



Cybersecurity Research and Practice

Presented by

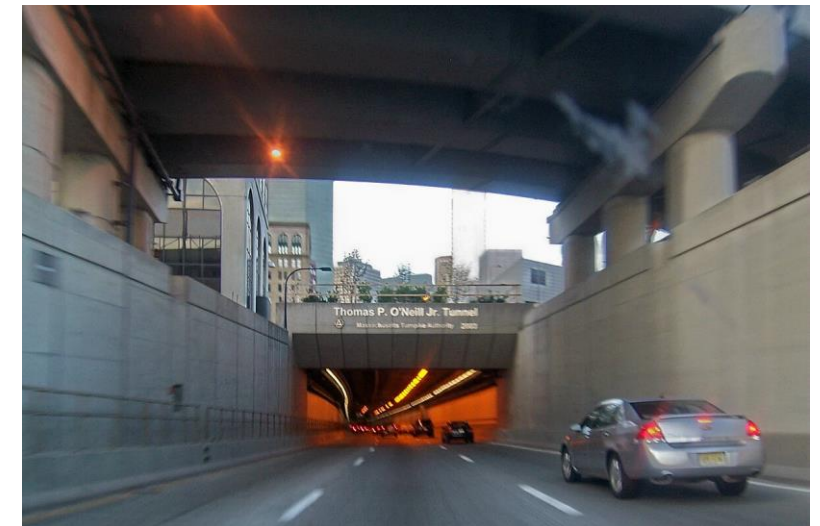
Chester Osborne, Joseph Herr, & William Lyons

