SPACE DEVELOPMENT AGENCY

DELIVERING CAPABILITIES

21 October 2020

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Director, SDA
OUSD (R&E)

SDA
SPACE DEVELOPMENT AGENCY

SDA MISSION:
ALIGNED TO THE NATIONAL DEFENSE STRATEGY

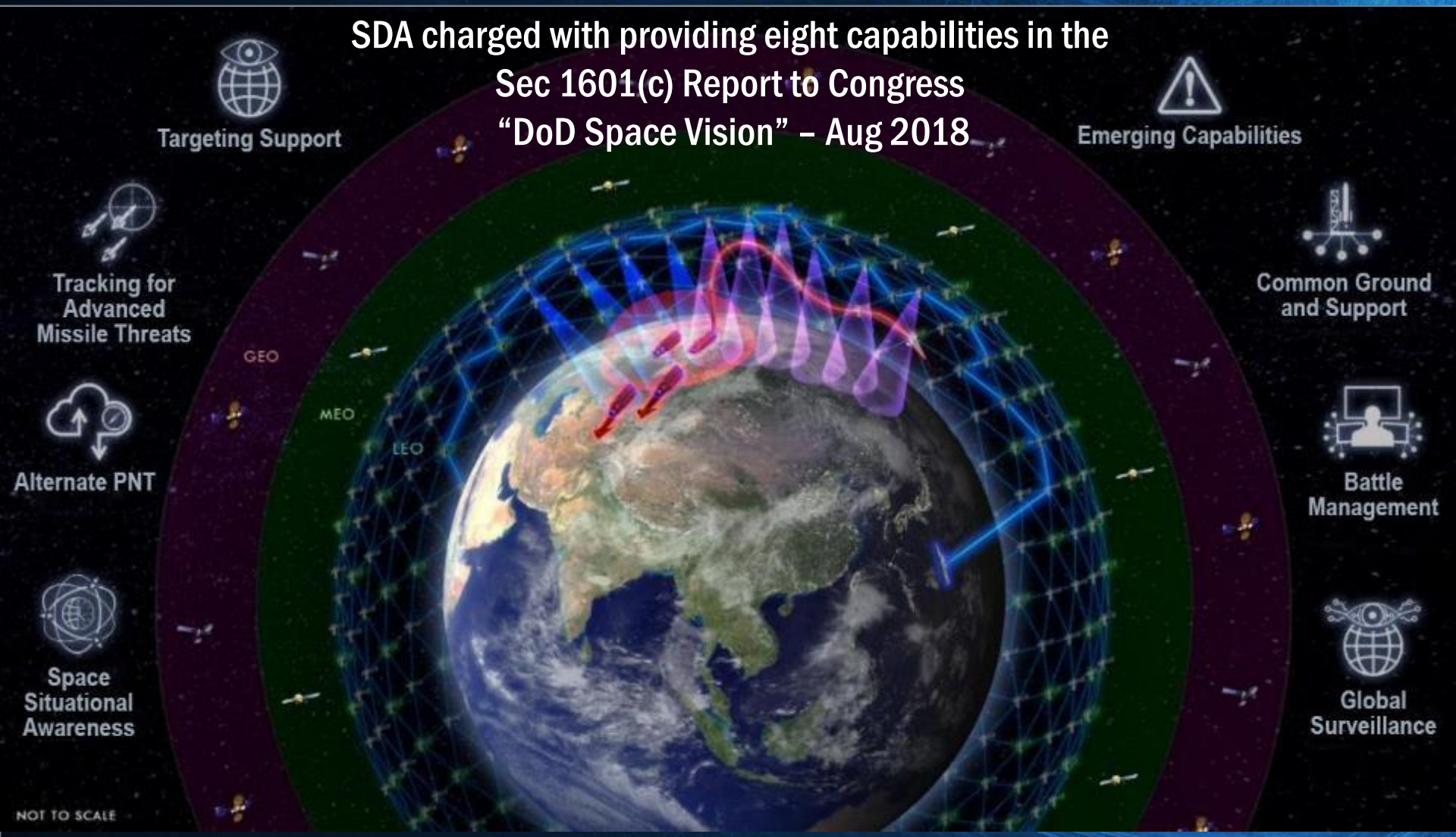
National Defense Strategy
Resumption of Great Power Competition, Modernization of Priorities
Lethality, Partnerships, Reform

USD R&E Mission
Military Technological Superiority, Modernization
Creating the Technologies of the Future Fight

SDA Mission
Orchestrate the development and fielding of the Department's future, threat-driven space architecture and accelerate the development and fielding of next-generation space capabilities

A New Vision for Space

SDA charged with providing eight capabilities in the Sec 1601(c) Report to Congress "DoD Space Vision" – Aug 2018

