DELIVERING RESILIENT CAPABILITY AT SPEED

Mr. Burke "Wild" Hare, SDA-South Site Director

2 May 2025

SEMPER CITIUS

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SDA
SPACE DEVELOPMENT AGENCY

SEMPER CITIUS

In Latin, it means “always faster.” SDA recognizes that good enough capabilities in the hands of the joint warfighter sooner may be better than delivering the perfect solution too late. Because of this, it means we as an agency accept a higher level of risk, employ novel business models, and move to develop and field capabilities more quickly than you might see in “traditional” government agencies. We believe this builds resiliency into our people and our product—the Proliferated Warfighter Space Architecture.

When we say “semper citius,” we mean that we are moving at or ahead of the speed of the threat because we know the joint warfighter is counting on us.

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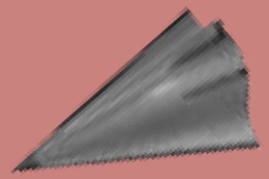
Focus

Beyond-Line-Of-Sight (BLOS) targeting for time-sensitive ground, maritime, and air targets



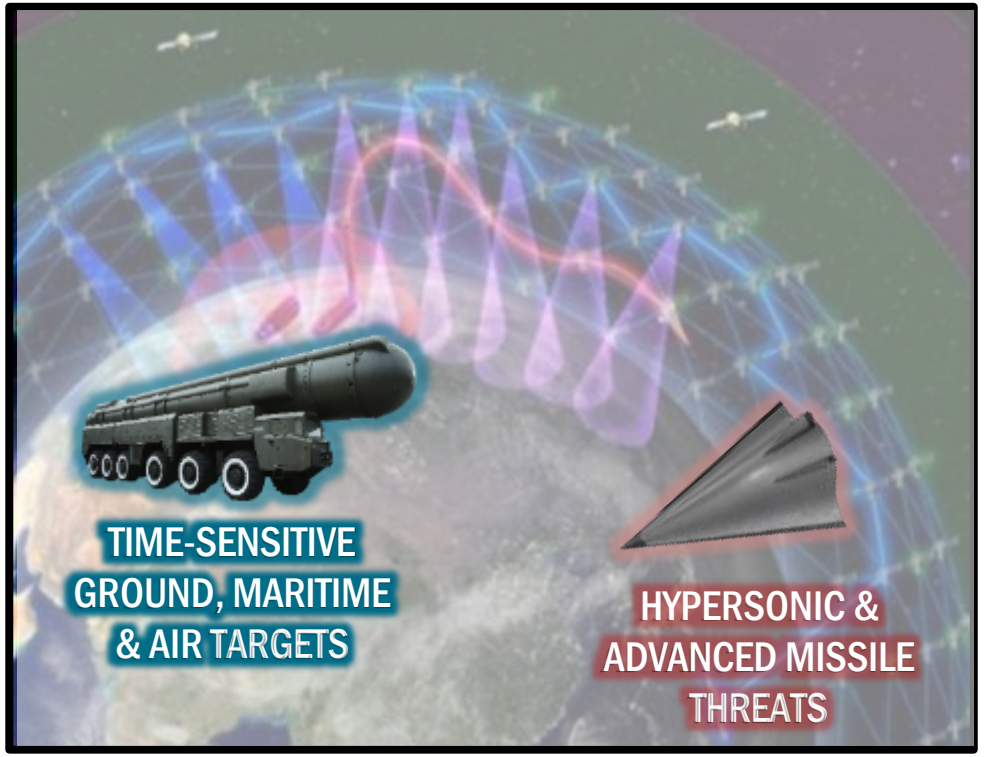
Hypersonic and advanced missile threat warning and tracking

SDA's architecture endeavors to perform the following functions from space:

- Detect threat systems
- Track threat systems
- Identify threat systems
- Develop targeting solutions
- Distribute targeting data directly to warfighters

...to close kill chains precisely and at a currently unattainable pace

Define and monitor the Department's future, threat-driven space architecture and accelerate the development and fielding of next-generation space capabilities



Resilient military sensing and low-latency data transport by means of a proliferated low-earth orbit space architecture

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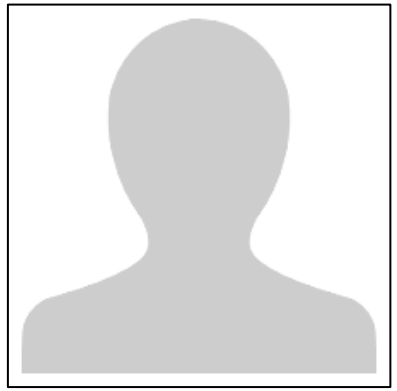
SDA IN THE DEPT. OF THE AIR FORCE

GENERAL B. CHANCE SALTZMAN

Chief of Space Operations, United States Space Force



Assistant Secretary of the Air Force for Space Acquisition and Integration

Vice Chief of Space Operations

Office of the Chief of Space Ops

Space Operations Command

Space Training & Readiness Command

Space Systems Command

Space Rapid Capabilities Office

SDA Director (to CSO/PEO for the PWSA*)

