



CYSEC

ENISA CONFERENCE

LEO / GEO SATELLITE COMMUNICATIONS

MAY 24th | Lisbon



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About CYSEC

- **Founded in 2018**
- **A team of +35**
- **Offices in Switzerland, France & Italy**

● **+70 active customers**

● **3 Lines of Products**
ARCA Trusted OS
ARCA Satlink
ARCA Satcom

● **Proud organizer of CYSAT (www.cysat.eu)**
Biggest EU Conference dedicated to
Cybersecurity in the space industry

● **Active in the following industries**



Healthcare



Industrial
Automation



Smart
Infrastructure



Energy



Space



Automotive

OUR VISION

We believe organizations should be able to benefit from state-of-the art security in a straightforward, transparent and cost-efficient way.

OUR MISSION

Our mission is to protect your business sensitive data on distributed architecture enterprises don't own or control.

Member of



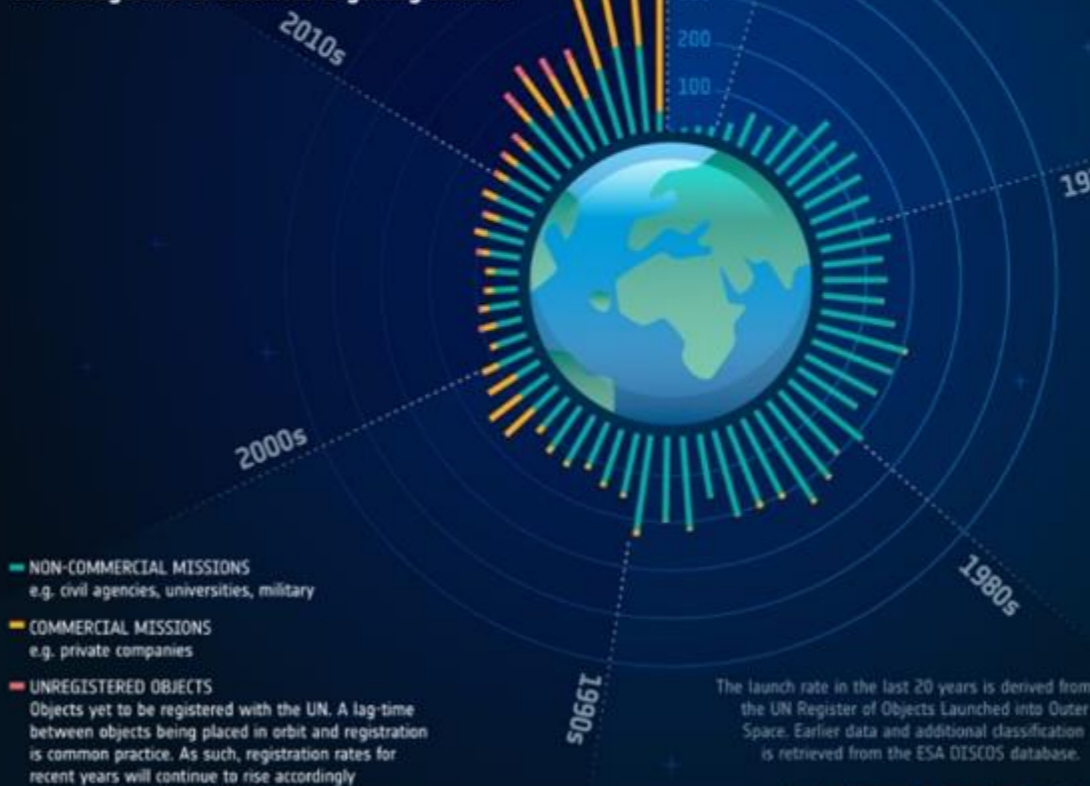


UNITED NATIONS
Office for Outer Space Affairs



WE'RE LAUNCHING MORE THAN EVER

Since the beginning of the space age, thousands of spacecraft have been launched to space, with a **dramatic increase in recent years**. In the past couple of decades, the number of launches from private companies has dramatically increased, while the **average size of satellites is getting smaller**.



— NON-COMMERCIAL MISSIONS
e.g. civil agencies, universities, military

— COMMERCIAL MISSIONS
e.g. private companies

— UNREGISTERED OBJECTS
Objects yet to be registered with the UN. A lag-time between objects being placed in orbit and registration is common practice. As such, registration rates for recent years will continue to rise accordingly

The launch rate in the last 20 years is derived from the UN Register of Objects Launched into Outer Space. Earlier data and additional classification is retrieved from the ESA DISCOS database.