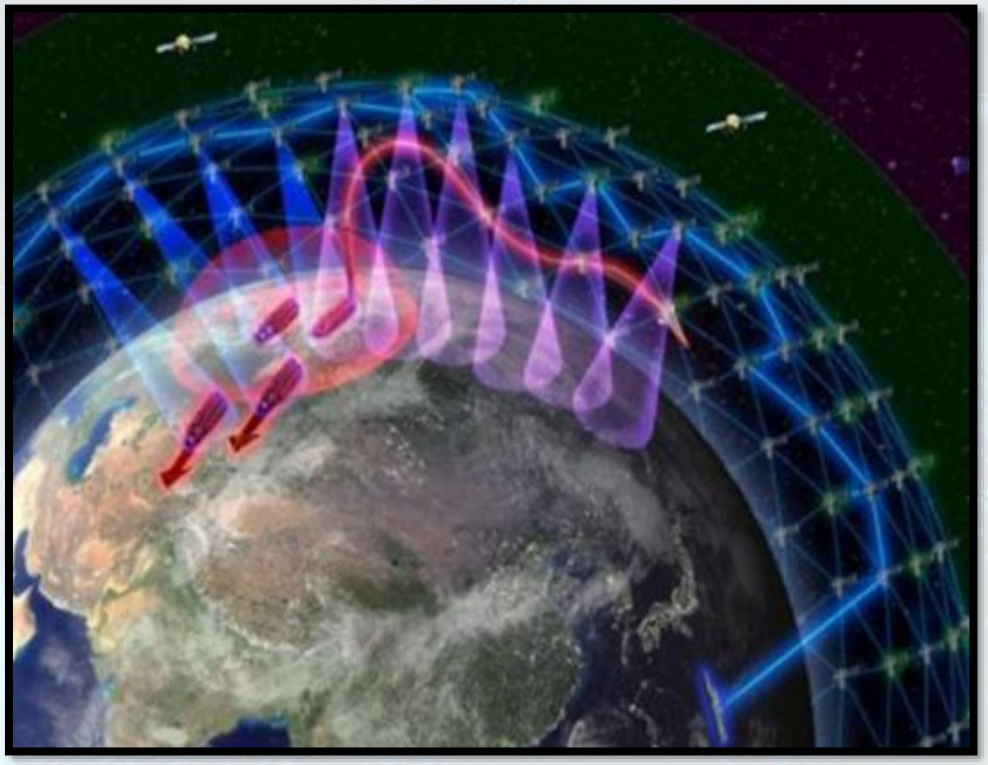


A small but necessary pivot for the military space community from risk aversion toward innovation

Mission and Initial Capabilities

SDA Mission

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

Initial Capabilities

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

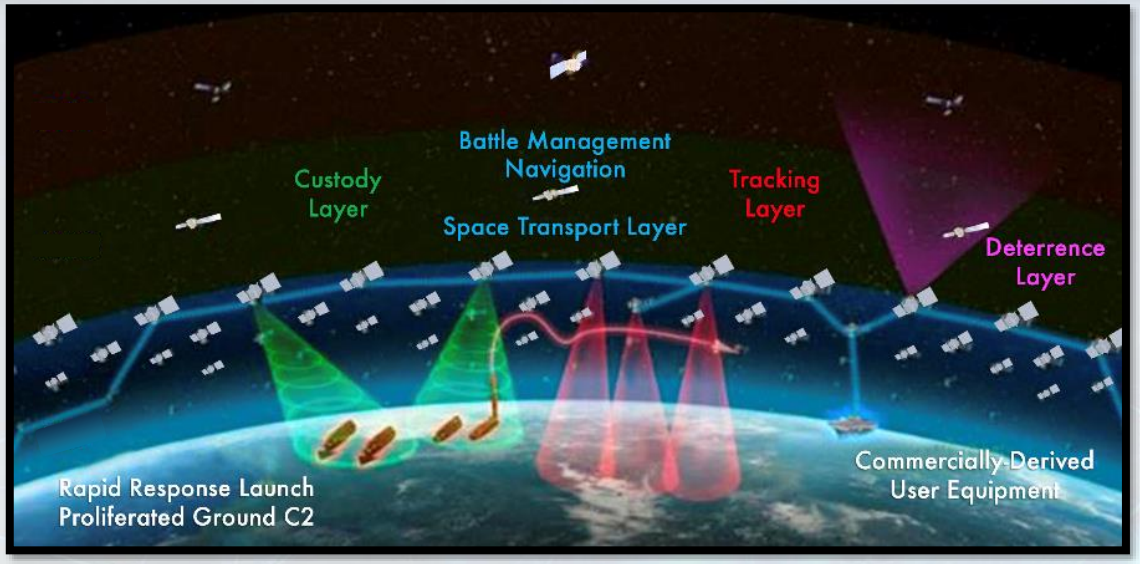
Hypersonic and advanced missile threat warning and tracking

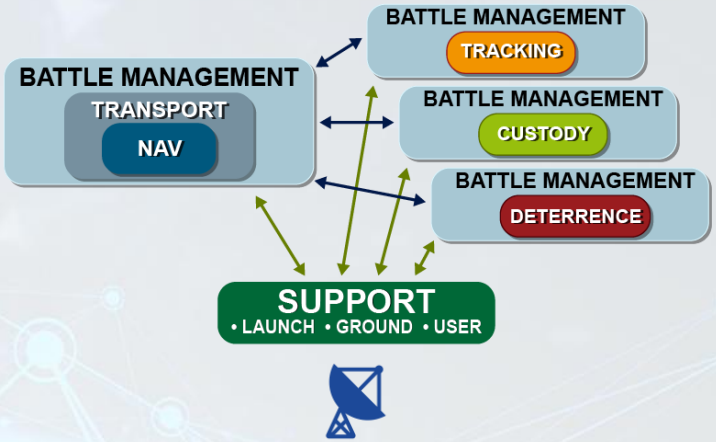
SDA's architecture endeavors to perform the following functions from space:

