REVOLUTIONIZING SATELLITE MONITORING FOR THE NEW ERA

Erwin Greilinger, CTO and Product manager for Satellite monitoring Solutions

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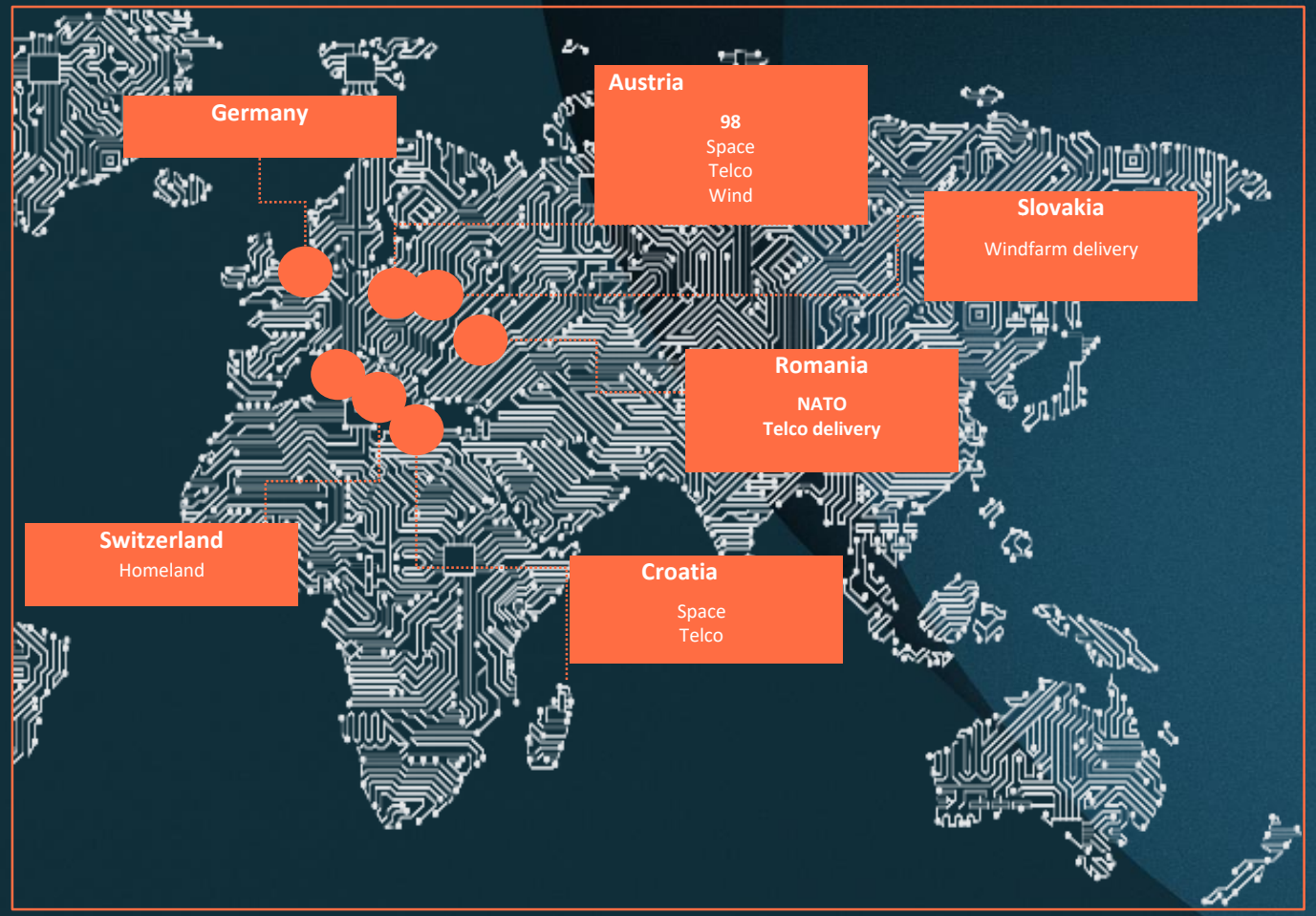
EVIDEN