Up-to-date as of December 2020

#SpaceSustainability

#SpaceCare

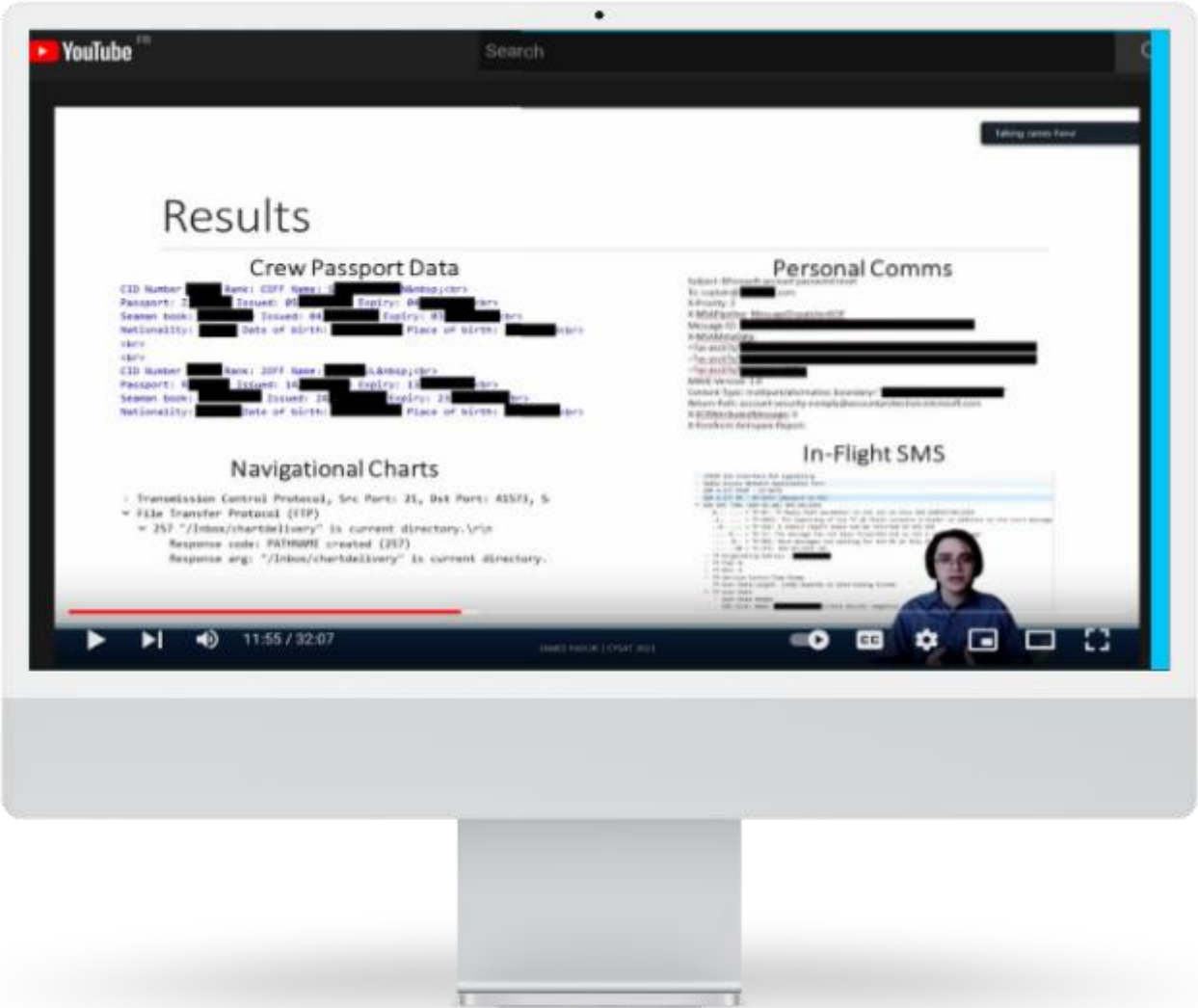
More and more assets in LEO!