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

In order to close kill chains precisely and at a currently unattainable pace

SDA's National Defense Space Architecture (NDSA): Layered Architecture Approach





A global, persistent, low-latency data and communications transport layer

Low-latency battle management to enable time-sensitive kill chain closure

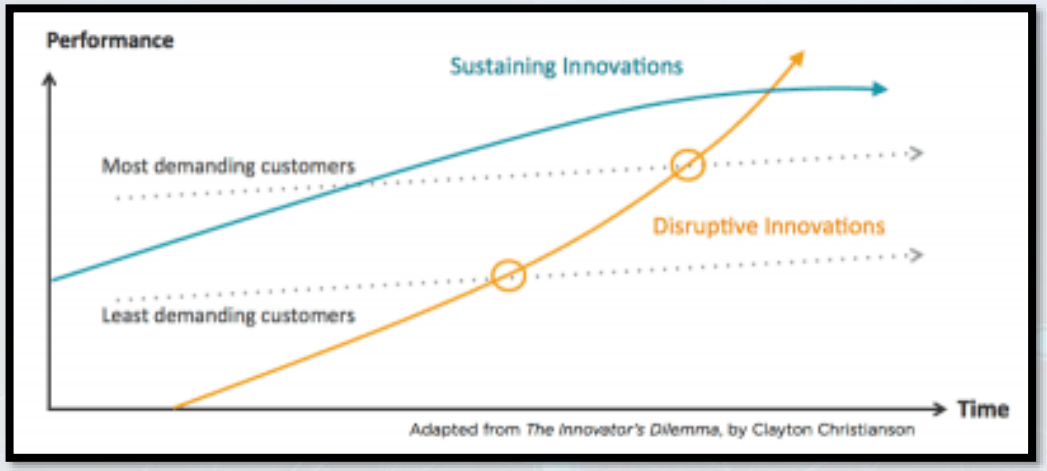
Indications, warning, tracking, and targeting of advanced missile threats

Emerging capabilities such as space situational awareness and rapid access in cislunar volume

24x7, all-weather constant custody of time-sensitive targets

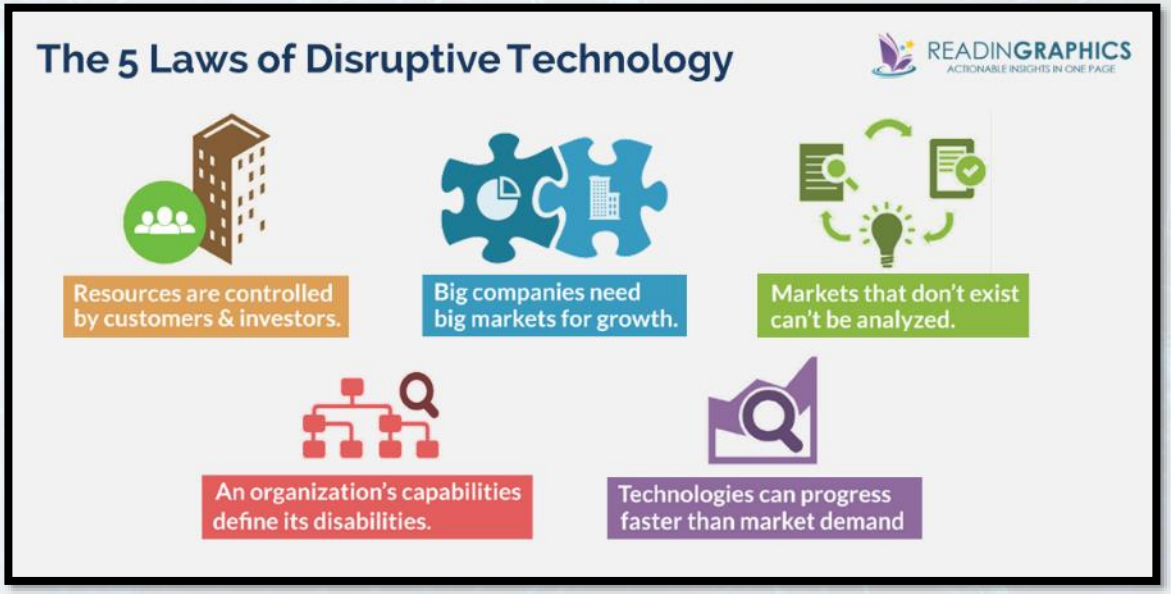
Alternate position, navigation, and timing for GPS-denied environments

Innovator's Dilemma



"That's one of the reasons, frankly, we stood up SDA, is to…break out of the conventional system and find different, more creative ways to field our capabilities."
-Secretary of Defense Mark Esper before the House Armed Services Committee, Feb. 26, 2020

NTS-3 - example of what comes out of an *Innovation Office* in industry.
The L3Harris Innovation office was completely fenced from P&L oversight



TRANSPORT OVERVIEW

FY22 Transport Tranche 0 will provide low-latency connectivity directly to warfighters

