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Geospatial Business Intelligence Experts™

DAY-CON XVIII

What is Happening In Space – A Cyber Brief

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Today's Content

- Chinese Space Maneuverability
- US Commercial Capabilities
- Cybersecurity and Hidden Dependencies in Space
- Protecting Cyber Supply Chain

US MIL CYBERSECURITY MARKET

Figure 7 | Stock image.

Military cybersecurity market to grow by $17.9 billion through 2028: report

The global military cybersecurity market will grow by $17.9 billion between 2024 and 2028, driven by the increasing adoption of cloud-based services and artificial intelligence (AI), according to a new market report from Technavio. The research team estimates a compound annual growth rate (CAGR) of 11.53%, with AI and machine learning identified as key growth drivers, particularly in developed countries with advanced infrastructure. The report authors said that these technologies are being integrated to improve cybersecurity by reducing human error and enhancing threat detection.

Challenges to the market, noted the study authors, include system integration and interoperability issues within military IT infrastructures, particularly as defense agencies implement new technologies. The report highlights key players in the market, including Airbus SE, Lockheed Martin Corp., Northrop Grumman Corp., and Booz Allen Hamilton Holding Corp.

Chinese Space Maneuverability

Chinese launch 4 satellites directly from sea

Chinese scientists turn largest Earth surveillance network satellite upside down to hunt killer asteroid

Chinese Natural Resource Missions
Chinese Space Maneuverability

At Space Mobility Jan. 30, '24 Chief Master Sgt. Ron Lerch, of the Space Systems Command's intelligence directorate, said China's rapidly advancing military space-based reconnaissance capabilities are worrisome… Especially the SAR capabilities.

Chinese Weather Balloon
Chinese Space Maneuverability

FOX NEWS 6:30 CT

CHINA FLOATS SPY BALLOON OVER U.S.

FOX NEWS ALERT

CHINA Lands on Moon to Collect Samples

Chinese Space Maneuverability

4 PM EDT, June 2, 2024

BEIJING (AP) — A Chinese spacecraft landed on the far side of the moon Sunday to collect soil and rock samples. Chang'e 6 moon exploration program, which is named after a Chinese moon goddess. It is the second designed to bring back samples, following th Chang'e 5, which did so from the near side in 2020.

The Result: Chinese Flying Satellites Like Fighter Jets – Counterspace Tactics

PLA's Academy of Military Science, A Study of Space Operations,

"Whoever is the strongman of military space will be the ruler of the battlefield; whoever has the advantage of space has the power of the initiative; having 'space' support enables victory, lacking 'space' ensures defeat."