**Proliferated Warfighter Space Architecture*

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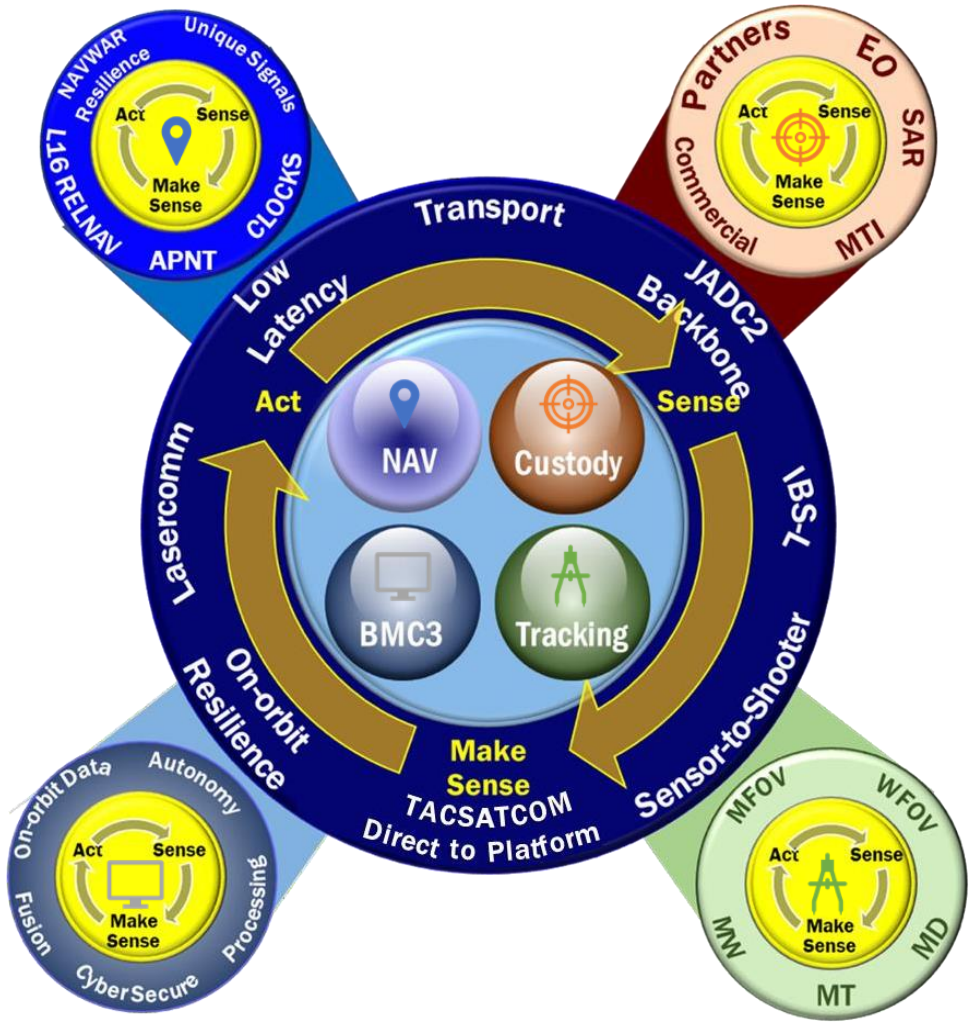
The Proliferated Warfighter Space Architecture: A Global Weapons System

- **Vision:** Space-based systems of systems providing surveillance and targeting as a service
  - Cornerstones
    - National, tactical, commercial-based target Custody, including mission partner contributions.
    - 24/7/365 Tracking (MW, MT, MD, fire control quality information)
    - On-orbit, cyber secure BMC3
    - Alternate Position, Navigation and Timing providing critical anchor in GPS-denied environments
  - Enabled by a proliferated, resilient, low-latency, global, mesh Transport network
  - Advancing tech through ecosystem-wide Futures Program



SDA leverages Spiral Development to deploy and *proliferate* new technology into the PWSA every two years, called a "tranche", to continually *increase capability* used by the warfighter.

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SDA Business Model and Commercial Space

SDA's business model supports the use of commercial space technologies and capabilities and commercially owned and operated services to *develop*, *augment* and *improve* the PWSA

Spiral Development

SDA Incorporates new technologies and capabilities every two years

Competitive Marketplace

SDA predictably solicits for new capabilities through competitive solicitations

Interoperability

Development of standards and open systems architecture

Affordability

Acquisition of commercial commoditized spacecraft and purchasing at scale to drive down cost

SDA Business Model is aligned with USSF and DoD level Commercial Space Integration Strategies

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Tranche Descriptions

0 Tranche 0 (FY22) – *Warfighter immersion:* Demonstrated the feasibility of a proliferated architecture in cost, schedule, and scalability toward necessary performance for beyond line of sight targeting and advanced missile detection and tracking.