October 9, 2025

Cyber Infrastructure Threat

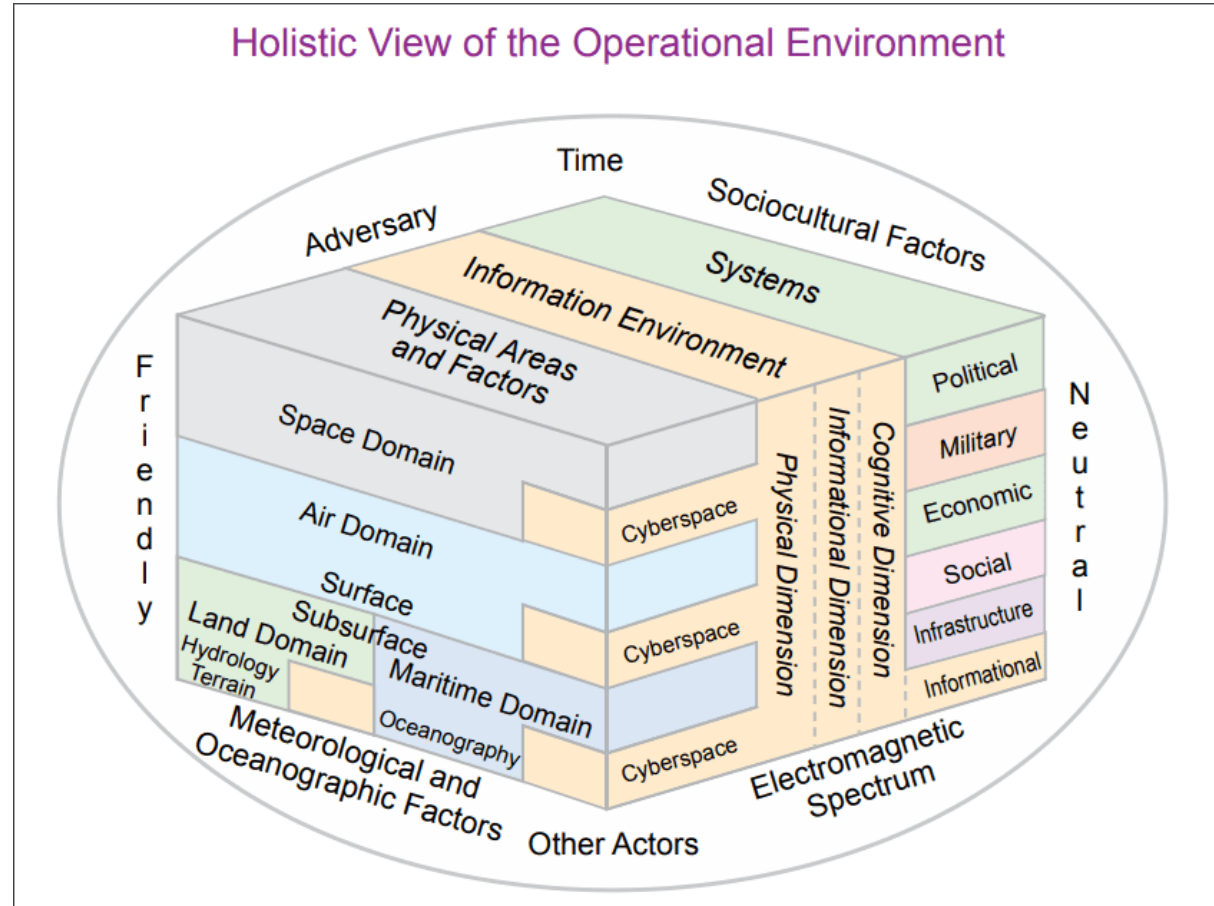


Cyber Risk to Infrastructure



How to Nation States think About Warfare?

- Shaping
- Overt
 - Kinetic
 - Non Kinetic
- Covert
 - Kinetic
 - Non Kinetic
- Attributable
- Non-Attributable



Bad Actors with Motivation and Ability

State and Non- Actors

Non-State Actors

For Profit

For Effects

-Disrupt: Functionality, Confidence

-Deny: Leverage, Create Openings

-Corrupt: Spoof or Remove Value

Instruments of National Power			
D Diplomatic	I Informational	M Military	E Economic
▪ Embassies/ Ambassadors ▪ Recognition ▪ Negotiations ▪ Treaties ▪ Policies ▪ International forums	▪ Military information ▪ Public diplomacy ▪ Public affairs ▪ Communications resources ▪ International forums ▪ Spokespersons, timing, media and venues for announcements	▪ Military operations ▪ Engagement, Security Coop, Deterrence ▪ Show of force ▪ Military technology ▪ Size, composition of force	▪ Trade policies ▪ Fiscal and monetary policies ▪ Embargoes ▪ Tariffs ▪ Assistance

Why Cyber

Can be Cost and Risk Effective

Operational Preparation of the Environment

Pre kinetic

Coordination of fires

Not Attributable

No "Boots on Ground" (Sometimes)

Key Component of Everyday Life

Negates Need for "Over the Beach Capability"

Ability to recover assets for asulters benefit



Current Military Capabilities

Green Berets use disruptive cyber technology during Swift Response 2024

By Sgt. 1st Class Tim Beery August 27, 2024



RELATED STORIES

OCTOBER 13, 2022
TMF Board selects the Army Critical Infrastructure Cyber Protection Project for investment

SEPTEMBER 28, 2022
New E-EFMP system supports Army families with special needs members

APRIL 12, 2022
U.S. Army STAND-TO! | Army Organic Industrial Base Modernization Implementation Plan



Pentagon backs SOCOM model for Cyber Command amid calls for separate cyber force

"Our preference was the SOCOM-like model," Army Lt. Gen. William Hartman said.



Anastasia Obis

May 20, 2025 6:38 pm ⌚ 4 min read



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The Sad and Sorry Tale of Cyber Command's Seven-Year Failure

ADEN MAGEE

September 4, 2025



Reframing the Special Operations Forces-Cyber-Space Triad Special Operations' Contributions to Space Warfare

Space & Missile
Defense 2024

Maj. Brian Hamel, U.S. Army

[Download the PDF](#)

SOF has a culture of decentralized combat operations with a focus in the human domain.

—Col. Mark Orwat

Humans are always in the loop of spacepower.

—Dr. Bleddyn Bowen

By the Numbers

36,000 malicious scans per second in 2024

97 Billion Exploitation attempts globally in 2024

1.7 Billion Stolen Credential Record

In 2024 more than 40,000 vulnerabilities were added to the National Vulnerability Database – 23% increase over 2023

Headlines

Unauthorized message appears on Moanalua Freeway sign

By Jeremiah Estrada Dec 30, 2024 Updated Dec 30, 2024 6

Alabama digital road sign hacked to display white supremacist messages

[Computing](#) > [Internet](#) > [Online Security](#)

Hacking an Electronic Highway Sign is Way Too Easy

News By Jill Scharr published June 6, 2014

Warning: hackers ahead? Electric highway signs are very easy to hack — especially a certain brand which uses the same default password.

CYBERSECURITY

Maryland Cyber Attack Interrupts Bus Tracking, Exposes Data

The matter impacted the state Department of Transportation and has, the Maryland Transit Administration said, resulted in “incident-related data loss.” Real-time bus tracking is unavailable on some routes.

