# SPACE CYBERSECURITY

## WHY IT MATTERS & WHAT YOU CAN DO

Presented by Tim Fowler

ETHOS LABS

# AGENDA

- What is Space Cybersecurity?

- Why Does it Matter?

- What are the Challenges?

- What Can You Do?

- Final takeaways.

# WHAT IS
# SPACE CYBERSECURITY?

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# KEY AREAS OF SPACE CYBERSECURITY

- Space Segment (Satellites & Payloads)

- **Ground Segment (Mission Control & Ground Stations)**

- Communication Links (RF & Optical)

- Supply Chain Security

- Space Cyber Threats

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# SECURING THE SPACE SEGMENT

- **Protecting onboard computers and software from malware and unauthorized access.**

- **Preventing satellite hijacking or spoofing of control signals.**

- **Ensuring secure firmware and software updates.**

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# SECURING THE GROUND SEGMENT

- **Securing command and telemetry systems to prevent unauthorized control.**

- **Hardening network infrastructure against cyber intrusions.**

- **Implementing strong authentication and encryption for data transmissions.**

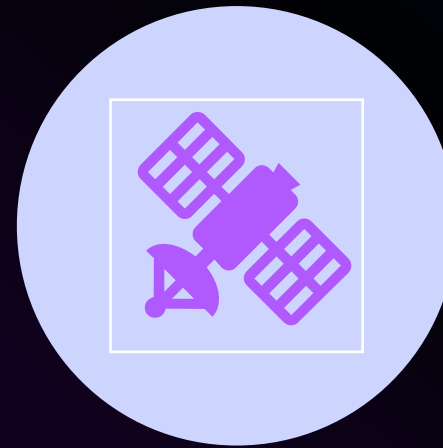ETHOSLABS

# SECURING COMMUNICATIONS

- **Encrypting telemetry, tracking, and control (TT&C) signals.**

- **Preventing jamming, spoofing, and eavesdropping on satellite communications.**

- **Using frequency-hopping or spread-spectrum techniques for resilience.**

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# SECURING THE SUPPLY CHAIN
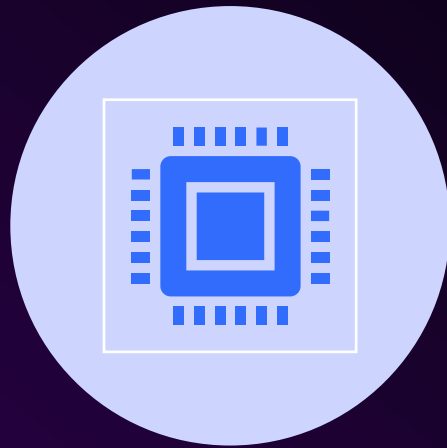
ENSURING COMPONENTS AND
SOFTWARE IN SPACE SYSTEMS ARE
FREE OF BACKDOORS.

SECURING SATELLITE
MANUFACTURING, LAUNCH, AND
DEPLOYMENT PROCESSES.

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# UNDERSTANDING SPACE CYBER THREATS

- Jamming & Spoofing – Disrupting or faking signals to manipulate satellite behavior.

- Malware & Ransomware – Infecting satellite systems to disable operations.

- Data Exfiltration – Stealing sensitive telemetry or mission data.

- Insider Threats – Employees or contractors compromising security.

- Nation-State Attacks – Advanced persistent threats (APT) targeting space assets.

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# WHY DOE IT

# MATTER?

# IT MATTERS BECAUSE...
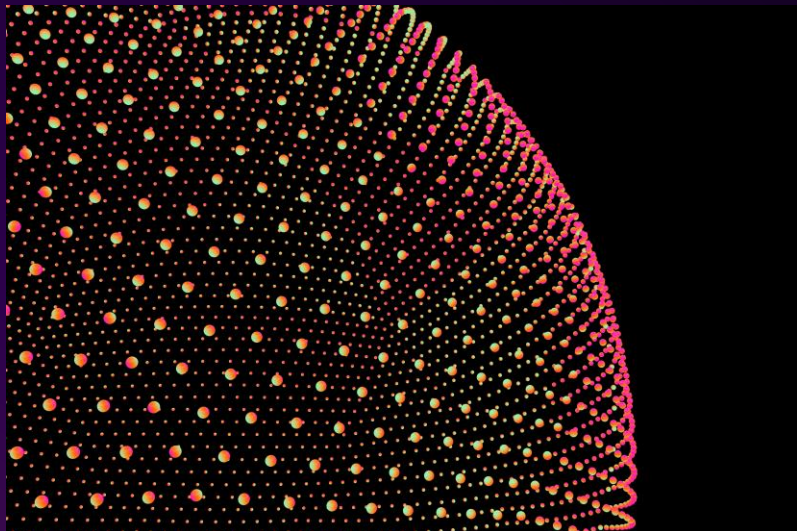
Space is No Longer Just Science—It's Critical Infrastructure

The Rise of Space Commercialization = More Attack Surfaces

Nation-State and Military Conflicts Have Extended into Space

Lack of Cybersecurity Standards Leaves Space Systems Exposed

Legacy Systems in Orbit Are Vulnerable

Space Cyber Attacks May Be Easier Than You Think
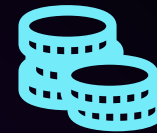
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# IT MATTERS BECAUSE...

