NESDIS Antennas as a Service: An Overview

National Environmental Satellite, Data, and Information Service

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Executive Summary

- **NESDIS Antennas as a Service (NAaaS) provides the foundation to establish an Enterprise common service based business model for ground station services**
  - **Streamlines ground station service acquisition, operations, maintenance, and sustainment to allow customers to reorient focus upstream on producing science mission data**
  - **Increases return on investment on existing NOAA ground resources while enabling cost-effective utilization of commercial services when best suited to augment NOAA resources**
  - **Builds on current USSF Federal Augmentation Services (FAS) partnership and precursor multi-mission antenna transitions**

- **NAaaS transition: Supportive of existing legacy and future NOAA and Partner missions**
  - **Defines resilient classes of multi-mission antenna assets supporting current and future programs - GeoXO, SWO, NEON as well as partner missions**
  - **Decommissions aging antennas, retrofits select antenna to multi-mission assets, and builds next generation antennas**
  - **Creates a new FISMA boundary for all NESDIS antennas**
  - **Utilizes the Antenna Planning Services Committee (APSC), a cross -collaborative partnership with NESDIS line offices and satellite programs to align NAaaS with their mission milestones and requirements**

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Capacity Gap: NESDIS Launch Cadence

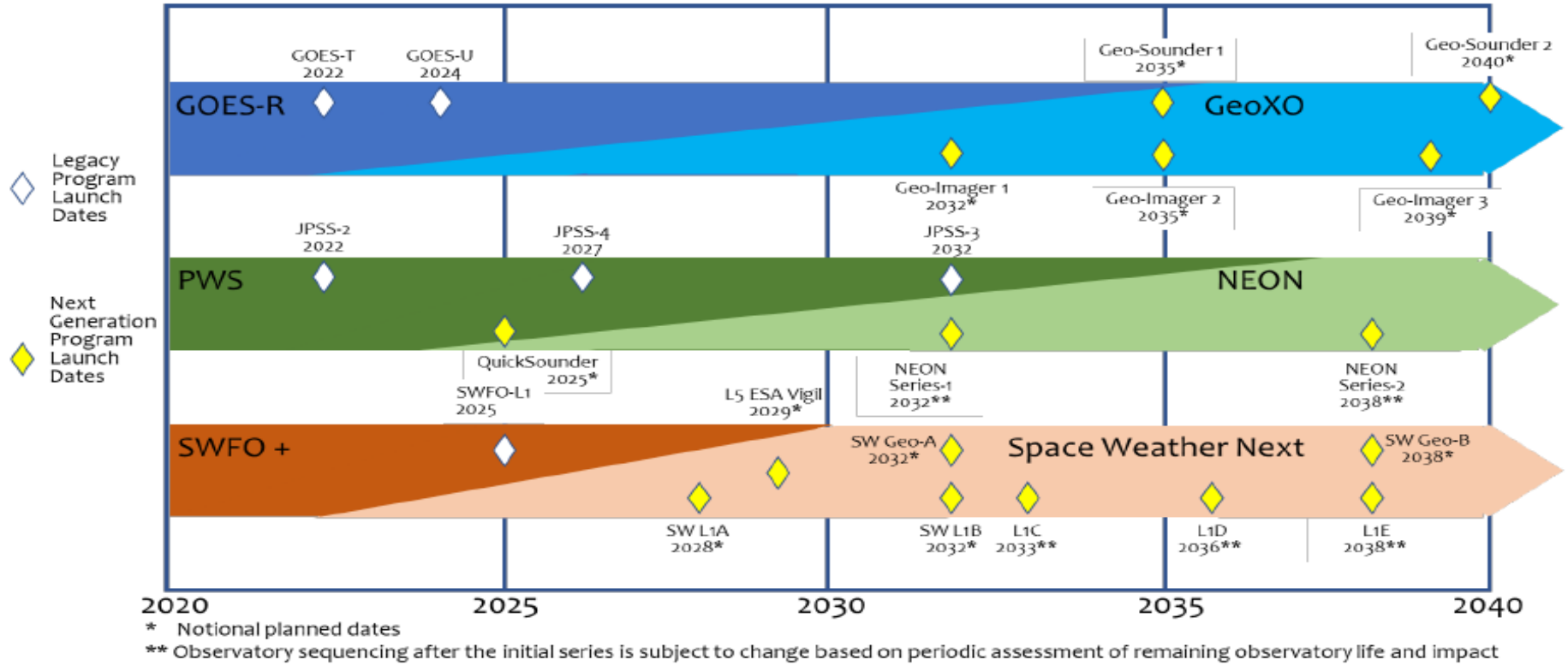

Figure 2: Potential NESDIS Next Generation Launch Schedule

- **Increased demand for NESDIS and Commercial Antennas – launching 20+ new satellites through 2040**
- **NESDIS Antennas as a Service (NAaaS) will provide resilient flexibility to support multiple CONOPs, expanded NESDIS and partner missions and Continuity of Operations (COOP)**

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NAaaS supports NGE Alignment and NESDIS Strategic Objectives

