Defense Space Modernization Roadmap

Leveraging Industry, Commercial, Government, and International

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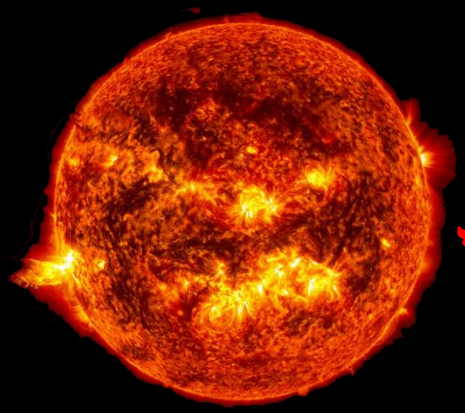
Diversify, Develop, & Demonstrate to Deter, Deescalate, & Dominate

https://www.CTO.mil *@DoDCTO*

Technology from the Earth to the Moon and Beyond



Autonomous navigation, autonomous systems capable of operating and taking advantage of multi-body environments

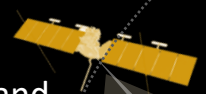
Commoditized busses with high power generation, energy storage, power management and adaptable payloads

Hardening and Resiliency to space weather with high background radiation

Intelligent, low swap, Local and wide volume search, detection, tracking, ID, and state prediction

Standards developed and used by international partners

Facilities that can simulate space, digital engineering, and support rapid assessments



CIS-LUNAR ~1.3s

High bandwidth , secure comm, PNT, Assured C3

FOV

FOR

GEO

~0.1s

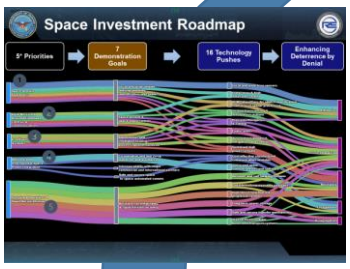
LEO

Launch capabilities and opportunities enabling joint operations and reconstitution

Cis-lunar regime and operations **to drive technology** improvements that **flow to all orbital regimes**

Roadmap Process

Used unclass budget data



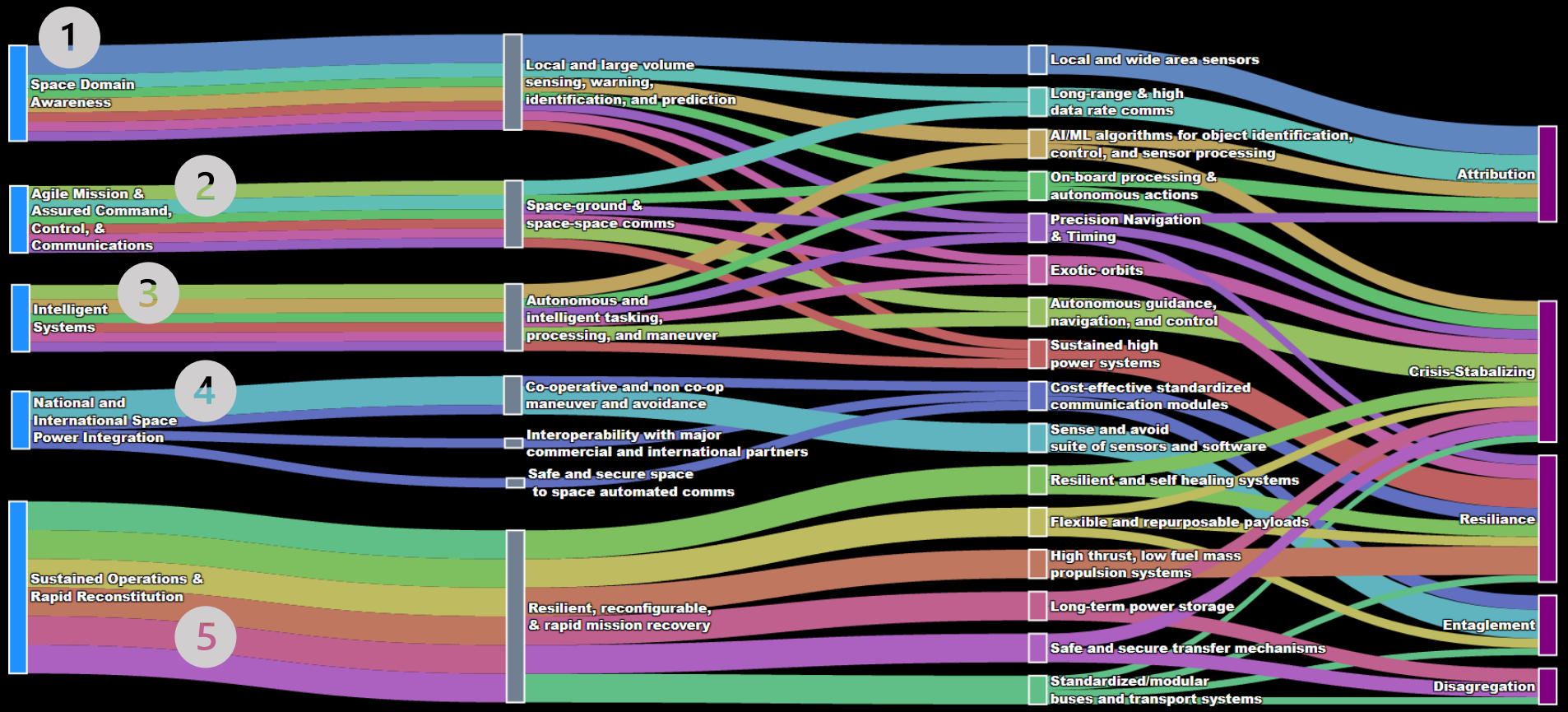
Strategic Review → **Stakeholder Engagement and Data Collection** → **Budgetary Assessment** → **Complimentary Efforts Identified** → **Roadmap Building** → **Roadmap Implementation**