around
5 billion €
revenue

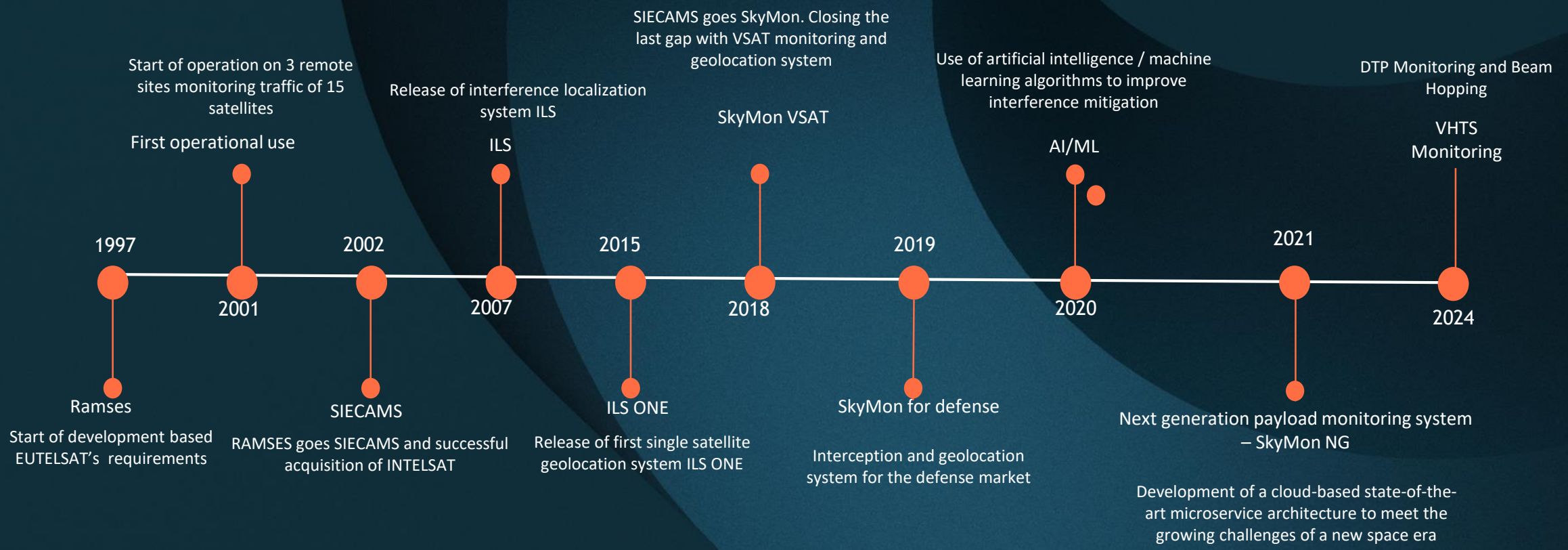
European
Number 1
in Cloud and High-Performance Computing

worldwide
Number 1
in Managed Security Services

47,000
engineers
and IT-problem solvers in 47 countries

OUR PATH TO BUILDING SATELLITE MONITORING (GEO, LEO,…)

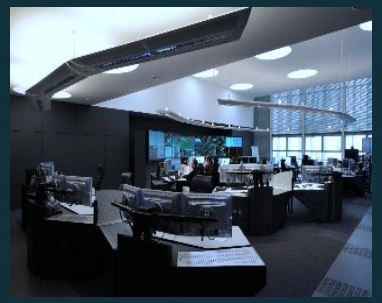
25+ years of SkyMon



SKYMON PORTFOLIO

Identify and geolocate satellite signals that impact daily operation of the satellite operator/ MOD