A Climate Ready Nation – NESDIS Strategic Plan FY2022-26

- **STRATEGIC OBJECTIVE 1.5: Enhance Comprehensive Observations and Monitoring Systems**
  - **1.5.3: Expand Commercial Partnerships and New Technology**
  - **1.5.4: Improve Common Source Data Integration and Common Ground Services**

NESDIS Strategic Implementation Plan – Strategic Objective #4

- **Develop agile, scalable ground capability to improve efficiency of service deliverables to support data from all sources**

National Space Weather Policy

- **Purchase and use United States commercial space capabilities and services, to the maximum extent possible**
- **Prioritize alignment and collaboration with commercial industry**

NESDIS Ground Enterprise (NGE) Architecture and CONOPS

External Partnerships – USSF, SDA,NASA, USSF, International

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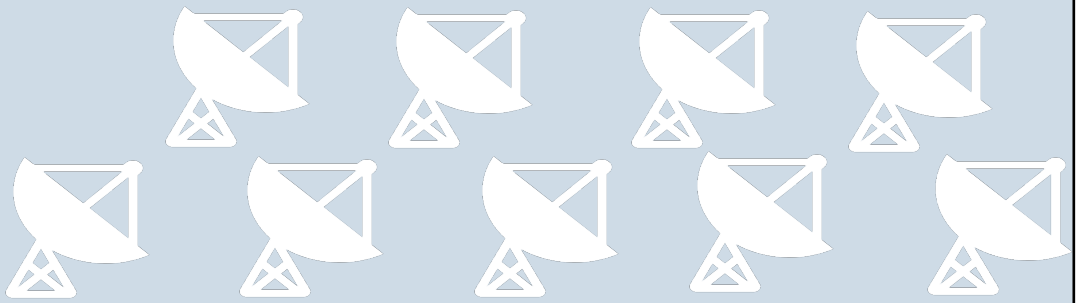
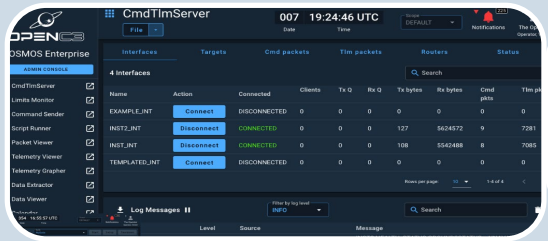
Transition to NESDIS Antennas As A Service

	Legacy Stovepipe Systems Now	Antenna Common Service Architecture (ACSA) Upgrades Transition	NESDIS Antennas as a Service (NAaaS) Future
Phase One: GeoXO SWO	 GEO Only	• **Upgrade HR series antennas to multi-mission assets** • **Add SWO and X-band Antennas** • **9.1m low cost GEO storage**	
Phase Two: LEO **(In development)**	 Limited Capacity	• **Common Service Tri-band Antennas** • **Multi-Mission TT&C Phased array** • **Commercial Services**	 
Antenna Common Service Infrastructure	 Outmoded Hardware	• **Cloud based Operations** • **Multi-Mission Support Tools** • **Standardized Equipment** • **Operator Efficiency**	 

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High Level Conceptual Overview

Enterprise Alignment

NESDIS Antenna Service Catalog

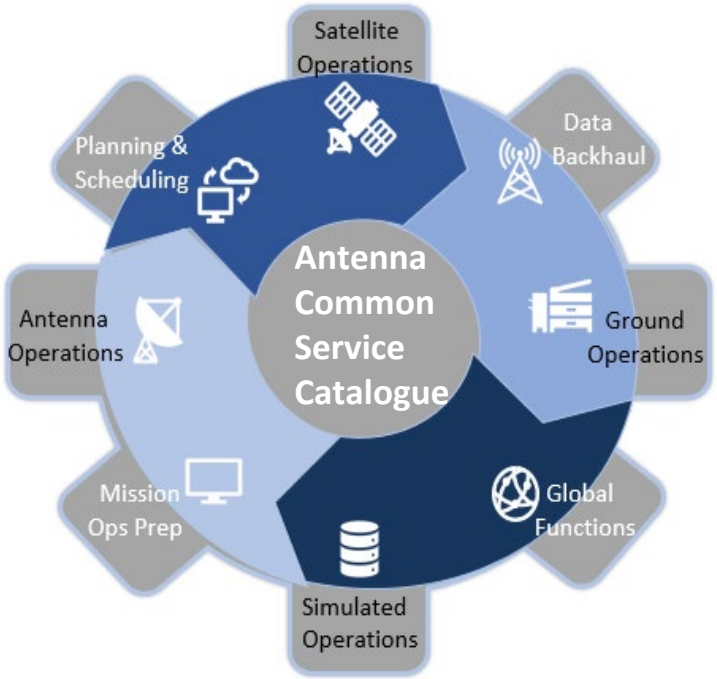
No

Commercial Service

Build new Antenna Capacity

Yes

NAaaS/Program – Establish SLA



NAaaS - NGE aligned business model creates streamlined efficient operations and allows programs to focus on production of high fidelity mission science data