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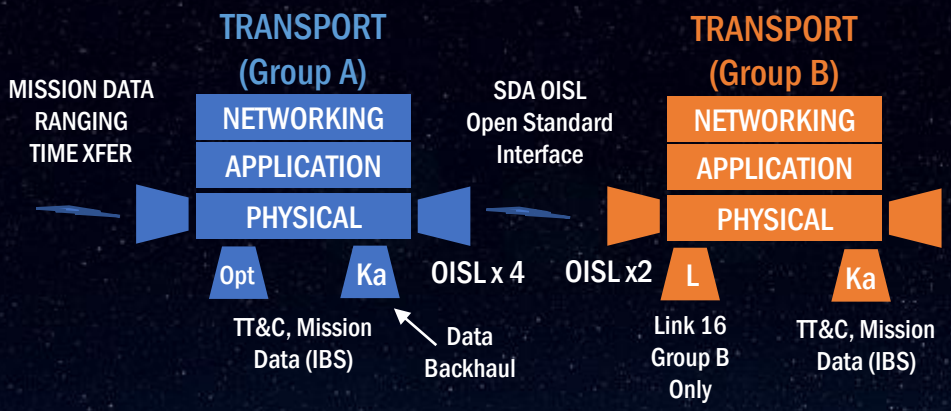
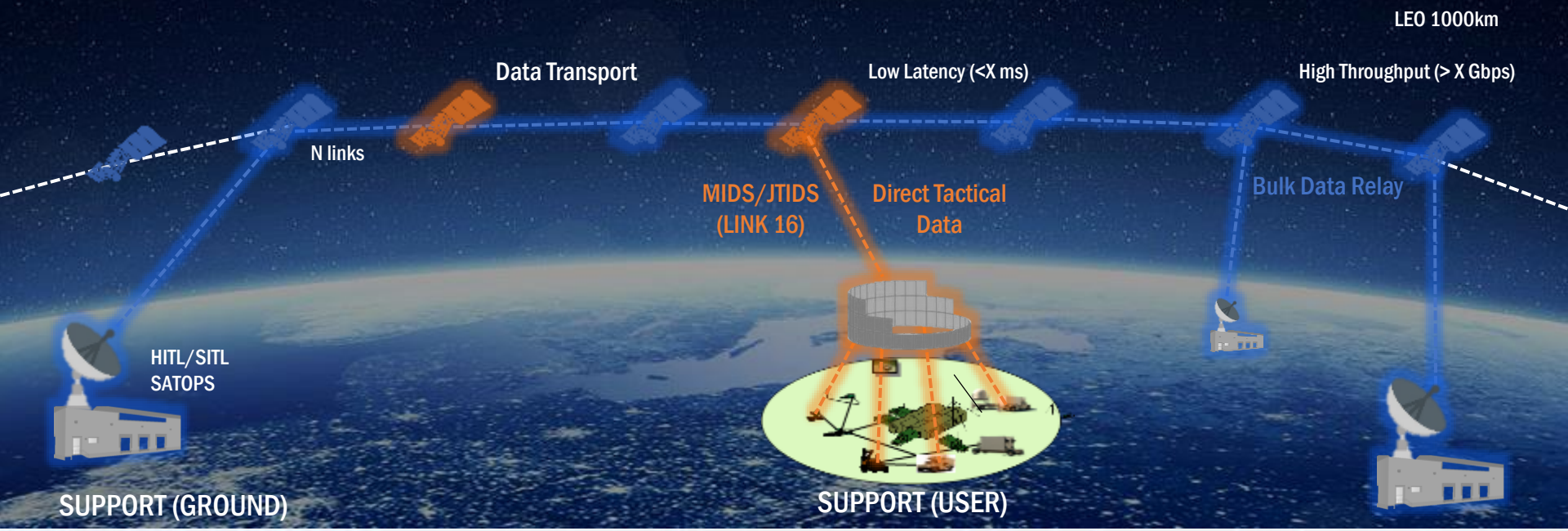


TRANSPORT PRIORITIES

JADC2 Backbone
Time Sensitive Targets
Link-16 (Data Links)
IBS

SECONDARY PRIORITY

Long Haul Data Comm



Tracking Overview

FY22 Tracking Tranche 0 will consist of sensors for detection, tracking & targeting

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WIDE FIELD OF VIEW (WFOV)

