



**RAJIV GANDHI INSTITUTE OF  
TECHNOLOGY**

Department of Computer Science & Engineering

# **Satellite Network Hacking & Security Analysis**

**UNDER THE GUIDANCE OF  
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**Presented By**

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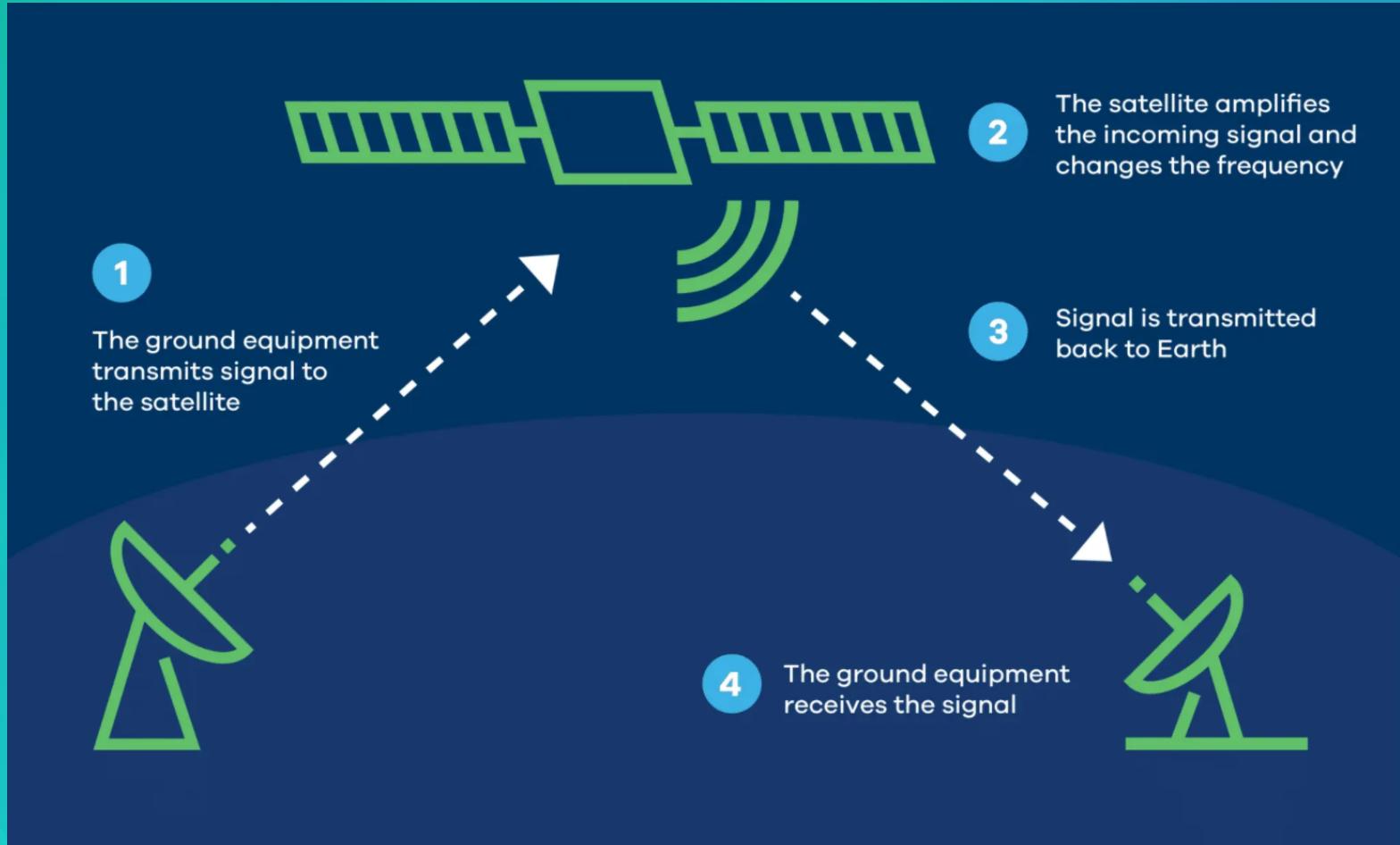
# ABSTRACT

- Satellites play a significant role in communication, early warning systems, global broadcasting, meteorology, navigation, reconnaissance and surveillance.
- Satellites are strategic asset for any country and are considered “critical infrastructure”
- However, space technology has been largely overlooked by the security point of view
- Therefore they are considerable as privileged targets for a possible cyber attack.