1 Tranche 1 (FY24) – *Initial warfighting capability:* Regional persistence for Link 16, advanced missile detection, and beyond line of sight targeting plus demonstration of UHF and S-band tactical satellite communications.

2 Tranche 2 (FY26) - *Enhanced warfighting capability:* Global persistence for all in Tranche 1 plus demonstration of advanced tactical data link(s) and future proliferated missions.

3 Tranche 3 (FY28) – *Sustained capability:* Advanced improvements over Tranche 2 plus future warfighting applications. This includes better sensitivity and accuracy for missile tracking, better targeting capabilities for BLOS, additional PNT capabilities, advances in lasercom, tactical data links, and RF communications, and advancements in autonomous operations.

4 Tranche 4 (FY30) – *Autonomous operations:* continual advances across the architecture.

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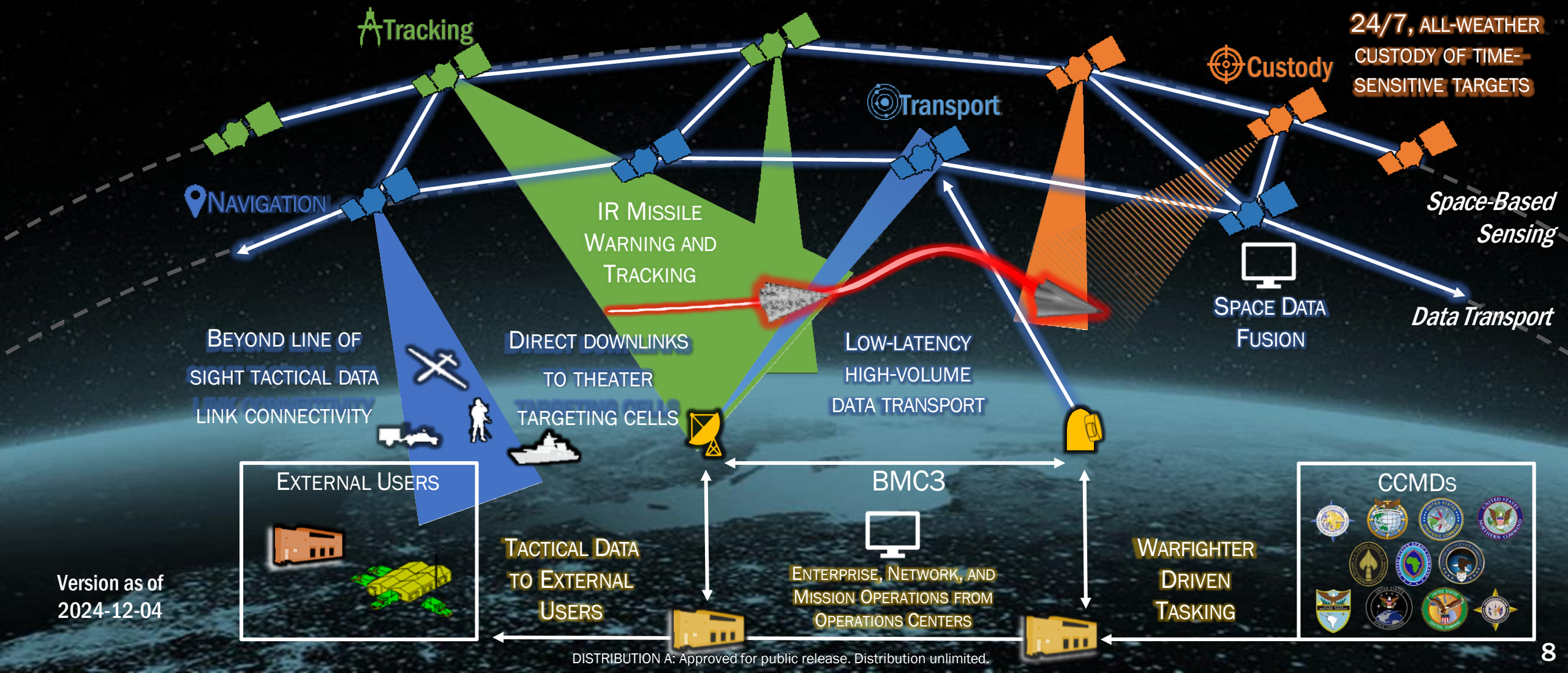
PROLIFERATED WARFIGHTER SPACE ARCHITECTURE

The Proliferated Warfighter Space Architecture (PWSA) is a proliferated constellation of hundreds of satellites, in low Earth Orbit, delivering capability at speed to the warfighter.