- **Physical assets:** According to [Euroconsult](#), over 15'000 satellites will be launched in the 2020 decade, 10x vs the 2000's
- **Digital assets:** The satellite data services market was valued at USD 5.9 billion in 2021 and is projected to reach [USD 16.7 billion by 2026](#), at a CAGR of 23.0% from 2021 to 2026
- The market growth is driven by the advent of "newspace", which is the use of space assets for commercial purposes, leveraging **small satellites** and "**as a service**" business models inspired by the cloud

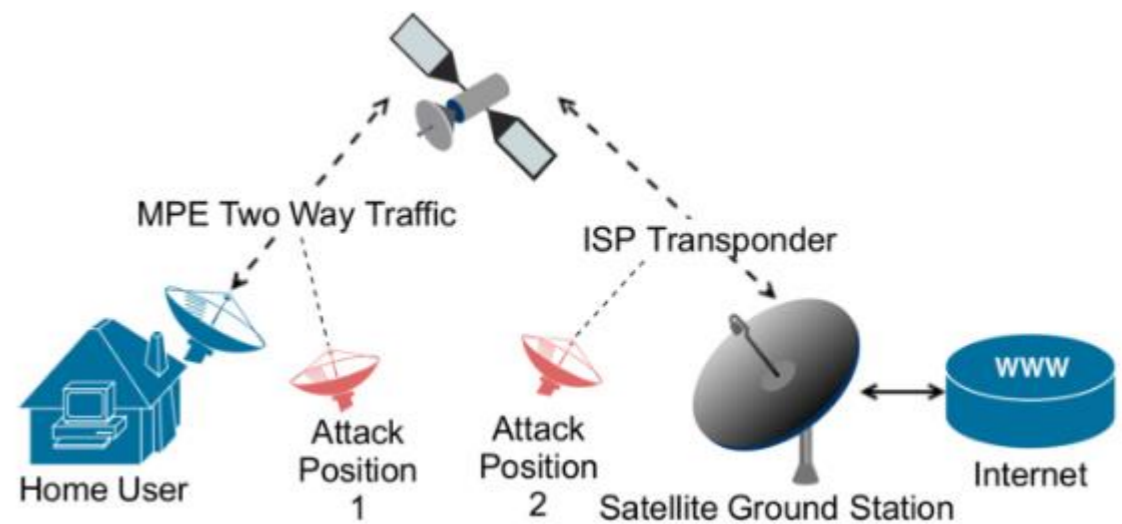
Cybersecurity as a growing issue

- **No standards (yet)**, no "questions asked", even with prop capabilities !
- **No products available off-the-shelf** to protect physical and digital assets in space

Today many commercial satellite broadband services are unencrypted and vulnerable to eavesdropping attacks



James Pavur (ethical hacker from Oxford University) demonstrated in 2019 how to eavesdrop **sensitive data** transmitted over satcom links with 300\$ equipment



Source: Pavur, J. (2021). *Securing new space: on satellite cyber-security* [PhD thesis]. University of Oxford.

End-users have to choose between performance and exposing their data to eavesdropping attacks



Up to now the blocking point to implement end-to-end encryption is the significant reduction of performances

