Increasing Demand for Services