



“ Rooted in trust, growing in security “

## **5-Day Workshop on Space Cybersecurity**

### **Day 1: Introduction to Space Systems & Cybersecurity Challenges**

#### **Session Topics:**

- Overview of Space Assets: Satellites, Probes, ISS, Ground Stations
- Communication Protocols: RF, Optical, SpaceWire, CCSDS
- Cyber Threats in Space: Nation-State Attacks, Jamming, Spoofing
- Real-World Case Studies: GPS Spoofing, Satellite Hijacking

#### **Practical Exercises:**

- Live Satellite Tracking & Data Analysis
- Utilizing GNU Radio for Basic RF Signal Analysis
- Capturing and Processing NOAA Satellite Signals
- Extracting and Interpreting Received Telemetry Data

### **Day 2: Securing Space Communications**

#### **Session Topics:**

- Vulnerabilities in Satellite Communications: Interception, Jamming
- Encryption & Authentication Methods in Space Systems
- Introduction to Quantum Cryptography & Future Security Challenges

#### **Practical Exercises:**

- Simulating Secure Satellite Communications
- Using GNU Radio to Simulate Ground-to-Satellite Transmission
- Implementing Basic Encryption Techniques in Simulated Environments



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## **Day 3: Attacks on Space Infrastructure**

### **Session Topics:**

- Cyberattacks Targeting Spacecraft & Ground Stations
- Spaceborne Malware: Threats to Onboard Computers
- Case Study: Russian SATCOM Hack (2022)

### **Practical Exercises:**

- Identifying and Analyzing Vulnerabilities in a Simulated Satellite Control System
- Using GNU Radio to Detect Weak Signals and Unauthorized Transmissions

## **Day 4: Defending Satellite Networks**

### **Session Topics:**

- Threat Detection & Incident Response in Space Cybersecurity
- AI & Machine Learning Applications in Space Threat Intelligence
- Role of Blockchain in Securing Space Data

### **Practical Exercises:**

- Simulating a Jamming Attack & Implementing Defense Mechanisms
- Using GNU Radio to Simulate RF Jamming Scenarios
- Developing and Testing Anti-Jamming Techniques (e.g., Frequency Hopping)

## **Day 5: Policy, Regulations & Final Project**

### **Session Topics:**

- ITU & NASA Regulations on Space Cybersecurity
- Ethical Hacking & Responsible Disclosure in Space Systems
- Future Trends & Challenges in Space Cybersecurity