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Targeted Utilization of Commercial Capabilities

For each phased upgrade

- **APSC implementation IPTs will perform trade space analysis to assess NGE transformation through adoption of commercial services versus upgrade of NESDIS antenna assets**
- **Assess current trends and development of commercial antenna services**

Some key areas already under investigation include:

- **Key enabling technologies – Space Based Data Relays, Phased Arrays, Virtualized Ground System**
- **SWO – Adoption of readily available commercial service for OCONUS coverage requirements**
- **NEON: Evaluation of commercial services writ large**
- **OSPO/OCS: Adoption of commercially available cloud based Mission Operations services**
- **OSPO/OCS: Adoption of commercial service based software defined radios (SDRs)**

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Non-Cost Benefits / Cost Avoidance

Sustainment

- Reduces the number of unique items to manage in sustainment program
- Simplification of hardware needed, training and maintainability
- Streamlines procurement processes supporting multiple unit buys
- Parts management, reduced # of SKUs
- Better utilization and management of parts and components

Maintenance

- Lower number of unique antenna maintenance items and procedures
- Antenna sharing between weather & GEO allows maintenance at night without interrupting availability and reduces the number of antennas that need to be live.
- Provides resilience, redundancy and back-up capabilities
- Multiple antennas could be used to support a single program

Operations

- Streamlined operations procedures for M&C of antennas across missions
- Simplified operational support
- Don't have to be an expert on multiple antennas
- Simplifies Enterprise Scheduling of Resources
- More efficient utilization of antenna capacity
- AaaS services can be extended to non-NOAA antennas as leased services

Cost Avoidance

- New Missions do not need to procure mission specific antennas
- Total number of antennas would be lower avoiding sustainment & maintenance costs
- Don’t need as many antenna experts across programs

Benefits across sustainment, maintenance and ops for NAaaS along with cost avoidance

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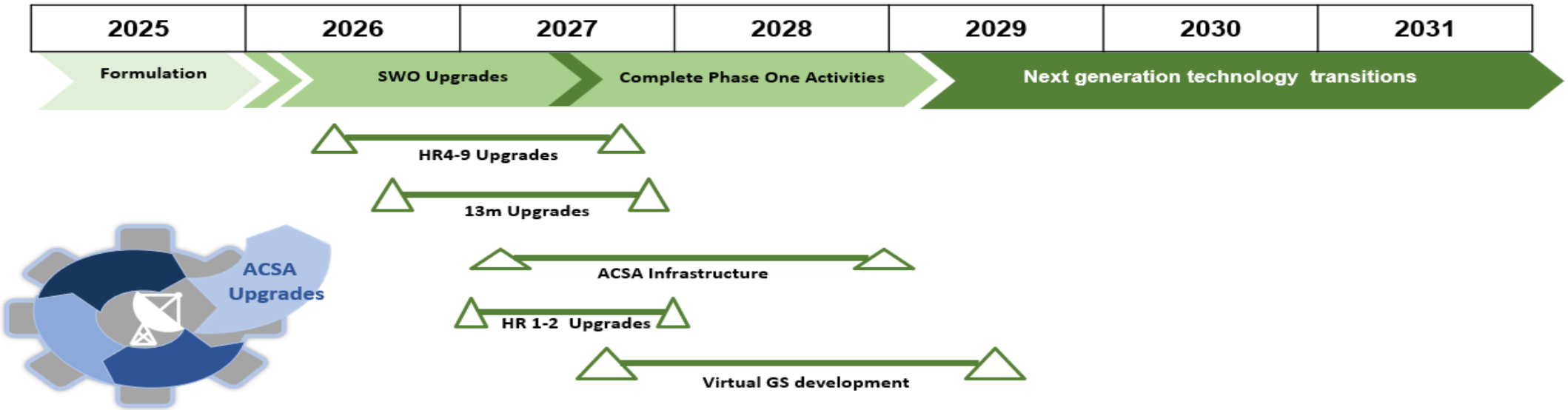
Phase One Development : GeoXO SWO Upgrades

Phase One FY25-30

- Planned upgrades to nine antennas, buildout of six new antennas and installation of common service antenna infrastructure at WCDAS and CBU
- The ACSA Phase One buildout will provide:
  - Ten antenna suites fully supportive of GOES-R and future GeoXO mission requirements
  - Nine antenna suites fully supportive of SWFO-L1 and future SWO mission requirements
  - Flexible operational resiliency mutually supportive of: GeoXO and SWO CONOPS, Continuity of Operations (COOP), sustainment and maintenance downtimes



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Conclusion

NESDIS Antennas as a Service:

- Establishes an antenna common service architecture that instantiates a unified, streamlined and flexible ground system supportive of current and future requirements
- Prioritizes adoption of commercial services and capabilities
- Provides flexible operational resiliency to current and future NESDIS Program Of Record and Partner missions, accounting for operational CONOPS, Continuity of Operations planning and support to stored spacecraft
- Represents a collaborative paradigm shift among NESDIS stakeholders for realization of a mutually beneficial next generation enterprise common service based ground system

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Questions

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