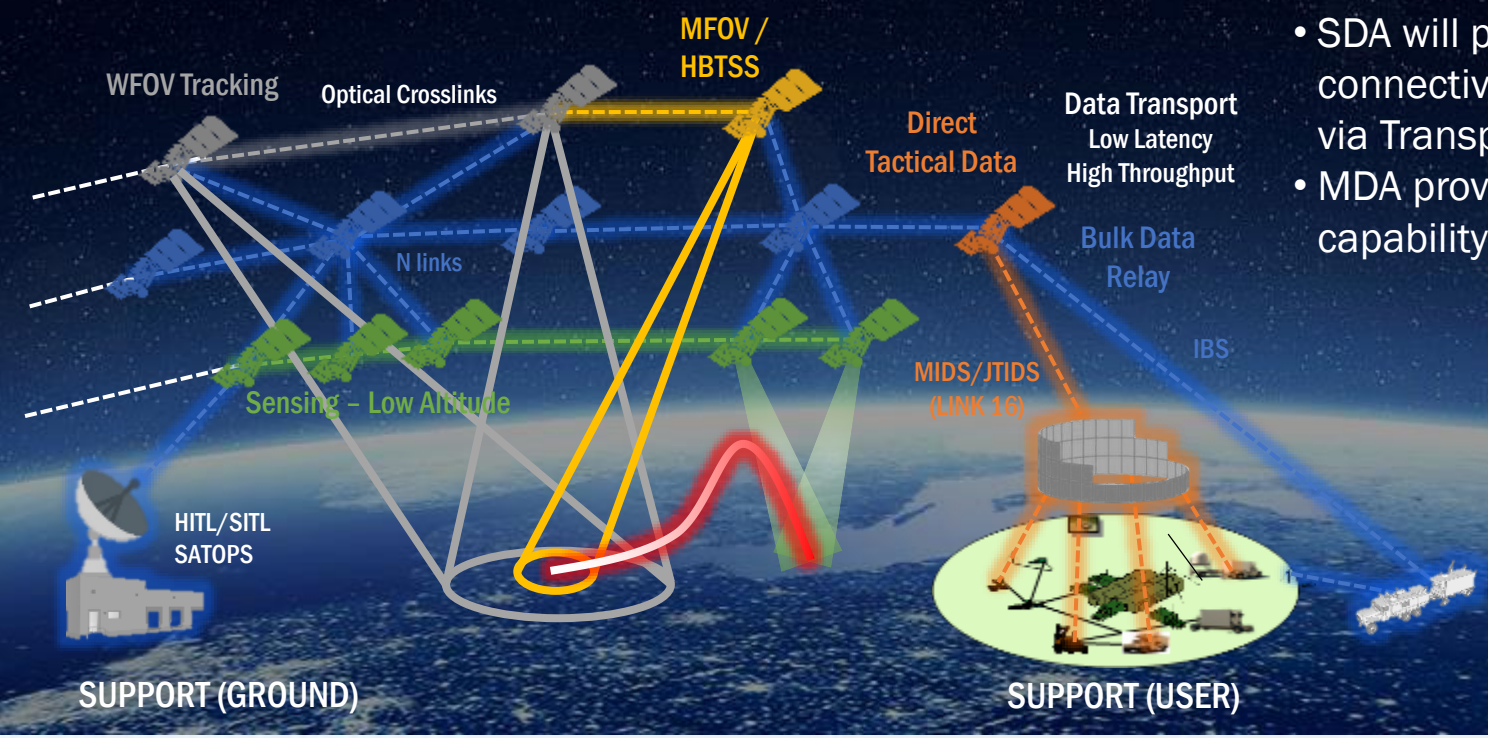
- HGV detection & tracking
- SDA/DARPA

MEDIUM FIELD OF VIEW (MFOV) (HBTSS)

- Cued from WFOV
- Target quality data
- Better sensitivity
- SDA/MDA

SDA is the architect of the transport and tracking layers

- SDA will field initial capability and orchestrate partners in augmenting capability
- MDA will bring first augmented capability with Tracking sensors derived from HBTSS
- SDA will provide data connectivity & interoperability via Transport Layer
- MDA provides existing ground capability & expertise



Custody Overview

FY22 Tranche 0 Targeting dependent on mission partner plans

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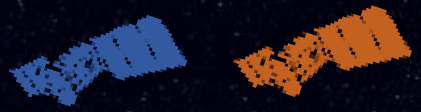
PROLIFERATED ISR CONSTELLATION

- Coverage dependent on partner plans
- Could have 5 minute revisit in FY23
- SDA teamed with SMDC to get data to troops

TRANSPORT SATELLITES



Group A

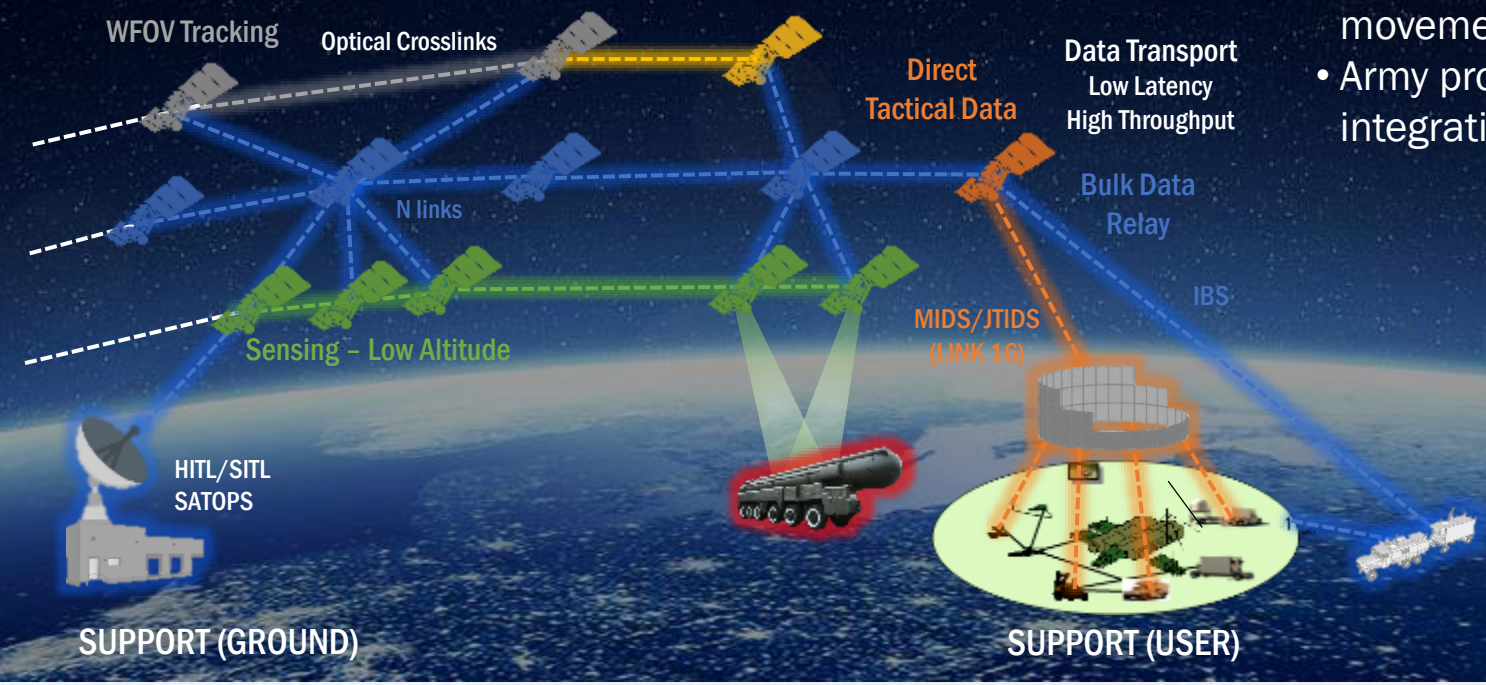
- Receives data from Custody and Tracking
- Fuses data onboard