# INTRODUCTION

- Satellites play a crucial role in our contemporary society.
  - They are used in both private and public sectors for numerous purposes, from research to communication.
  - Unfortunately, with the diffusion of this complex system, the interest of governments and hackers also increased.
- Take a look into:
    - satellite network security
    - satellite network treats and security analysis,
    - satellite network vulnerabilities,
    - satellite network hacking

# How Does A Satellite Work ?



# Satellite Threat Actors

Attacker Type	Example Motivation	Techinal Capability
National Military	Space Control Anti-Satellite Weapons	High
State Intelligence	Counter-Intelligence Technology Theft Eavesdropping	High
Industry Insiders	Sabotage Espionage	High
Organized Crime	Eavesdropping Ransom Technology Theft	Moderate
Commercial Competitors	Sabotage Technology Theft	Moderate
Terrorists	Soceital Harm Message Broadcasting	Low
Individuals	Personal Challenge	Low

# How to go about doing so

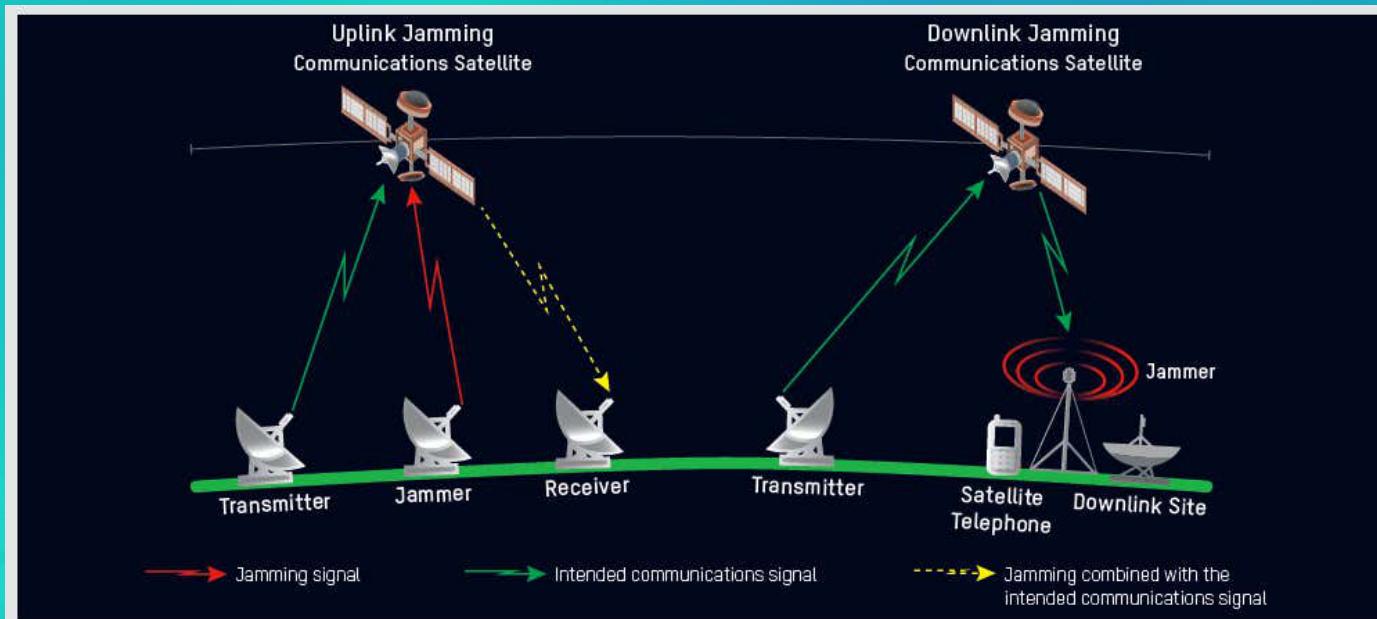
- Attacking the satellites themselves
- e.g. via control system exploitation
- Attacking satellite ground stations
- e.g. via traditional network intrusion

# Types of Attacks

There are just too many...