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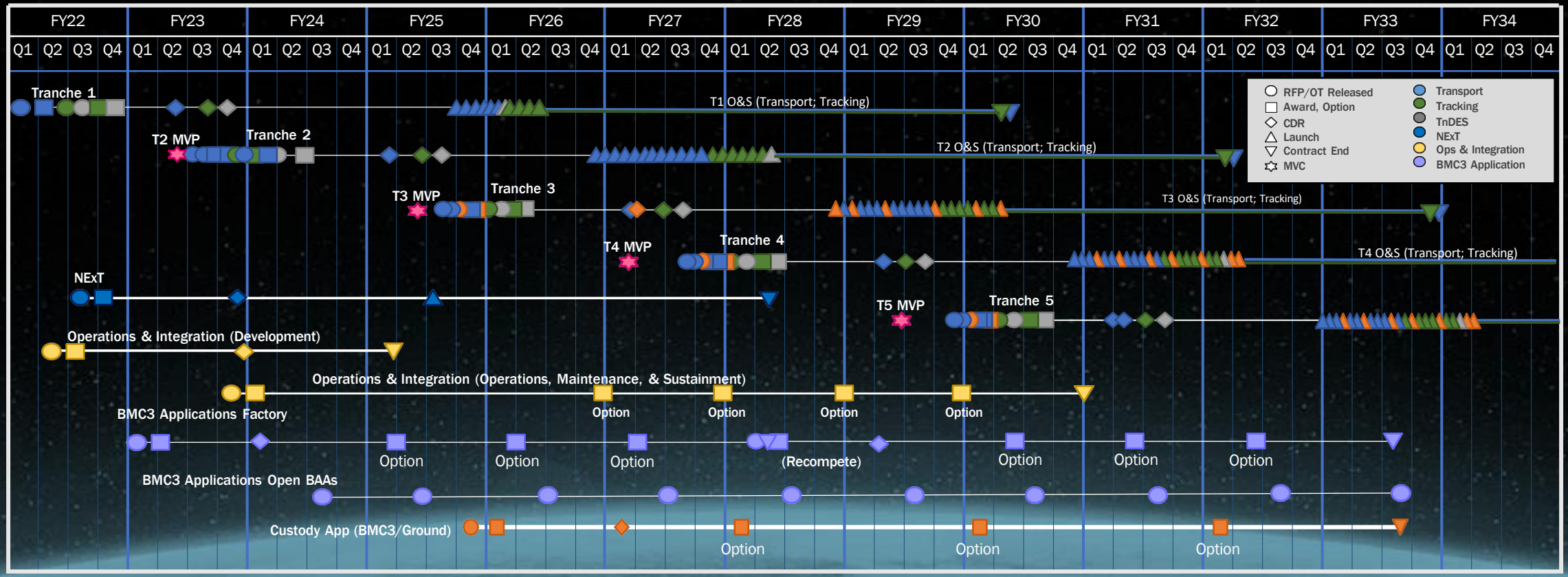
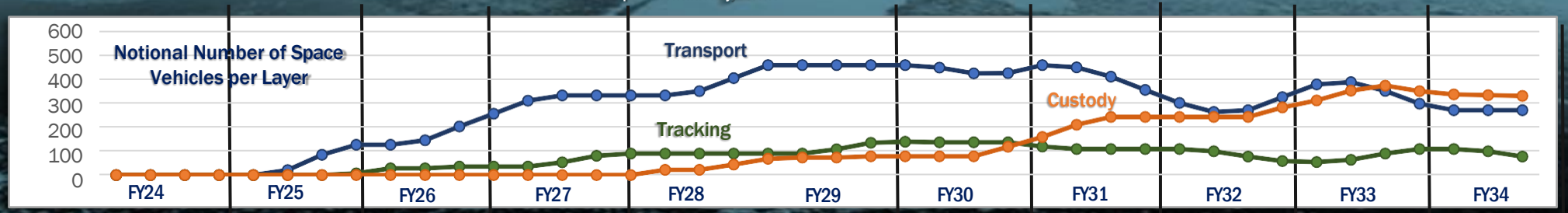
PWSA Deployment



BMC3: Battle Management Command, Control, Communications
PWSA: Proliferated Warfighter Space Architecture

NExT: PWSA Experimental Testbed
TnDES: Tranche n Demonstration and Experimentation Systems