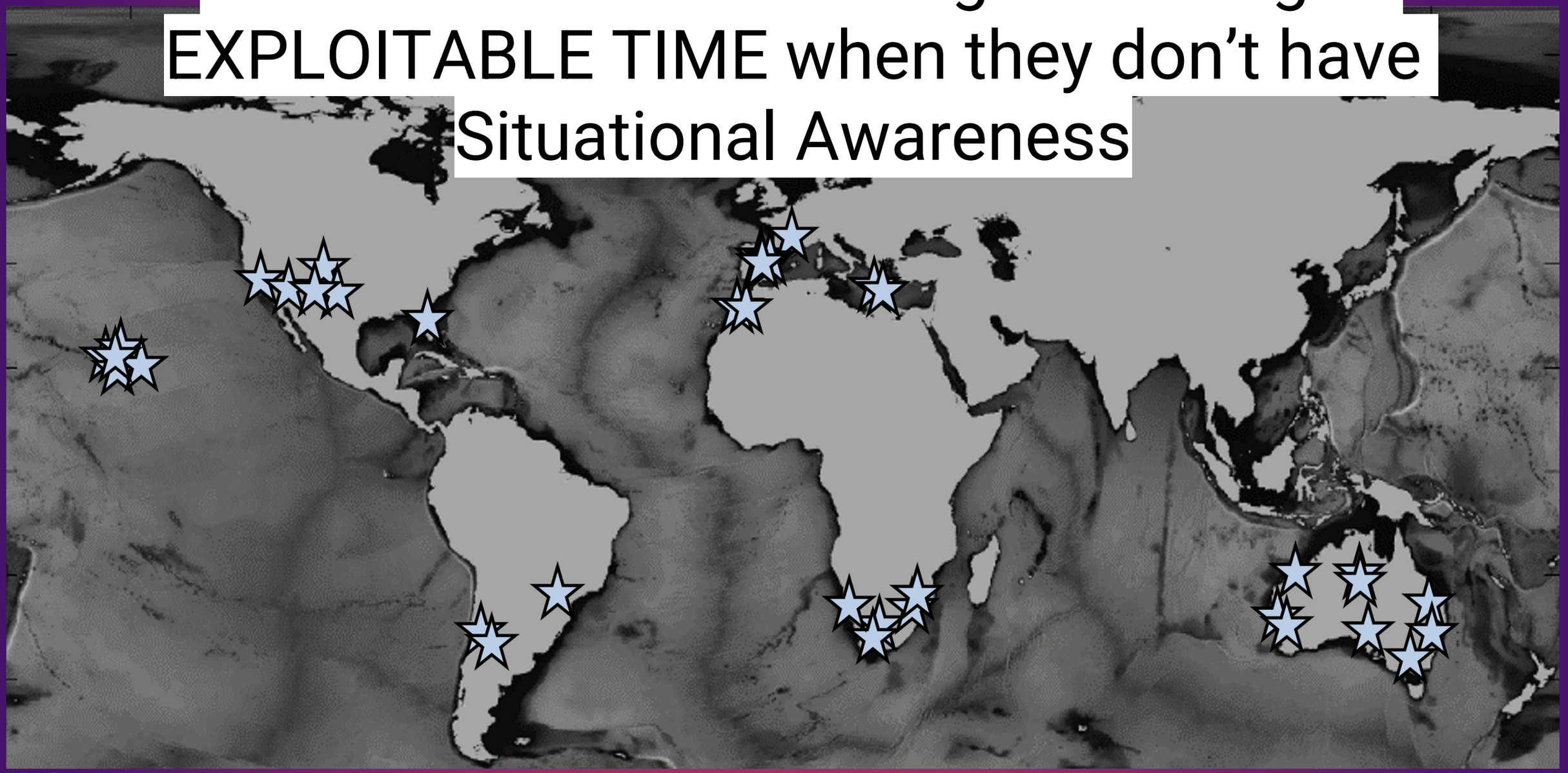
Jiang Lianju and Wang Liwen (eds.), Textbook for the Study of Space Operations (Beijing: Military Science Publishing House, 2013), p. 1.

Commercial Dual-Use Technology Addressing Emerging Spectrum Threats and Vulnerabilities

ExoAnalytic Global Telescope Network

info@exoanlytic.com – Clint Clark

World's largest commercial optical telescope network – 300 Units Tracking Chinese Satellite Loitering – Looking at EXPLOITABLE TIME when they don't have Situational Awareness