Group B

- Disseminates to Link-16 weapons
- Disseminates to Army TITAN system for rebroadcast

SDA is the architect of the transport and custody layers

- SDA will field initial capability and orchestrate partners in augmenting capability
- Classified mission partners have plans for fielding satellites
- SDA will provide data movement & interoperability
- Army provides theater integration



High Level Schedule

HBTSS: Hypersonic and Ballistic Tracking Space Sensor
LEO: Low Earth Orbit
MFOV: Medium-Field-of-View
OPIR: Overhead Persistent Infrared
SV: Space Vehicle
WFOV: Wide-Field-of-View

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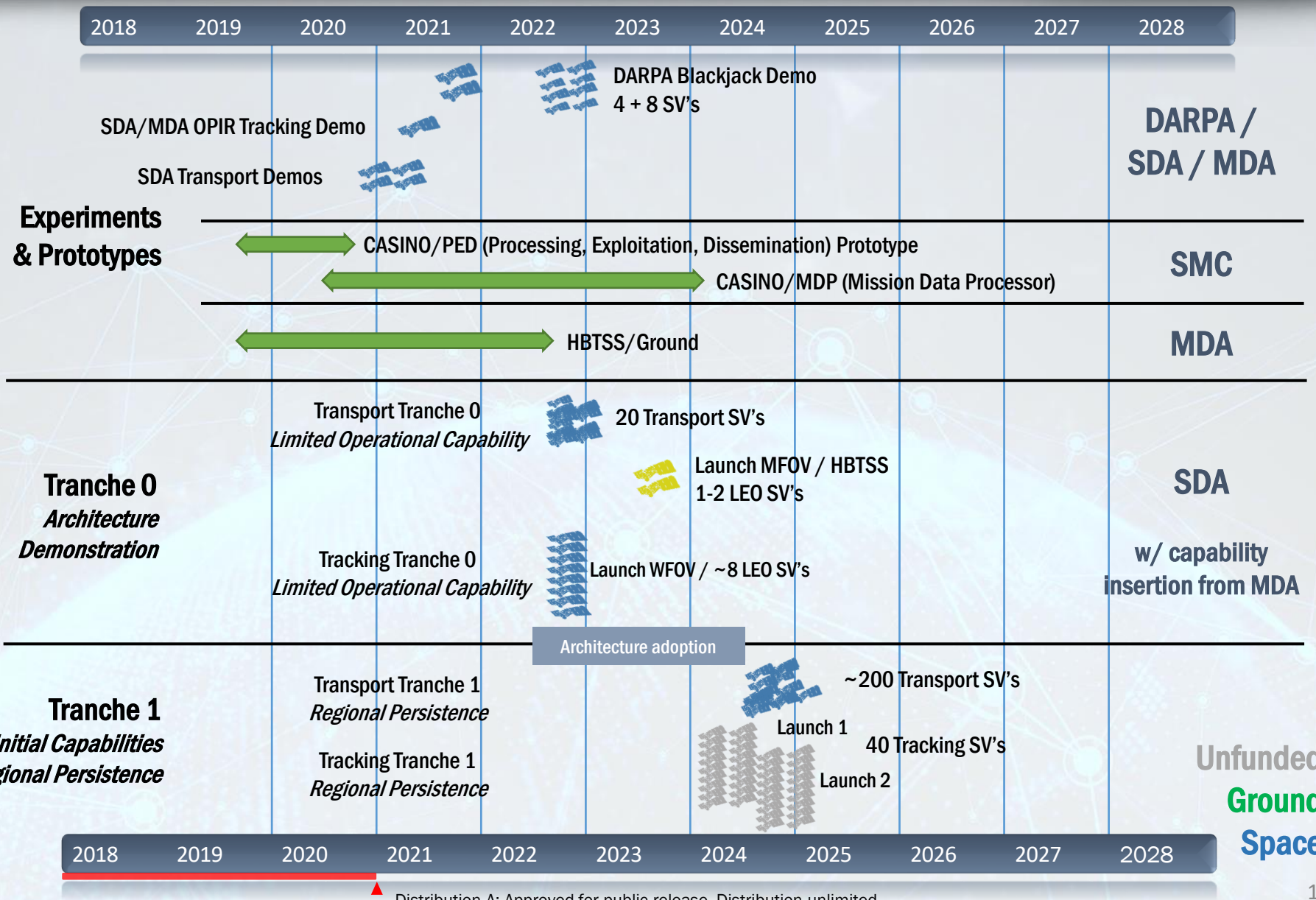
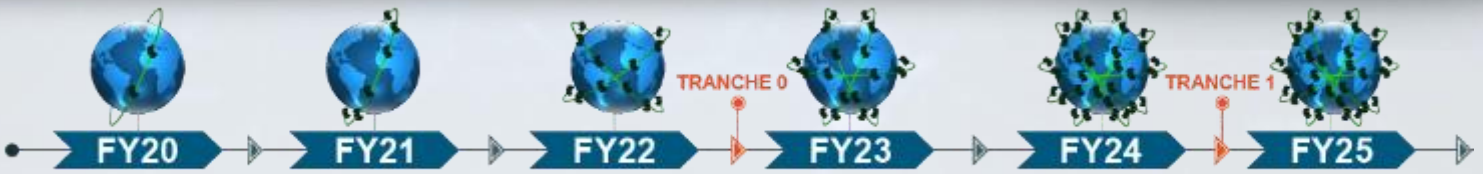