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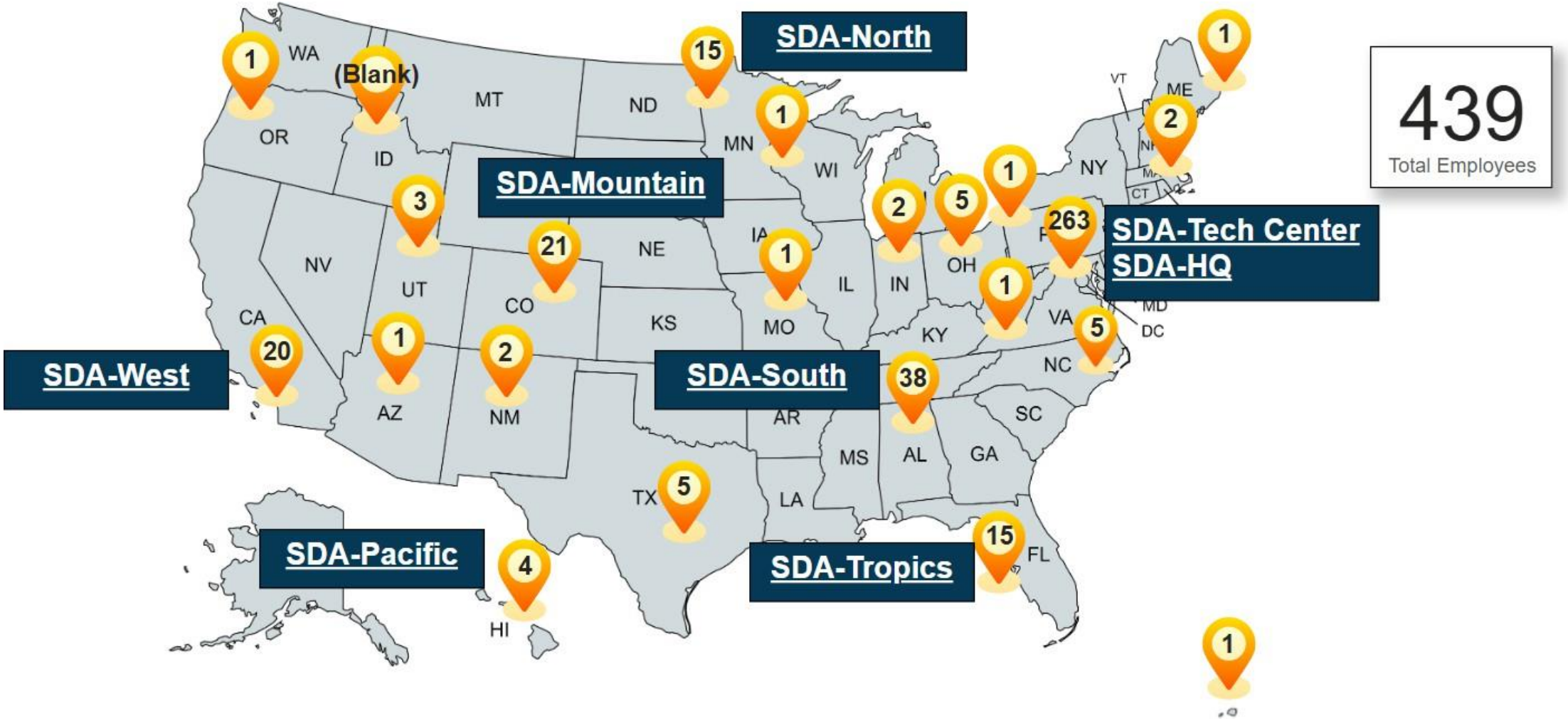
A Distributed Organization



WHAT IS "SDA-SOUTH" ? (1/2)

- SDA-South Missions: PWSA Space Operations, PWSA Demonstration Space Operations and SDA Technical Support Cells
- Tranche-1 Operations Center-South (OC-S) status:
  - On Schedule to be ready for PWSA Tranche 1 Operations
  - Leveraged Existing Redstone Arsenal Facility
  - Redstone Arsenal Garrison Department of Public Works performed Refurbishment
  - Refurbishment Contract Awarded on Time FY22 –Completed in 18 Months (July 2024)

SDA Operations Center-South is a Space Development Agency Command and Control Center in Huntsville, Alabama that will be a key center of gravity for SDA Operations.

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WHAT IS "SDA-SOUTH" ? (2/2)

- SDA-South Missions: PWSA Space Operations, PWSA Demonstration Space Operations and SDA Mission Cell Technical Support
- SDA-South personnel footprint to grow with deployment of PWSA Tranches.
  - SDA-South Site Director
  - Security
  - Tranche 0, 1, 2
  - Space Vehicle Engineering
  - Emerging Capabilities
  - Warfighter Integration
  - Enterprise Operations
  - Space Operations
  - BMC3

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SDA 2024 Year in

Acquisition Excellence

120+ agreements completed in 2024 valued at more than **$5.6B**

54 awards to small businesses valued at more than **$64M**

19 non-traditional defense space companies for initial HALO Vendor Pool under PWSA Futures

112 days from RFP to Contract Award, Mainlining Speed of Acquisition

AFC
SDA establishes Advance Fire Control Program

T2
Tranche 2 Contract Hardware awards complete

SDA's Spiral Development Model Now Spans the Full Spectrum

T0	T1	T2	T3
On Orbit	In Build	In Design	In Planning

SDA Turns 5

SDA workforce grows to more than **400** employees

~$14M SDA Personnel

Executing a budget of ~$4.6B, SDA is as much as **10x** more efficient than other government acquisition organizations.

Technical Execution and Excellence

Tranche 0 SVs successfully demonstrate Warfighting Capability

Link 16

Successful Link-16 space to theater bidirectional communications

Established space-to-space optical links using SDA-compliant OCTs.