September 29, 2025 • Journey Burris, Baltimore Sun



Kansas City, Kansas, police, fire non-emergency services impacted by ‘network incident’

By Robert A. Cronkleton

May 22, 2024 10:10 AM | Gift Article

Cyber Security Balancing Act

- › *Balancing Security vs Friction for users / slow down buisness*



Legacy Systems

- › *Stand alone cabinets or closed loop systems.*



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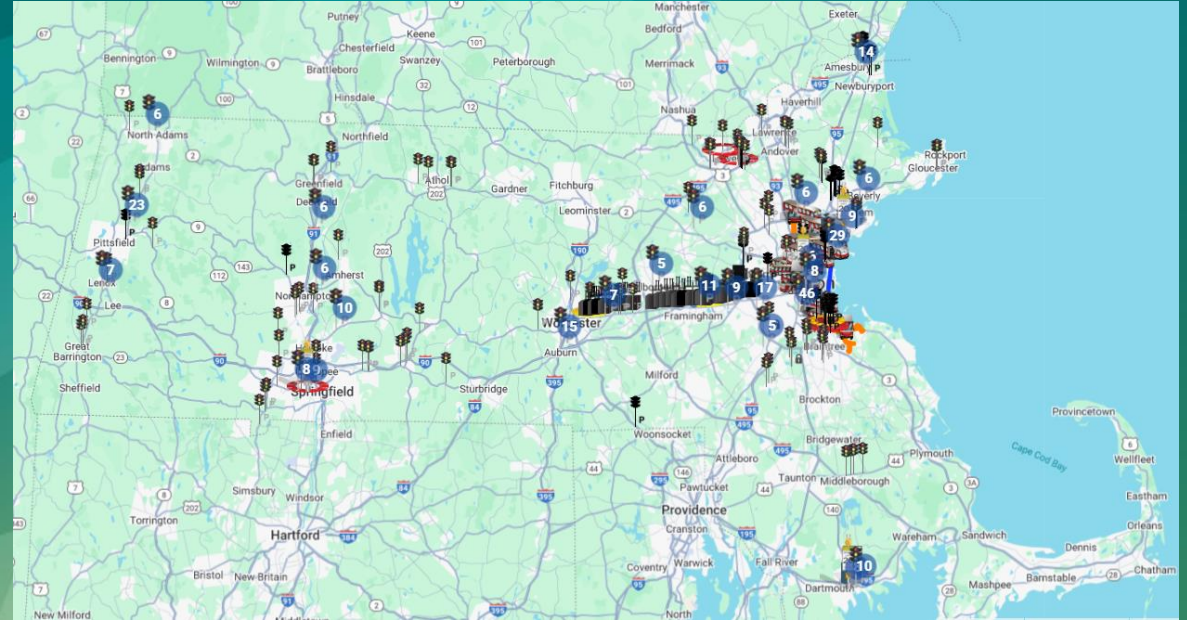
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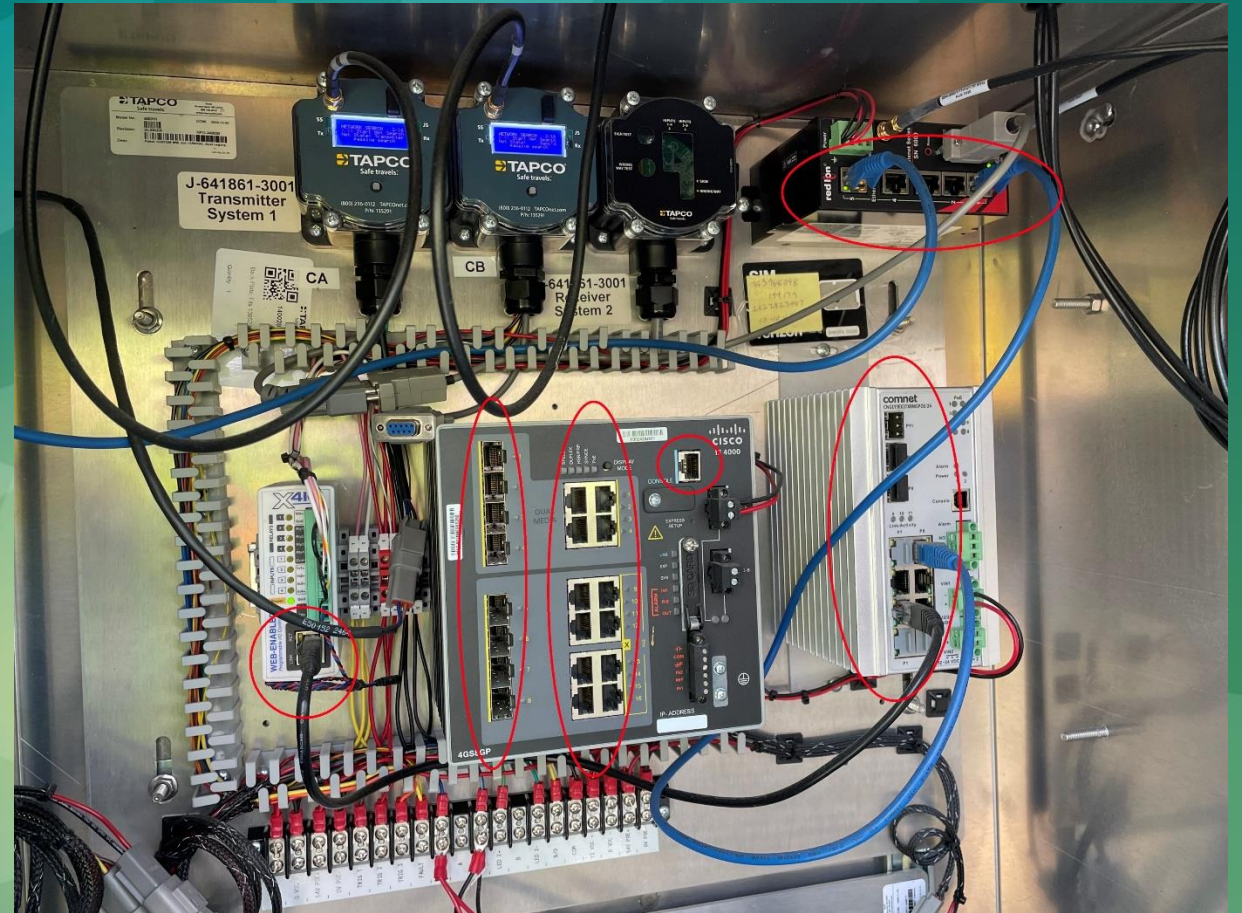
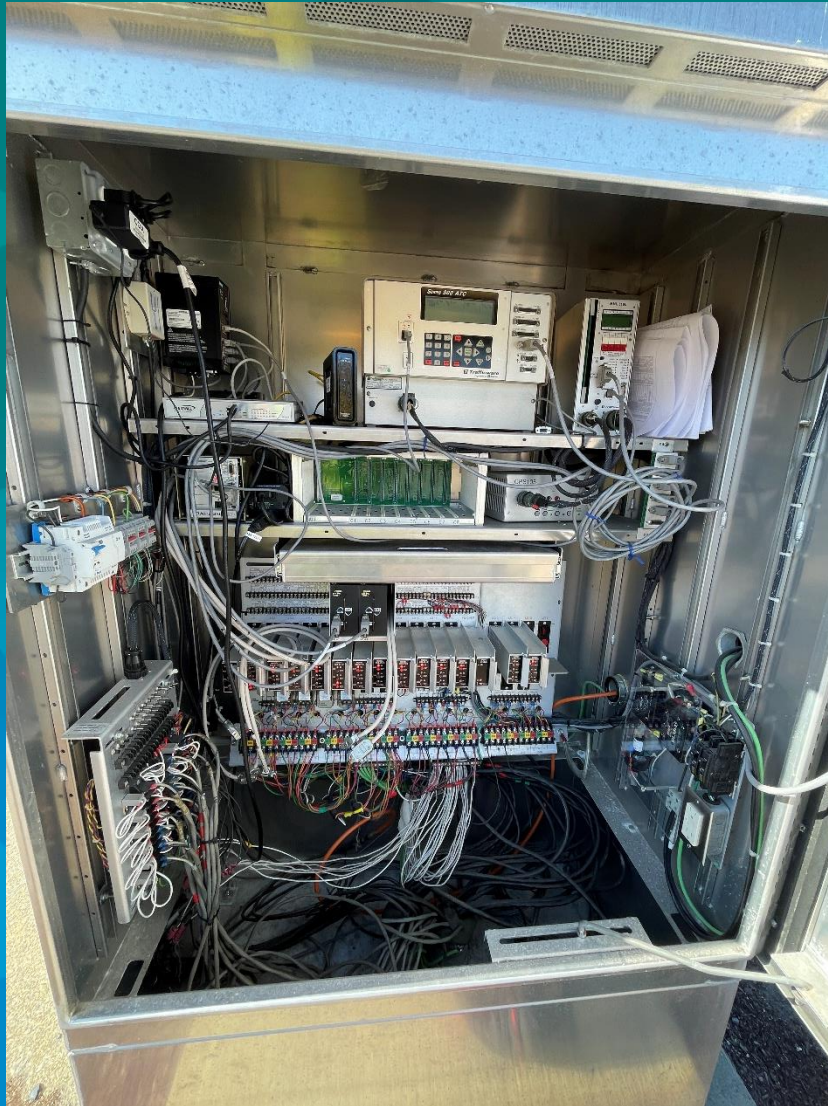
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Additional Difficulty