CompassData

haydenh@compassdatainc.com

CompassData

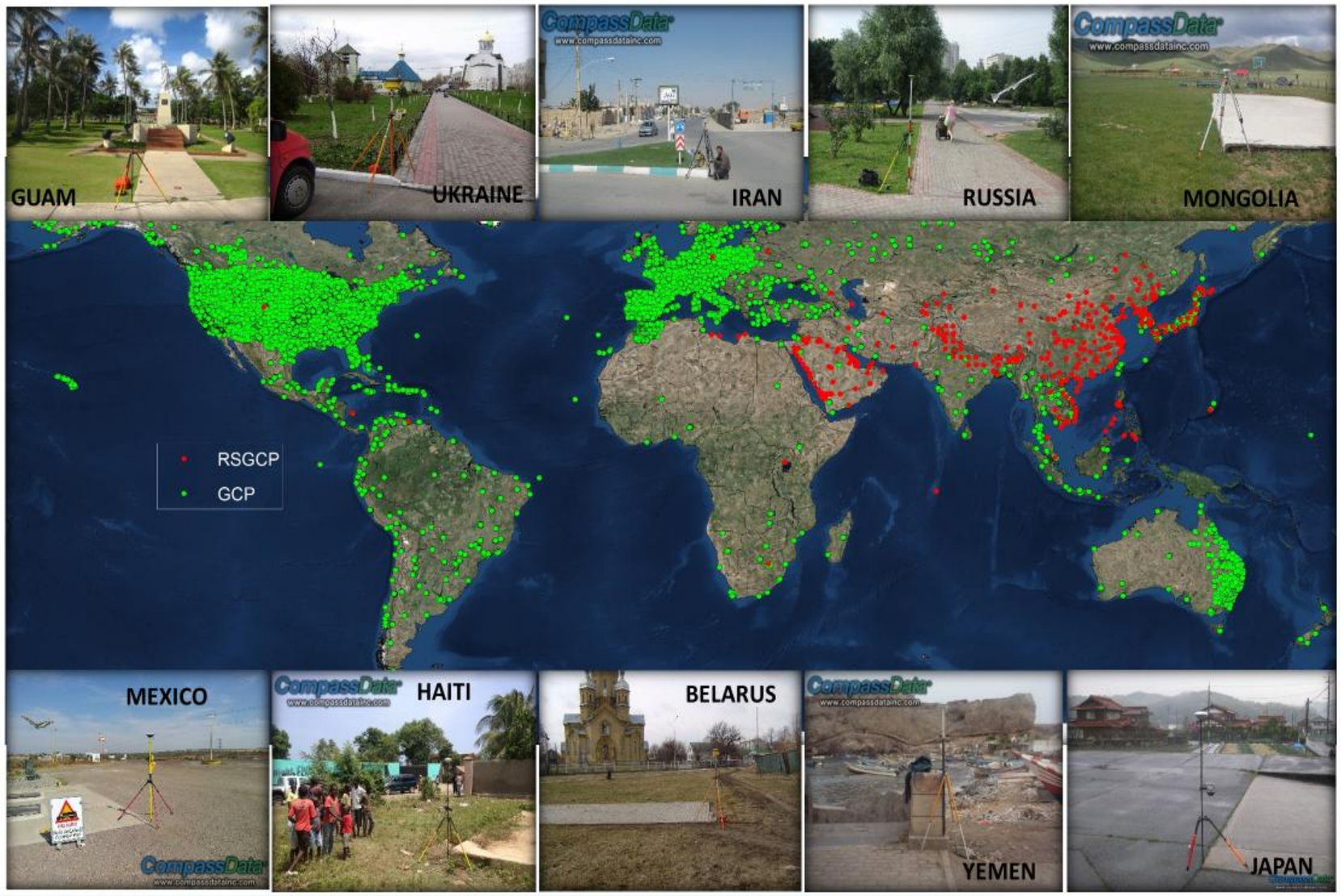
Ground Control Point Archive

Global Survey Content

100,000 Photo Identifiable GCPs available off the shelf for license and subscription models

Global geodetic expertise

Accuracy verification or enhancement through rectification



Aerostar

https://www.aerostar.com

US INDOPACOM

Addressing Agile, Flexible Space Solutions

IndoPACOM Crimson Viper providing a low-cost entry point – for commercial dual use technologies August 5-16, 2024, Thailand

SDA: Fuse, Use, Analyze and Inform Invert 2-D Hyperspectral Imager

UNITED STATES AIR FORCE ACADEMY

Space Domain Awareness Reference

Ch.	Title	Authors
1.	Space Domain Awareness (SDA)--Overview	Dr(s). Jim Shell, Moriba Jah, Wiley Larson
2.	Strategy and Tactics for SDA	Dr. Donald Lewis
3.	Characterization of the Space Environment	Dr. Ryan Weisman
4.	Space Object Motion and Events	Dr(s). Marek Ziebart, Carolin Fruh, Matt Hejduk
5.	Sources of Information (Hard and Soft Inputs)	Dr(s). Jim Shell, Francis Chun, Roger Tippets, Rex Kiziah and John Garnham
6.	Information Organization, Storage and Management	Dr(s). Ramona Walls, Peter Jansen
7.	Exploitation, Fusion and Inference of Information on Space Objects and Events	Dr(s). Emmanuel Delande and Jeremie Houssineau
8.	SDA and Decision-Making for Flight Safety, Sustainability and Security	Marc Berkowitz
9.	End-to-End In-Situ Orbit Sensing Example	Maarten Meerman, Kathleen Coderre, Pam Magee
10.	**SDA Spacecraft Object Identification—Fuse, Use, Analyze and Inform**	**Dr(s). Shawana Johnson, Michael Warren and Timothy Stratman**