CAPABILITY DELIVERY TIMELINE



NDSA Layer	Risk Reduction Demo (FY20-21)	Tranche 0 Capability (FY22)	Tranche 1 Capability (FY24)
Data & Comm Transport	Demonstrate very low latency data transport, to include optical satellite crosslink and direct downlink	Periodic regional access • low-latency data connectivity • Data directly to weapons • Data disseminated to theater with SMDC Team	Persistent regional access • low-latency data connectivity • Data directly to weapons • Data disseminated to theater with SMDC Team
Advanced Missile Tracking	Flight experiment to collect data in wavebands of interest at LEO	Periodic regional access • for detection of HGVs • HBTSS flight for targeting data in FY23 (in FY22 if additional funds in FY21) • Communication directly with C2BMC	Persistent regional access • for detection of HGVs & other advanced missile threats • Targeting quality data • Communication directly with C2BMC
Custody	Identify and assess candidate multi-phenomenology fusion algorithms for on-orbit applications . Use commercial data and algorithms to test T0 on-orbit processors	Demonstrate multi-phenomenology, ground-based sensor fusion and as a goal demonstrate on-orbit fusion capability assisted by ground processing	Periodic regional access with multiple sensing types using mission partner contributions and demonstrate multi-phenomenology, on-orbit sensor fusion
Navigation	Demonstrate dissemination of PNT information over TDL	Periodic regional access of alternate PNT	Persistent regional access of alternate PNT

Unfunded in current PBR

Tranche Descriptions

Tranche 0 (FY22) – *Warfighter immersion:* The minimum viable product is demonstrating the feasibility of the proliferated architecture in cost, schedule, and scalability towards necessary performance for beyond line of sight targeting and advanced missile detection and tracking.

Tranche 1 (FY24) – *Initial warfighting capability:* Regional persistence for tactical data links, advanced missile detection, and beyond line of sight targeting.

Tranche 2 (FY26) - *Global persistence* for all in Tranche 1. This will incorporate lessons learned from operating gen 0 for at least two years.

Tranche 3 (FY28) – Advanced improvements over Tranche 2. This includes better sensitivity for missile tracking, better targeting capabilities for BLOS, additional PNT capabilities, advances in blue/green lasercom and protected RF comm.

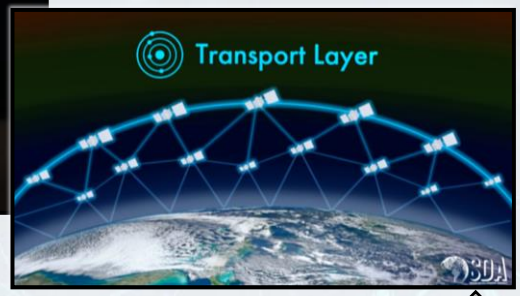
Tranche 4 (FY30) – continual advances to the layers TBD.

Recent News

31 Aug: Tranche 0 Transport Layer Awards

Firm-fixed-price contracts awarded to teams led by

LOCKHEED MARTIN AND YORK SPACE SYSTEMS



Each team will design, develop, and deliver:
- 7 satellites with 4x optical intersatellite links (OISL) enabling crosslink and downlink
- 3 satellites with 2x OISLs and Link 16 transmit/receive capabilities

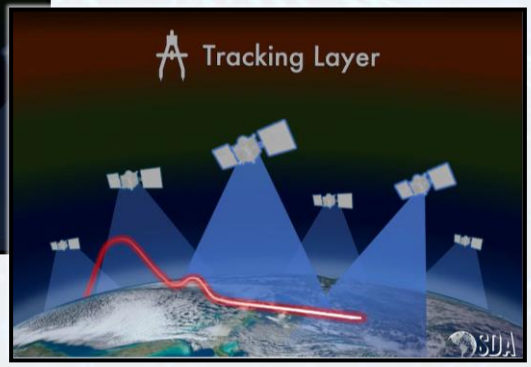
All 20 satellites will be delivered for launch by the end of FY22

2020 | August | September | October

2 Oct: Tranche 0 Tracking Layer Awards

Firm-fixed-price contracts awarded to teams led by

L3HARRIS™ AND SPACEX



Each team will design, develop, and deliver:
- 4 wide-field-of-view (WFOV) overhead persistent infrared (OPIR) satellites capable of detecting and tracking advanced missile threats then passing threat missile tracks to warfighters through the Transport Layer