# Jamming

- It's a form of electronic anti-satellite attack that interferes with satellite communication.
- Doesn't physically damage the satellite
- Types: uplink jamming and downlink jamming

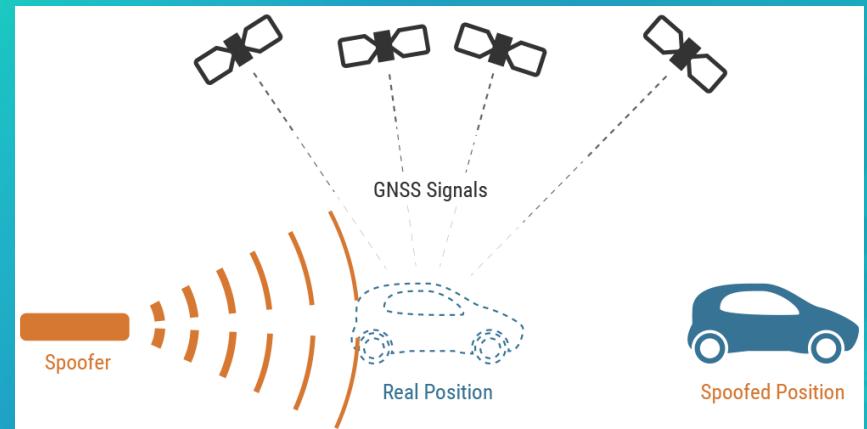


# Eavesdropping Attacks

- Signals from GEO satellites encompass an entire continent, due to this vast ness the attacker could be anywhere, and is capable of receiving the transmission.
- How ?. By using cheap satellite dish and software defined radios .
- Satellites have weak encryption system.
- Satellites are resource constrained and subjected to harsh orbital environment.

# Spoofing

- Commonly seen in media broadcast (satellite TV) .
- Achieved by replacing the victims uplink signal with a more powerful malicious radio transmission.
- Lack of on-board verification of incoming signals.



# Spoofing of Global Navigation Satellite System (GNSS)

- Targets terrestrial system and involve directiong a false simulated GNSS signal.
- Defense against GNSS:
- use of accelerometer.
- spectrum anomaly detection to detect spoofed transmission and much more.



A faint, semi-transparent background image of several green leaves with visible veins, scattered across the slide.

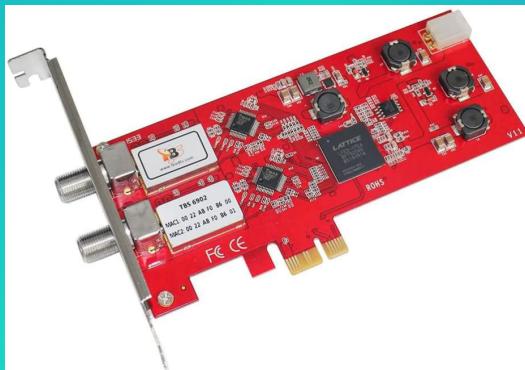
# How do I get into hacking a satellite ?

# All the stuff you need...

## Hardware



Satellite Dish



DVB Tuner Card

## Software

- Free Scanner Software:
  - Crazy Scan
  - Blind Scan
- Download data
  - TSReader
  - PROG DVB

# Legally



# Conclusion

- “Security through Obscurity”
- Satellites are an increasingly vital component of modern life and their security represents a key point of failure in systems ranging from military communications to meteorological forecasting.
- The intersection between outer space and cyberspace remains poorly understood - with important contributions scattered across diverse and isolated disciplines.

# References

- [1] Satellite Network Hacking & Security Analysis
  - By: Adam Ali.Zare Hudaib
- [2] SOK: Building a Launchpad for Impactful Satellite Cyber-Security Research
  - arXiv:2010.10872v1 [cs.CR] 21 Oct 2020

# THANK YOU !!!

Happy Hacking