SDA: Fuse, Use, Analyze and Inform

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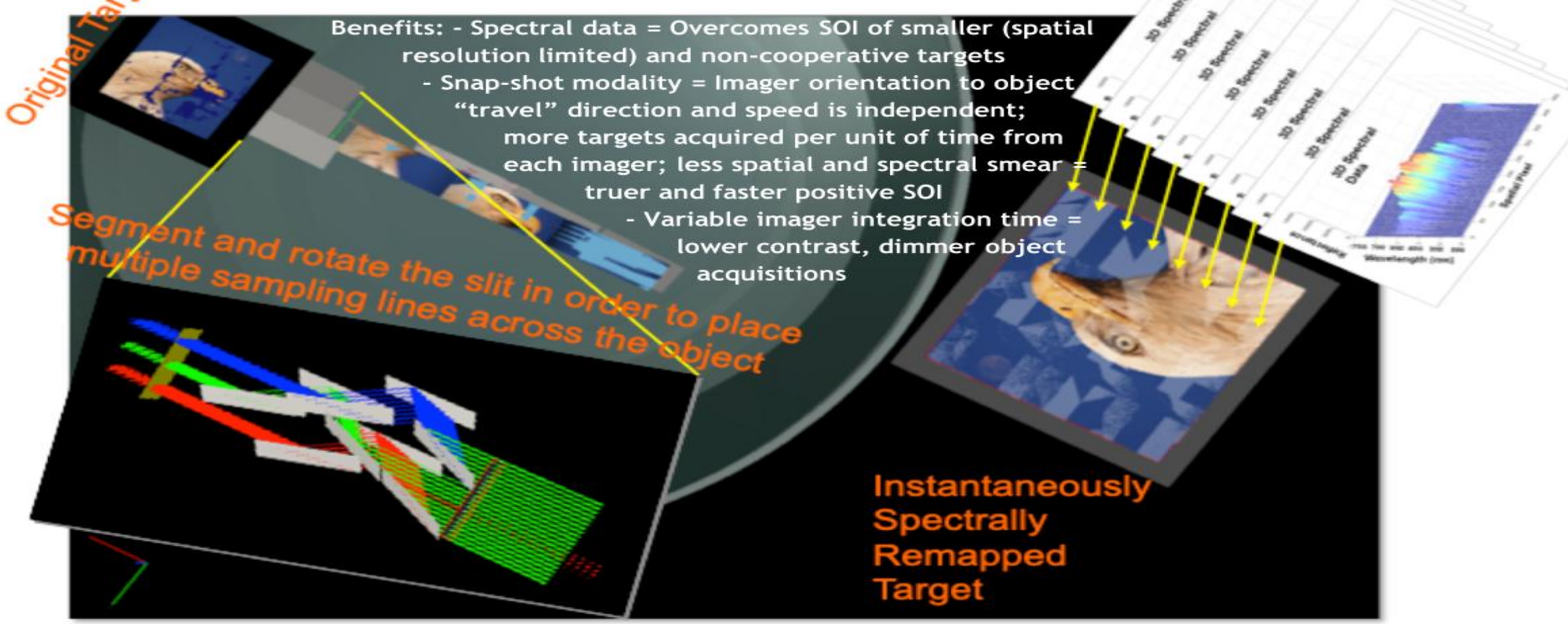
2D Hyperspectral Imager

Chapter 10 - Fuse, Use, Analyze and Inform[ation] - (FUAI)

- 2D Remapping = Instantaneous Hyperspectral Imaging of an Area



Emerging Spectrum Challenges Cyber Vulnerabilities

Cyber Vulnerabilities

SPACE

- **USE** – space debris as the hack vehicle
- **HOW** – use circa 1980-1990's satellites
- **WHY** – age, Hard to attribute, cheap,
- **Provides** – Anti-Access, Area Denial through collision