Optical Links

WFOV

Tranche 0 SVS Demonstrate Tracking Capability

Tranche 1: Ready for Launch 2025

x2

SDA completed the SDA Operations Centers

SDA ground entry point established in partnership with Norway's Ministry of Defense.

Optical Interoperability Established for all Tranche 1 OCT Vendors.

Tranche 2: Preliminary Design, Complete

The Warfighter is our Customer

Tranche 3: Ready to Acquire

Warfighter Concurrence for PWSA Tranche 3 Transport Layer and Tracking Layer Minimum Viable Capability (MVC)

Warfighter Immersion

Warfighters exposed to future PWSA capability via "live" participation of Tranche 0 SVs in Warfighter exercises and wargames.

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WAY AHEAD

- SDA is a constructive disruptor - and demonstrate and field needed capabilities faster and cheaper
- SDA's two main pillars are proliferation and spiral development;
- Delivery status
  - Tranche 0 On-Orbit, performing demonstrations
  - Tranche 1 in Assembly, Integration and Testing; Launch to begin in summer 2025
  - Tranche 2 in design; Launch to begin in late 2026
  - Tranche 3 acquisition in progress
- SDA is creating a marketplace to strengthen the space industrial base through scheduled solicitations, agnostic of incumbents
  - Leveraging OTAs for acquisitions; Firm-Fixed-Price contract awards
  - Important for industry to bid realistically and deliver to capability based on established schedule
  - Carry forward lessons learned with planning, development and deployment of PWSA Tranches
- SDA is leading standards that are being adopted by industry
  - Industry driving toward interoperability, compatibility.
- Current Challenges:
  - Legacy thinking still trying to derail SDA – "slow down", "prioritize 'better' over 'good enough'", "Need to follow legacy processes"
  - Manage and mitigate supply chain impacts to PWSA delivery

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DELIVERING CAPABILITY

PWSA Layer	Tranche 1 (2025)	Tranche 2 (2027)	Tranche 3 (2029)
Data & Comm Transport	Persistent regional access • Low-latency data connectivity • Data directly to tactical elements • Dissemination to theater targeting cells • Tactical SATCOM / IBS demo	Persistent global access • Low-latency data connectivity • Data directly to tactical elements • Dissemination to theater targeting cells • Tactical SATCOM / IBS	Advanced Persistent global access • Sustainment of T2 capability (robust L-16, TACSATCOM, IBS) • New Link-16 waveforms • Persistent IBS, S-and L-Band TACSATCOM • New TACSATCOM waveforms • Translator Sats for advanced networking
Advanced Missile Tracking	Near Global Mono Coverage MW/MT capability • For detection & tracking of HGVs & other conventional and advanced missile threats • MFOV fire control demo in operational system • Use of existing MW/MT architectures and message formats	Near Global Stereo Coverage MW/MT capability • For detection & tracking of HGVs & other conventional and advanced missile threats • Targeting quality data • Preliminary Missile Defense capability	Continuous Global stereo Coverage MW/MT capability • Sustainment of T2 capability • Increased Missile Defense (MD) Coverage • Increased Resiliency
Custody	• Periodic regional access with multiple sensing types via mission partner contributions • Demonstrate on-orbit fusion	• Periodic global access with multiple sensing types via mission partner contributions • Enhanced on-orbit fusion	• Global access with multiple sensing types via PWSA and mission partner contributions • Integration of additional tracking missions
Navigation	• NAVWAR Resilient PWSA PNT Operations • PNT Situational Awareness • SDA GPS Independent Timing Service (Optical, Ka, Link-16)	• Further proliferation of T1 navigation capabilities to T2 PWSA constellation. • SDA PNT Signal Service Demonstrations (L-Band, TACSATCOM)	• Expanded NAVWAR Resilience • S-NAV Signal Service • Advanced PNT SA Sensor • COMNAV fusion

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DELIVERING CAPABILITY AT AN AFFORDABLE COST

SDA IS ON PACE TO DELIVER INITIAL SPACE TRANSPORT CAPABILITIES ON THE AGENCY'S ORIGINALLY-ADVERTISED SCHEDULE AT A PRICE POINT ONCE DEEMED UNACHIEVABLE

$15-25 Million
Price per Transport satellite published in SDA's original budget.

~$15 Million
Average price per satellite for SDA's 20 satellite Tranche 0 Transport Layer.
(Includes Non-Recurring Engineering costs)

~$14 Million
Approximate price per Tranche 1 Transport Layer satellite.

~$13 Million
Approximate price per Tranche 2 Transport Layer Alpha variant satellite at contract award.