Integral Role of Space Systems in Daily Life

Rising Cyber Threats to Space Assets

Geopolitical Tensions and Cybersecurity

Economic Significance of the Space Industry

Initiatives to Enhance Space Cybersecurity

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# WHAT ARE THE
# CHALLENGES?

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# UNIQUE CYBERSECURITY CHALLENGES IN SPACE

- Inaccessibility of Space Assets

- Long Mission Lifespans with Outdated Technology

- Limited Computing Resources

- High Latency & Disrupted Communications

- No Real-Time Patching or Updates
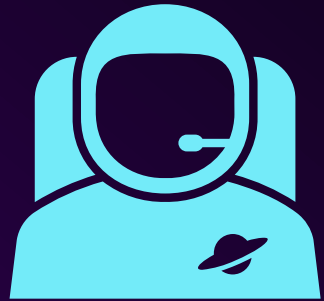
- Hostile Operating Environment

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# WHAT CAN
# YOU DO?

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SPACE CYBERSECURITY IS HERE

AND IT'S A GROWING INDUSTRY

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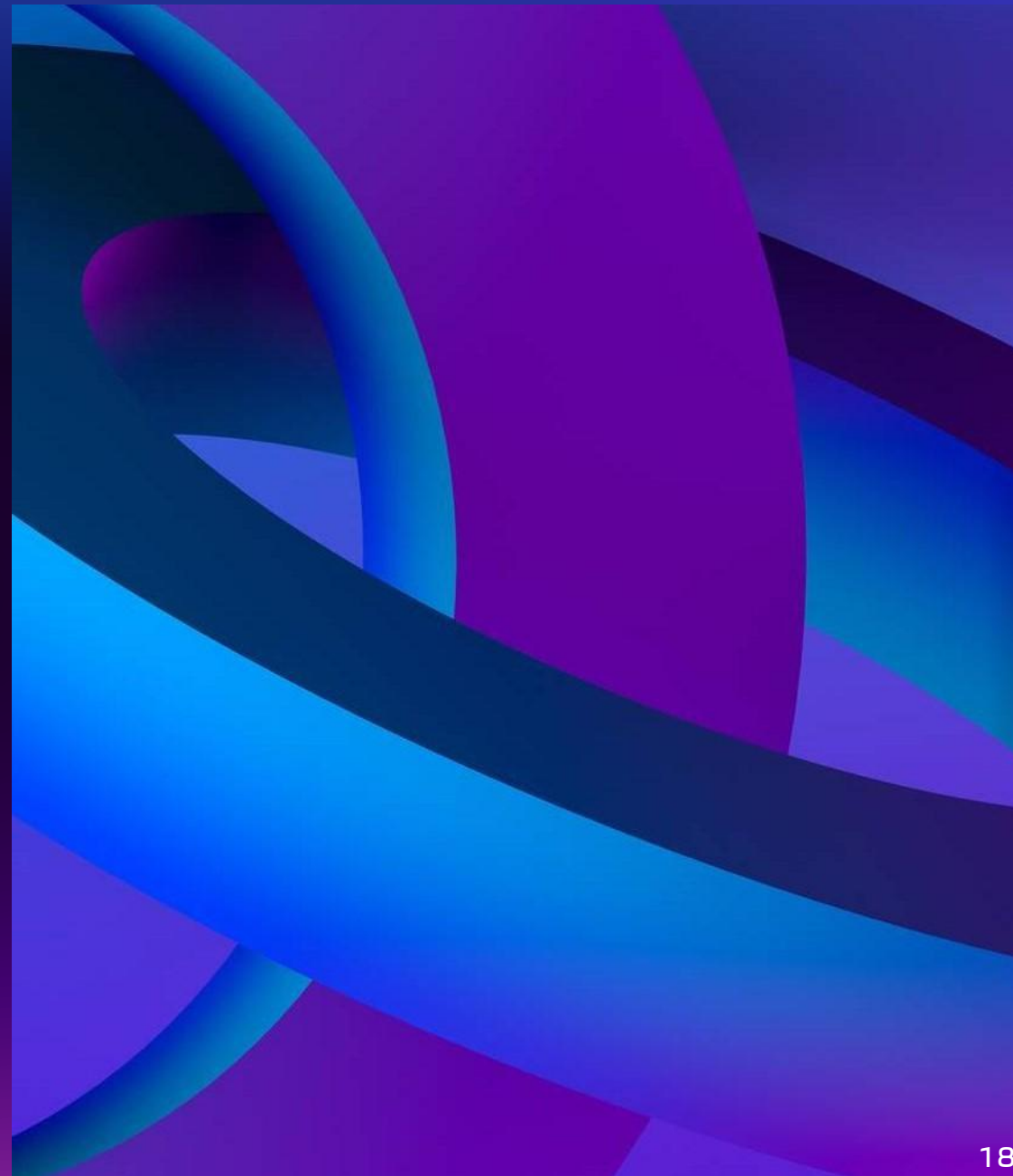# LEARN THE FUNDAMENTALS