Jun-22

Cyber Vulnerabilities

AIR

- **USE** – Manned and Unmanned
- **HOW** – BLOS Systems, Mesh, Other
- **WHY** - Provides – Precision Strikes, due to Comms Interference

Jun-22

Cyber Vulnerabilities

Terrestrial

- **USE** - Ground Based Communications Systems, Manufacturing Systems
- **HOW** – Ground stations, SCADA Systems
- **WHY** – Cheap and a Key Access to NATO
  - PNT
  - ISR
  - Missile defense
  - Comms – Radio, CBRS
  - Weather
  - SSA

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Notable Events

What is Impact of Cyber – Space?

Wicked Problems & Perfect Storms

- Colliding/Convergent Domains (Cyber, Physical, Social, Economics…)
- Unmanaged Assets, Hidden Dependencies
- Disruptive & Transformational Trends in compute and social media
- Lack of imagination – Novel and Emerging Threats

Protecting Cyber Supply Chains

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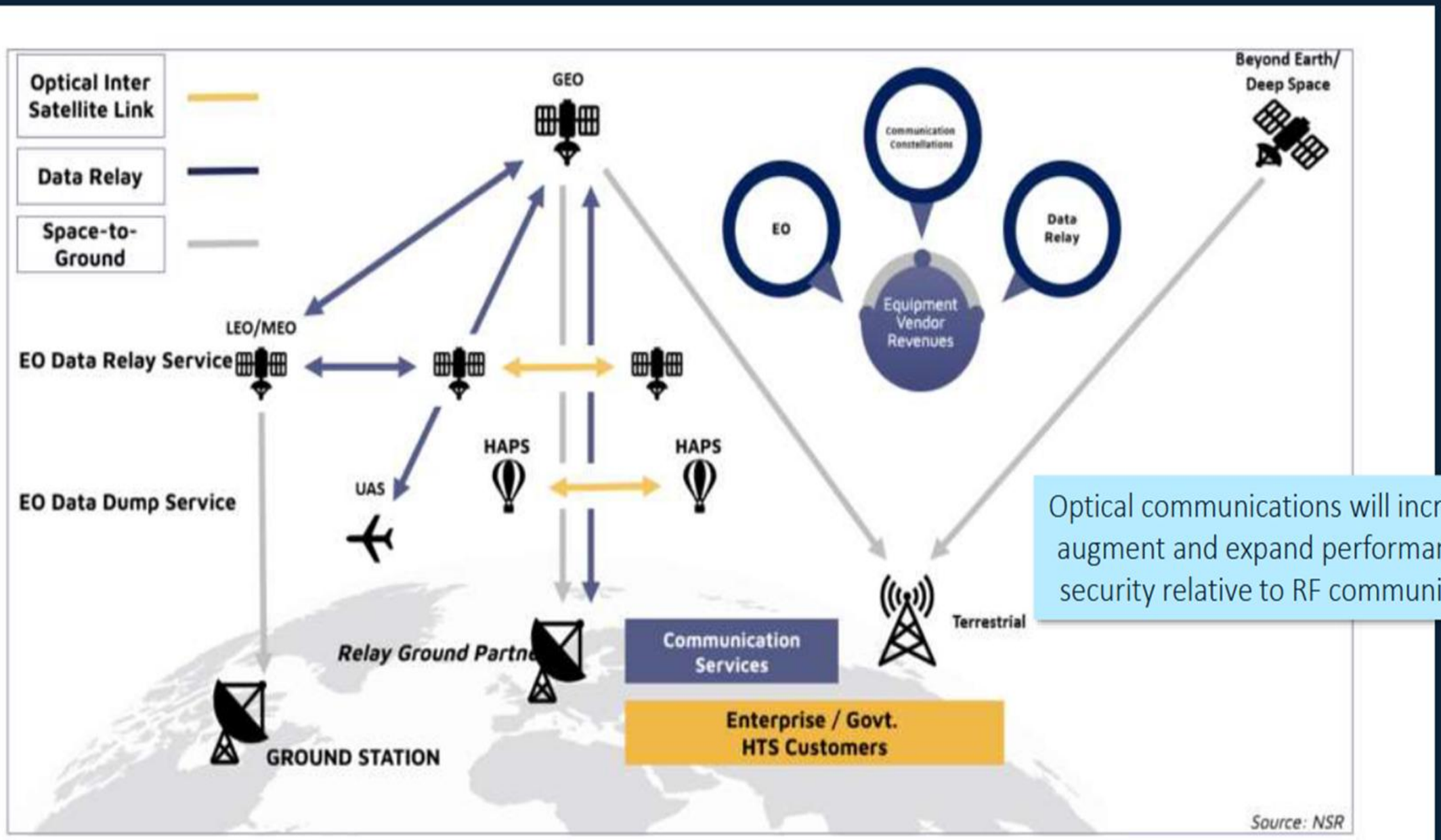
Progress: US Cyber Focus & Advanced Architectures