Physical Access



Industry Improvements

- › Strong Passwords (Not reused)
- › MFA
- › Anti-Virus
- › Software Patches/updates
- › VPN
- › Air Gap or Isolated Systems
- › Properly Configured Firewalls
- › Monitor systems / Pen Tests
- › Training/Informed Staff
- › System Logs

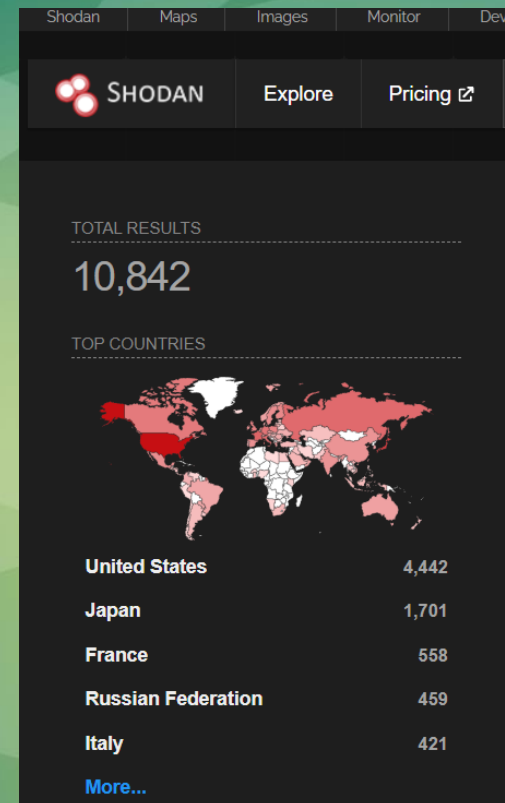
Time it takes a hacker to brute force your password in 2025

Hardware: 12 x RTX 5090 | Password hash: bcrypt (10)

Number of Characters	Numbers Only	Lowercase Letters	Upper and Lowercase Letters	Numbers, Upper and Lowercase Letters	Numbers, Upper and Lowercase Letters, Symbols
4	Instantly	Instantly	Instantly	Instantly	Instantly
5	Instantly	Instantly	57 minutes	2 hours	4 hours
6	Instantly	46 minutes	2 days	6 days	2 weeks
7	Instantly	20 hours	4 months	1 year	2 years
8	Instantly	3 weeks	15 years	62 years	164 years
9	2 hours	2 years	791 years	3k years	11k years
10	1 day	40 years	41k years	238k years	803k years
11	1 weeks	1k years	2m years	14m years	56m years
12	3 months	27k years	111m years	917m years	3bn years
13	3 years	705k years	5bn years	56bn years	275bn years
14	28 years	18m years	300bn years	3tn years	19tn years
15	284 years	477m years	15tn years	218tn years	1qd years
16	2k years	12bn years	812tn years	13qd years	94qd years
17	28k years	322bn years	42qd years	840qd years	6qn years

Stay Informed and Vigilant

- › **Malware: Virus, Worms, Trojans, Ransomware, Spyware**
- › **Social Engineering: Phishing, Vishing**
- › **Denial-of-Service(Dos/DDoS) Attacks**
- › **SQL Injection**
- › **Man-In-the Middle Attack**
- › **Zero Day Exploits**
- › **Hardware Hacks: Bash Bunny, Rubber Ducky, Wifi Pineapple, OMG Cable**



Transportation Cyber Collaboration Model

- Industry, Government, and Academia
- Use of Laboratory Facilities to Test Concepts
- Norwich's Cyber Fusion Center Transportation Lab
- Open for Scholarly Research, Development, & Testing...but also
- Collaboration with Industry and Government
- V2x and Penetration Concepts– V2V, V2i, all vulnerabilities



Thank you!



Questions?