Space

Cyber

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BE WILLING TO

LEARN
SOMETHING NEW

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# PICK YOUR SIDE

## Space

- ADCS
- TLE
- GEO
- LEO
- MEO
- SSO
- RCS
- ΔV (Delta-V)
- DSN
- COTS
- ITAR
- CCSDS
- TDRS
- GNSS
- STP
- EPS
- BOL / EOL
- SDA

## Cybersecurity

- APT
- SOC
- SIEM
- C2
- EPP
- XDR
- MITM
- IoC
- TTPs
- FIM
- RBAC
- EASM
- ZTNA
- PKI
- EDR
- DLP
- OWASP
- PPL

# POSSIBLE CAREER TRANSITIONS

Many **traditional cybersecurity roles** are becoming relevant to space systems:

- **Network Security Engineers** → Secure ground station networks.

- **Cloud Security Experts** → Secure satellite operations that rely on cloud-based infrastructure.

- **Penetration Testers** → Test ground stations, satellite telemetry, and mission control systems.

- **Incident Responders** → Develop frameworks for responding to satellite cyberattacks.

- **SOC Analysts** → Monitor space-based threats and detect anomalies in satellite data.

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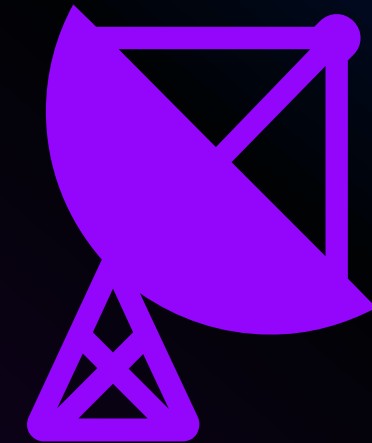
# FINAL TAKEAWAYS

- Space Cybersecurity is Here
  - There will be an influx of roles as the industry matures

- The Challenges of Operation in Space are never insignificant
  - The operating is actively working against you.

- You can get started now
  - Books, Trainings, Research, etc.

- Jump in…
  - Start the conversation and keep it going!
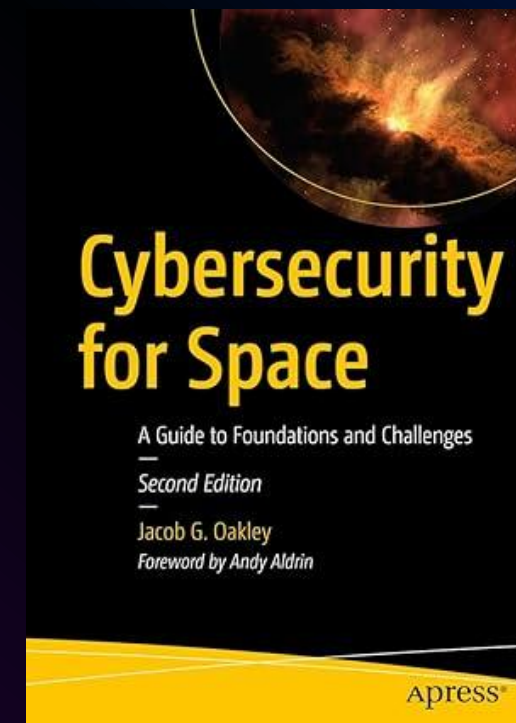
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ANTISYPHON TRAINING
POWERED BY BHIS

FOUNDATIONS
IN SPACE
CYBERSECURITY

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**Red Team Summit**
March 20 & 21, 2025
https://www.antisyphontraining.com/course/foundations-in-space-cybersecurity-with-tim-fowler/

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# THANK YOU

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