Hybrid LEO/MEO/GEO SATCOM Architecture



Optical communications will increasingly augment and expand performance and security relative to RF communications

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Progress: ALL DOMAIN SENSING CROSS FUNTIONAL TEAM

CONNECT THE EDGE TO EVERY DOMAIN

Progress: US CYBER COMMAND Air Force – Salt Typhoon Hack

General Timothy Haugh said the hack — which some in the intelligence community called "mind-boggling" — is just one part of China's global cyber program. "So that is an area that we have to continue to be able to educate our allies, our partners and the American people of what the [Chinese] intent is, whether it be coming at our critical infrastructure or intending to do collection through a large-scale series of operations against our telecommunications industry,"

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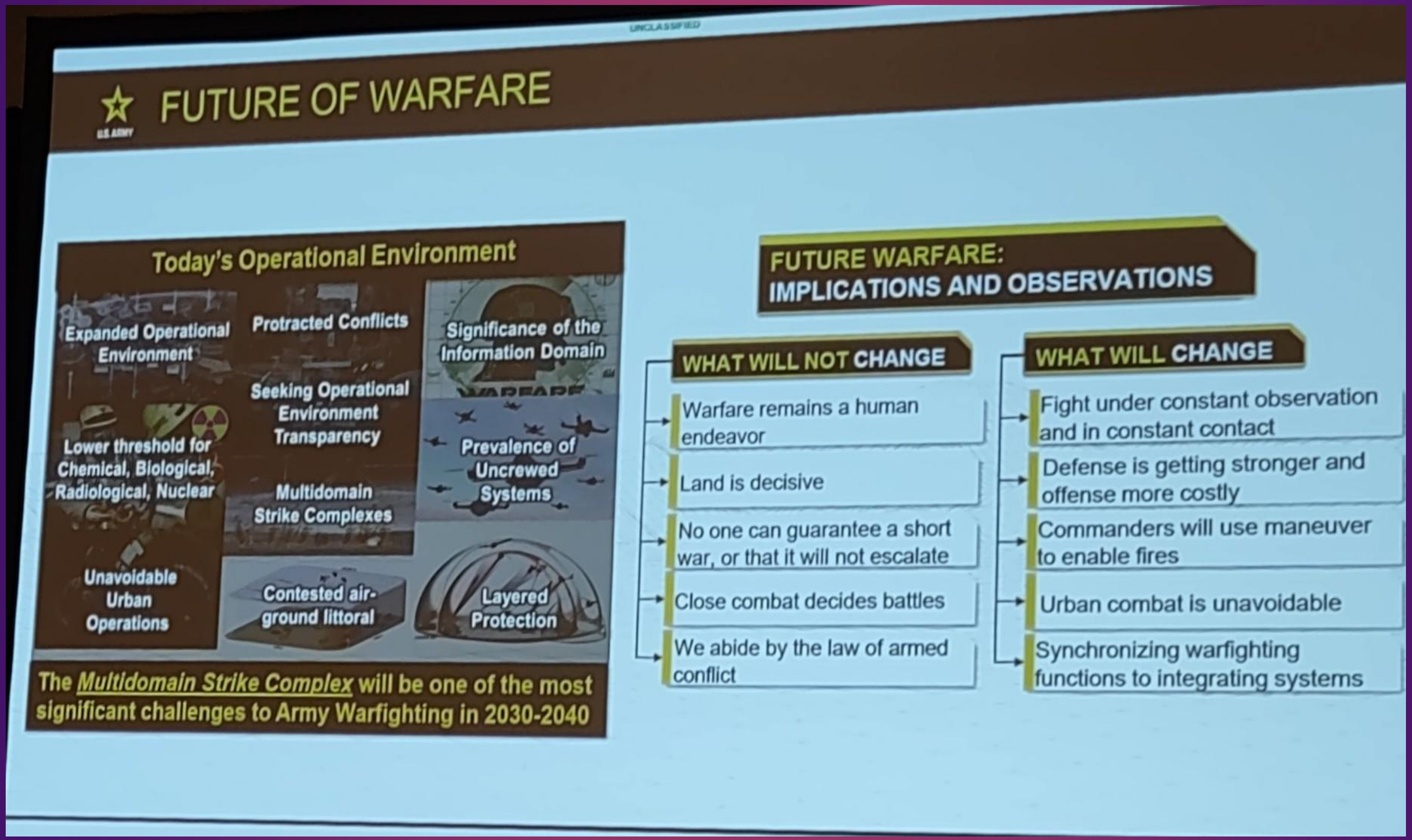
Progress: US Cyber Focus
Army Cyber Command & Army Futures