*Estimated costs do not include launches

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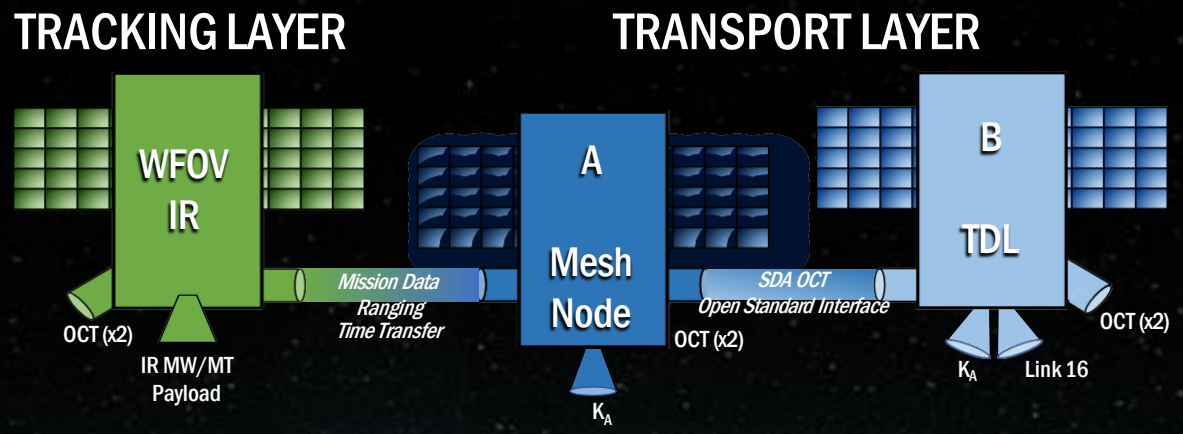
SDA Tranche 0 Architecture Overview

Tranche 0 consists of 28 Satellites
- 8 WFOV IR SVs
- 13 Group A Mesh Node SVs*
- 7 Group B TDL SVs

Distributed in 3 orbital planes**



*1 Transport SV remains on the ground as Software Testbed
**4 WFOV SVs share 3rd orbital plane with MDA HBTSS (Not Depicted Above)
IR: Infrared
TDL: Tactical Data Link
WFOV: Wide Field of View
OCT: Optical Communication Terminal
HBTSS: Hypersonic & Ballistic Tracking Space Sensor

Launches

- ✓ Launch 1: April 2023
- ✓ Launch 2: September 2023
- ✓ Launch 3: February 2024

SLC-4E
Vandenberg SFB, CA

SLC-40
Cape Canaveral, FL

Demonstrations*

Optical Comms
- ☑ Space to Space
- ☐ Space to Ground
- ☐ Space to Air

Link 16
- ☑ Space to Ground
- ☑ Space to Maritime
- ☑ Space to Air

WFOV
- ☑ Image Collection
- ☑ Tracking Capability

*Demonstrations Inform:
- Continued Testing
- Future Demos
- Tranche 1 & Tranche 2

Tranche 0 Demonstrates the Feasibility of a Proliferated Architecture in Cost, Schedule, and Scalability Toward Necessary Performance For Beyond Line Of Sight Targeting And Advanced Missile Detection And Tracking.

Version as of 2025-03-25

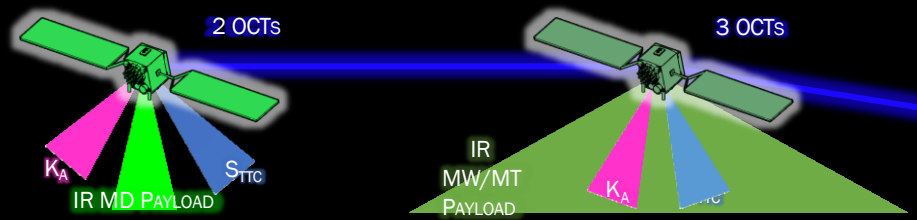
PWSA Tranche 1 (2025)

Initial Warfighting Capability

4 MD Demonstration Tracking SVs (4 Planes, MTD)

28 MT/MW Tracking SVs (4 Planes, MWTD)

126 Transport SVs (6 Planes, BLOS)



NORTHROP GRUMMAN L3HARRIS NORTHROP GRUMMAN L3HARRIS YORK SPACE SYSTEMS LOCKHEED MARTIN NORTHROP GRUMMAN

Altitude (km)	1000
Inclination (deg)	81.3

IR Missile Warning and Tracking with Global Access

Beyond line of sight tactical data link connectivity

Direct downlinks to theater targeting cells

Low-latency high-volume data transport with optical cross-links

GENERAL DYNAMICS Mission Systems iridium SAIC

Enterprise, Network, and Mission Operations from Two Operations Centers

BMC3 Mission Enhancements

Secure multi-domain optical communications

Version: 2024 05 31C

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PWSA Tranche 2 (2027)

Enhanced warfighting capability

PWSA

T2TL Alpha
100 SVs / 10 Planes
Resilient Global Link-16

T2TL Beta
72 SVs / 6 Planes* †
18 SVs / 2 Planes*
*Global TACSATCOM
†IBS Broadcast