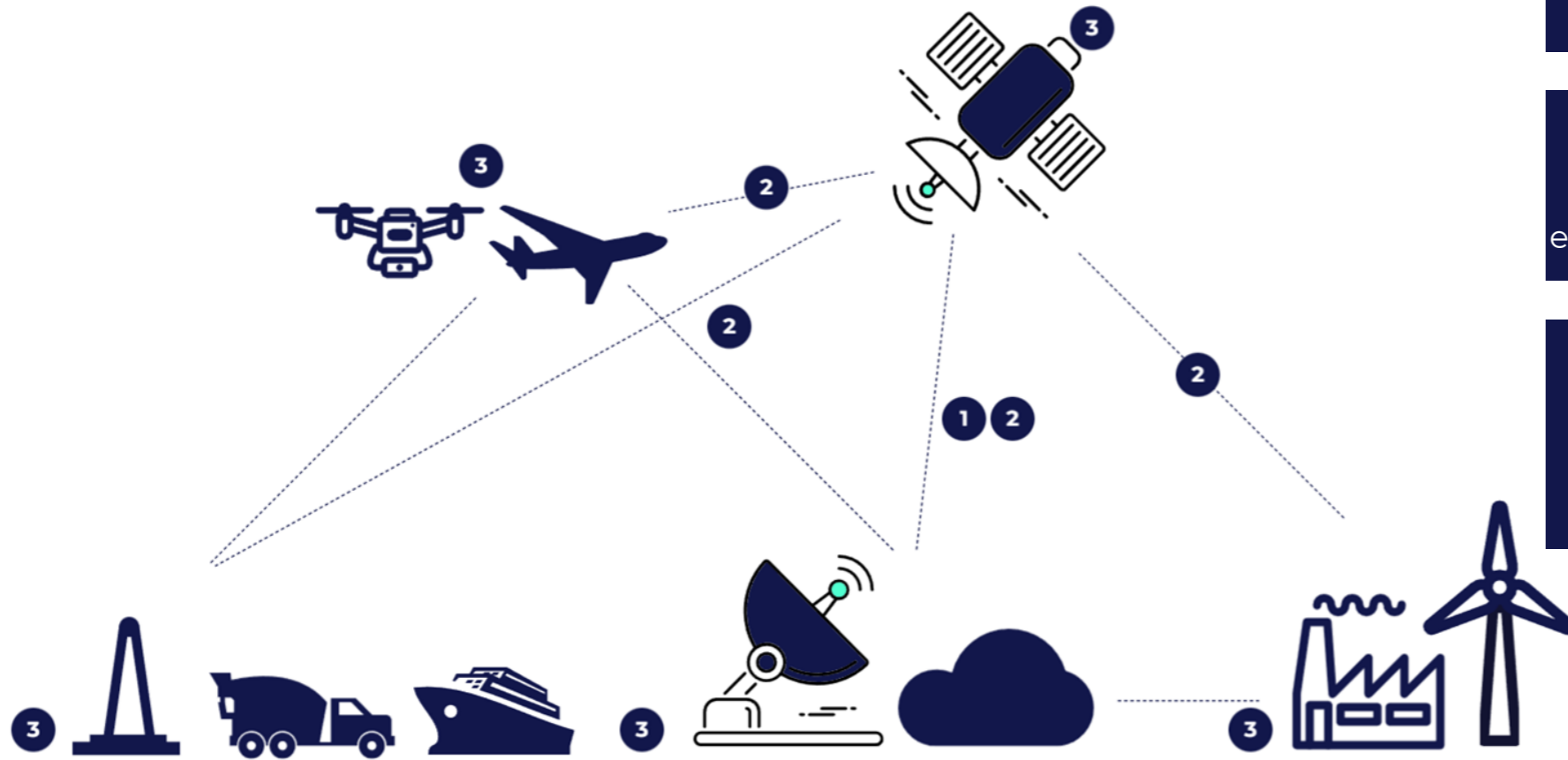
Existing security tools like VPN **have proved to be incompatible** with GEO satcom links



- Adoption of TCP in satcom is enabled by the extensive use of **Performance Enhancing Proxies (PEPs)**
- Unfortunately, **existing PEPs are incompatible with standard security tools** like Virtual Private Networks (VPNs) using IPsec or TLS/SSL encryption
- State-of-the-art VPNs like **OvenVPN can reduce the link throughput by as much as 80%** making them unacceptable by ISPs and end-users

CYSEC is addressing new security challenges

MARKET PROVEN PRODUCTS FOR SECURITY VULNERABILITY IN DATA ELABORATION & COMMUNICATION



1

ARCA SATLINK lib

Satellite link encryption - First NIST SDLS compatible solution

2

ARCA SATCOM Encryptor

Multipoints SatCom communication encryption without performances compromise

3

ARCA TRUSTED OS

Enabling Confidential Computing for EDGE + CLOUD + ON PREM in a Zero Trust environment

The target market: users communicating confidential data on GEO comsatcom links



TYPICAL USE CASES

- Military welfare
- Critical infrastructure (power plants, oil gas, etc)
- Mobility : maritime, aviation, etc

The target market: users communicating confidential data on GEO comsatcom links



Client connection on the roof

- Remote access to two different Satellite connections (Lausanne & Zurich). Allows for cross-validation of the data, as well as detecting issues specific to either of the test setups (misconfiguration, maintenance, etc)

LEO Starlink connection at CYSEC's office

- Testbed for different satellite network (LEO), in order to investigate ISP-specific induced latency / compatibility
- Easy access and fast test implementation



Thank you !



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Questions