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Progress: US Cyber Focus Army Cyber Command

The Problem

Operational Environment:

- The operational environment is impacted by rapid technological advancements changing the character of war
- More actors/emitters with a lower barrier of entry (SDRs, Sensors, Etc…)
- The ability to be seen in the EMS is lethal

Recent Army assessments:

- 2021 Cyber Center's *"STARBLAZOR" Reprogramming study*
- 2023 *Army CEMA 120-Day Study*
- 2023 *HQDA EW Capabilities Portfolio Review*
- 2024 *CEMA Lessons Learned from Russian-Ukraine War Info Paper*

***concluded that* the US Army must improve its ability to:**

- Triage and characterize signals of interest
- Understand, Maneuver, Fire in the EMS – friendly, neutral and adversary signals
- Rapidly develop RF effects
- Achieve agility in the EMS = Distinct battlefield advantage

The RF Data Pilot conducts experimentation to identify enterprise requirements for RF data triage, transport, follow-on data analysis and countermeasure / RF effects capability development.

Counterspace Tactics – EDGE AI

BLOG

Deploying AI at the edge: Enhancing military readiness and response

By Stan Crow, EdgeCortix

There is a lot of talk about terms like the military edge and artificial intelligence (AI) and their impact on military capability. Many of these conversations start with questions like "What is the edge?" "What is artificial intelligence?" and "What do edge computing and AI imply for embedded systems in the defense market?" Edge computing and AI are two powerful technologies that, when combined, significantly enhance operational capabilities.

Edge computing is the processing of data closer to the source rather than in centralized data centers or cloud environments. An example of edge computing is real-time data analytics on the

with the moves now informing major U.S. defense programs. The U.S. Department of Defense (DoD) "Replicator" program and the Air Force's Collaborative Combat Aircraft program are aiming to create uncrewed wingmen or even fleets that would operate autonomously without constant control by ground-based command centers.

> Cybersecurity tools can use edge AI to help spot probing patterns before full-scale attacks develop. Once an attack begins, AI close to the point of the cyberattack can guide system and network responses to mitigate damage faster than human personnel can respond.

There are several advantages to AI inference at the edge in military operations. Some examples include:

› Advanced autonomous systems: AI-enabled drones or autonomous

Counterspace Tactics

“The US no longer has space superiority, China has it. Everyone must tell the message we CAN’T let China have power in Space they will behave in Space they way they do on the Ground.”

Stated Major General Gregory J. Gagnon, Deputy Chief of Space Operations for Intelligence, US Space Force, Mitigating Threats to Space Operations through Intellgnce, Collection and Analysis, June 5, 2024 -7th Smallsat & Space Access Summit, National Harbor, MD

Thank You!

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