T2TL Gamma
~10 SVs / 2 Planes
WARLOCK

T2 Tracking MW/MT
48 SVs/ 6 Planes
Resilient Global MW/MT

T2 Tracking-MD
6 SVs / 6 Planes
Preliminary Missile Defense

York Space Systems · Northrop Grumman · Rocket Lab · Lockheed Martin · L3Harris · Sierra Space

4 OCTs · 3 OCTs · 4 OCTs · 3 OCTs · 3 OCTs

Legend

Communications Systems
- S-band TT&C
- IBS-LEO
- K_A UHF TACSATCOM
- Link 16
- Optical S-band TACSATCOM

Sensing Payloads
- PNT SA
- IR MWT
- IR MD

Processing Payloads
- BMC^3

PWSA Tranche 1

NEBULA

IR Missile Warning and Tracking with Global Access

Beyond Line of Sight Tactical Data Link Connectivity

Direct downlinks to theater targeting cells

Low-latency high-volume data transport with optical cross-links

Enterprise, Network, and Mission Operations from Two Operations Centers

Secure multi-domain optical communications

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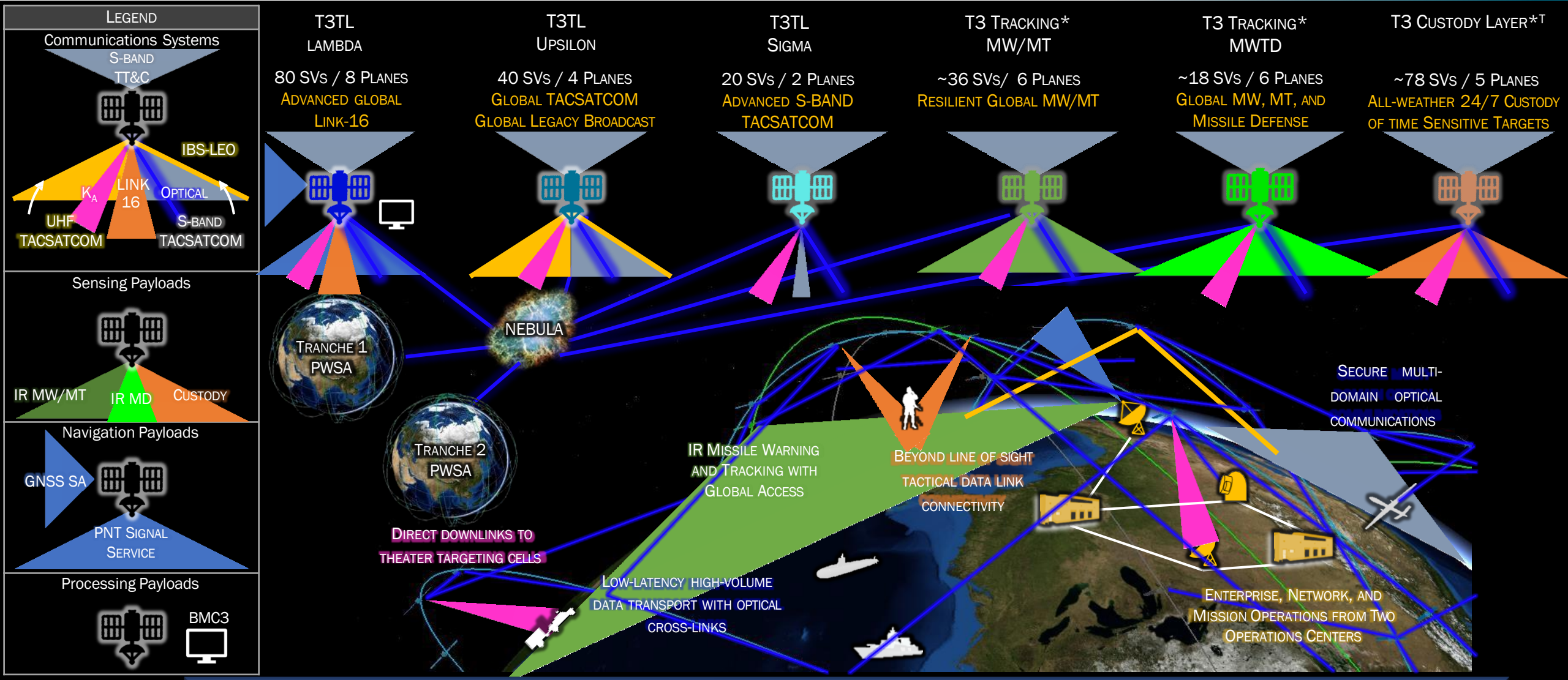
PWSA Tranche 3 (2029)

Sustained Warfighting Capability



Warfighter Council Concurrence and MTA Approval complete for T3TL, T3TRK and T3CL as of Feb '25 . Solicitations beginning in FY25

Version as of **2025-03-25**

*Capability delivery as cited in Golden Dome EO

T Pending Funding

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