AFRL	SCO	NASA
SCC	SOCCOM	DOE
RCO	ARMY	WHS
spRCO	NAVY	SDA
DAF	NRL	MDA
SAF	ANVL	NOAA
AFWERX	NGA	USGEO
SPWERX	NRO	OSD
DARPA	NSA	FVEY

Accelerate existing investments, push technologies to the warfighter, and expand opportunities for deterrence, de-escalation, and dominance

Space Investment Roadmap

5* Priorities → **7 Demonstration Goals** → **16 Technology Pushes** → **Enhancing Deterrence by Denial**



Example : Space Domain Awareness

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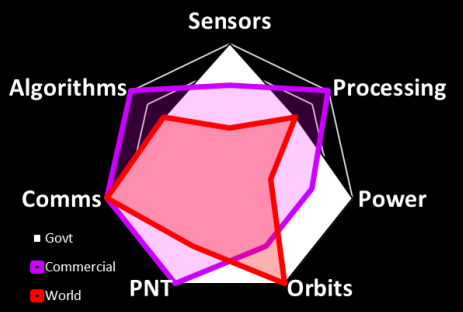
Space Domain Awareness: The capability to monitor, track and characterize an expansive, crowded, and dynamic environment. This includes both long-range wide volume situation awareness and short-time scale local tracking and prediction.



Technology Pushes	Local and Wide Volume Sensors	On-Board processing	Sustained High Power	Exotic Orbits	PNT	Comms	AI/ML algorithms for object, ID, control, and sensor processing
Investments NEAR	➢ Affordable & manufacturable large format arrays and apertures	➢ Rad hard processors*	➢ Advanced solar and nuclear*	➢ Modeling and facilities for simulations		➢ Efficient radiators, apertures, and transceivers	➢ Increase maturity of SDA algorithms*
MID	➢ Increase maturity of spectrum and waveform agility	➢ COTS based processors	➢ Energy Storage	➢ ESPA class to large satellites	➢ Alt Ranging	➢ Fine Pointing	➢ Search, detection and tracking
	➢ Fine grained target acquisition	➢ Secure cloud processing*	➢ Thermal management	➢ Autonomous orbit maneuvering	➢ Quantum accelerometers, gyros, sensors*	➢ Data backhaul	➢ ID and Event predictions
		➢ Diversified tip & cue*	➢ Power Management		➢ On orbit predictions	➢ Increase maturity of spectrum and waveform agility	➢ Sensor fusion
FAR	➢ Intelligent Sensors	➢ Federated computing			➢ Autonomous guidance and navigation		➢ Computational architectures Sensor fusion