All 8 satellites will be delivered for launch by the end of FY22

WORKING WITH SDA

NDSA Layer	Refine FY 19	Risk Reduction FY 20-21	Tranche 0 FY 20 – 22	Tranche 1 FY 22 – 24	Tranche N +1 FY 20+
Transport 	National Defense Space Arch. (NDSA) Request for Info. (RFI) SDA-SN-19-0001 Aug 2019	• Transport Crosslink Demo RFI (SDA-SN-20-0004)	• OISL RFI (SDA-SN-20-0001) • Networking RFI (SDA-SN-20-0002) • Transport Tranche 0 RFP (HR085020R0001)	Solicitation anticipated late FY 2022	**NDSA Systems, Technologies, and Emerging Capabilities (STEC)** **Agency-wide Broad Area Announcement (BAA) (HQ085020S0001)**
Battle Mgmt 		• Systems, Technologies, and Emerging Capabilities (STEC) BAA (HQ085020S0001)	• **Mission-Specific Application Prototypes (MSAP) BAA (HQ085020S0002)**	Solicitation anticipated late FY 2022	
Tracking 		• Tracking Phenomenology Experiment RFP (HQ085020R0002)	• Tracking Tranche 0 RFP (HQ085020R0003) • See MSAP BAA	TBD	
Custody 		• Data Fusion RFI (SDA-SN-20-0007)	• See MSAP BAA	Solicitation anticipated late FY 2022	
Navigation 		Ideas welcome – • See STEC BAA	• See MSAP BAA	Solicitation anticipated late FY 2022	
Deterrence 		Ideas welcome – • See STEC BAA	TBD	TBD	
Support 		Ideas welcome – • See STEC BAA	• **Tranche 0 Launch Services RFP (HR085020R0001)** • SDA Tranche 0 Mission Systems Engineering and Integration (MSE&I) RFP (HQ085020R004)	Solicitation anticipated late FY 2022	

BOLD indicates items open now for feedback/proposals.

WORKING FOR SDA

SDA is working to build our team and grow our talent in all relevant skill sets.

- Our team is made up of experts from across the space domain who are experienced in delivering capabilities to the warfighter and are focused on the SDA mission.
- Our technical team is supported by a lean, agile administrative team and front office.
- If you are interested in joining our dynamic team, please send us your resume: osd.sda.resumes@mail.mil

Follow SDA on BetaSam.gov, visit https://www.sda.mil and LinkedIn for updated opportunities.

DISRUPTIVE EXAMPLE IN USAF

DARPA, et al. Development (c1981 – 1995)

Balkan war deployment 1995

Non-USAF weaponized Predator (2001)

Big Safari starts LRIP (1999)

USAF Predator Program of Record (c 2002)

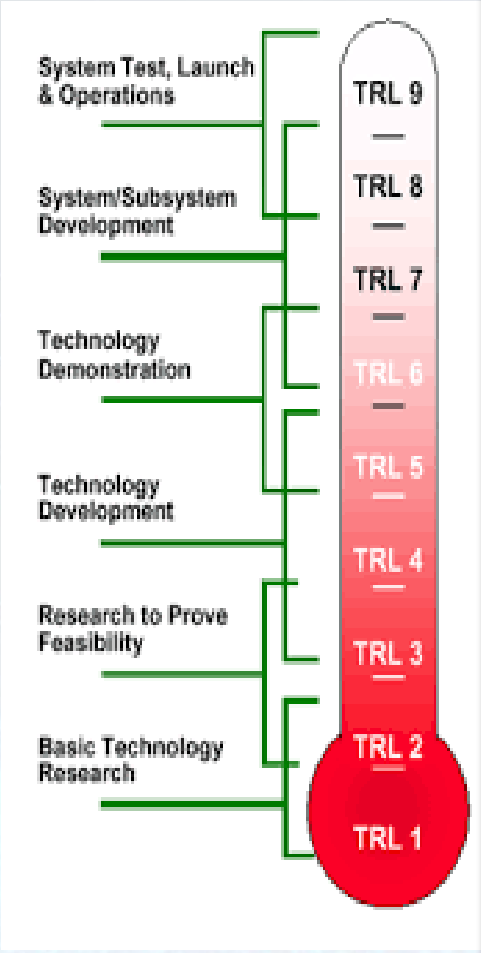
SDA Demos FY21

SDA Tranche 0 deployment FY22

USSF/SDA Operational System Tranche 1 FY24

USSF Complete Program of Record

How We All Fit Together



Technology Demonstration for Military Utility

SpRCO

DARPA

AIR FORCE RESEARCH LABORATORY

MISSILE DEFENSE AGENCY
DEPARTMENT OF DEFENSE

Focused on ground RADAR, interceptors, and data dissemination architecture – not space architecture or technology

Architecture Demonstration for Military Utility

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Focused on Capabilities from space

ACQUIRING CAPABILITIES AT SPEED

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Solicitation
Contract Award
Planned Award
Other

- Jan
  - Optical Intersatellite Link (OISL) Open Standard RFI
  - Space Mesh Networking RFI
  - Systems, Technologies, and Emerging Capabilities (STEC) BAA
- Feb
  - Tracking Phenomenology Experiment (TPE) Draft RFP
  - Transport OISL Risk Reduction RFI
- Mar
  - Custody Multi-INT Fusion RFI
  - Transport Tranche 0 Draft RFP
- Apr
  - Transport Tranche 0 Industry Day
- May
  - Multi-Band OPIR Payload Award
  - OISL Demo Award
  - Transport Tranche 0 RFP
  - Tranche 0 Mission Systems Engineering and Integration (MSE&I) RFI
  - Tracking Tranche 0 Draft RFP
- Jun
  - TPE RFP (Bus & Launch)
  - Mission-Specific Applications and Prototypes (MSAP) BAA
  - Tranche 0 MSE&I Draft RFP
  - Tracking Tranche 0 RFP
  - Prototype Infrared Payload Award
- Jul
  - Tranche 0 MSE&I RFP
- Aug
  - Transport Tranche 0 Award x2
  - Deterrence Study Award x2
- Sep
- Oct
  - Tranche 0 Launch RFP
  - Tracking Tranche 0 Award x2

TO DATE IN CY20...

PUBLISHED				AWARDED
5 RFIs	2 BAAs	4 DRAFT RFPs	5 RFPs	9 CONTRACTS

SDA IS ACCELERATING DEFENSE SPACE CAPABILITY DEVELOPMENT BY NAVIGATING ACQUISITION PROCESSES AT SPEED