Modular technology for multiple use cases



SKYMON CMS

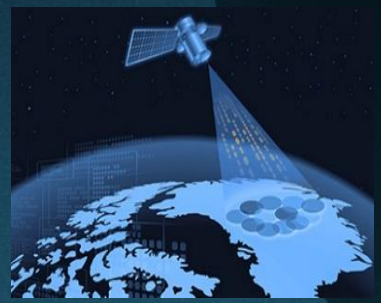
Carrier Monitoring and Detection System

SKYMON ILS - ILS ONE

Carrier transmitter Localization with adjacent and single (ILS one) satellite

SKYMON VSAT

Monitoring and Geolocation of VSAT Networks



SKYMON HTS

Cost efficient spot beam monitoring system

SKYMON STS

Passive RF ranging system

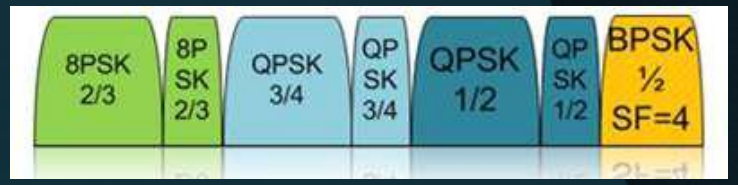
SKYMON LEO SAR

Monitoring Radar LEO satellites

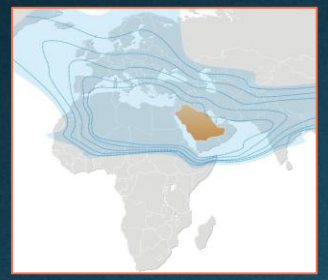
REVOLUTION IN SATELLITE MONITORING

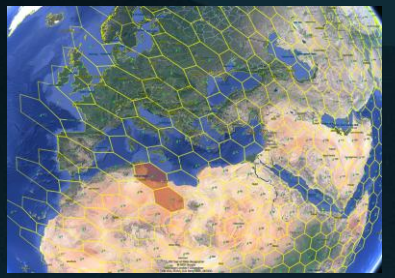
CHALLENGES OF SATCOM MONITORING

Diversity of Transmission Modes and Optimization Techniques

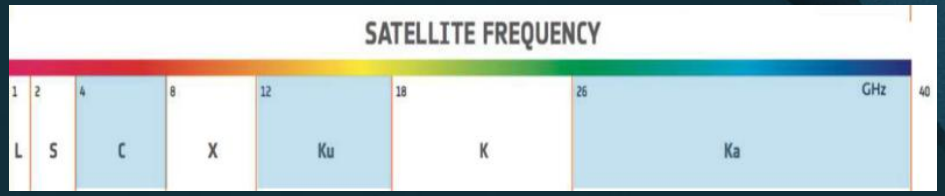


Diversity of Satellites and Service Coverages (LEO, MEO, GEO)






Diversity of used Frequency Bands



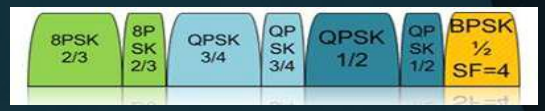
Diversity of Manufactures and Proprietary Standards

iDirect HUGHES Newtec ViaSat Gilat Gilat Satellite Networks

REVOLUTION IN SATELLITE MONITORING

How can we cope with these challenges?

Diversity of Transmission Modes and Optimization Techniques



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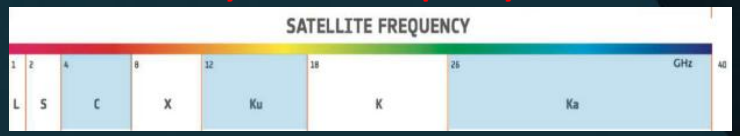

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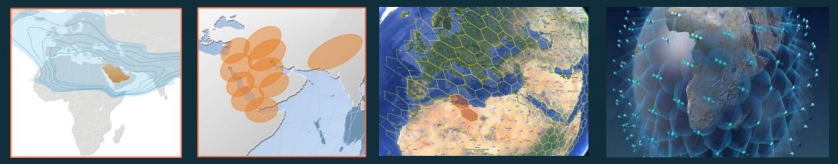

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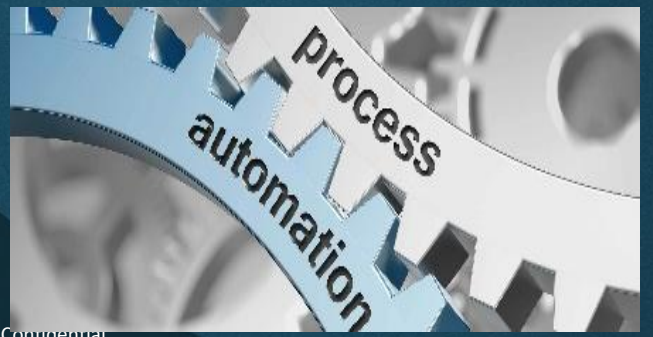
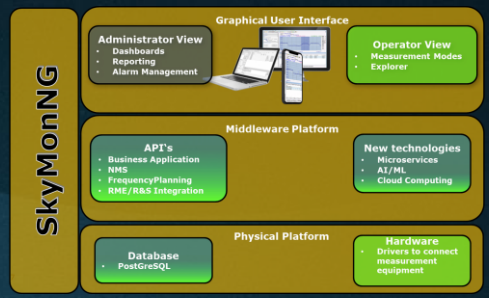
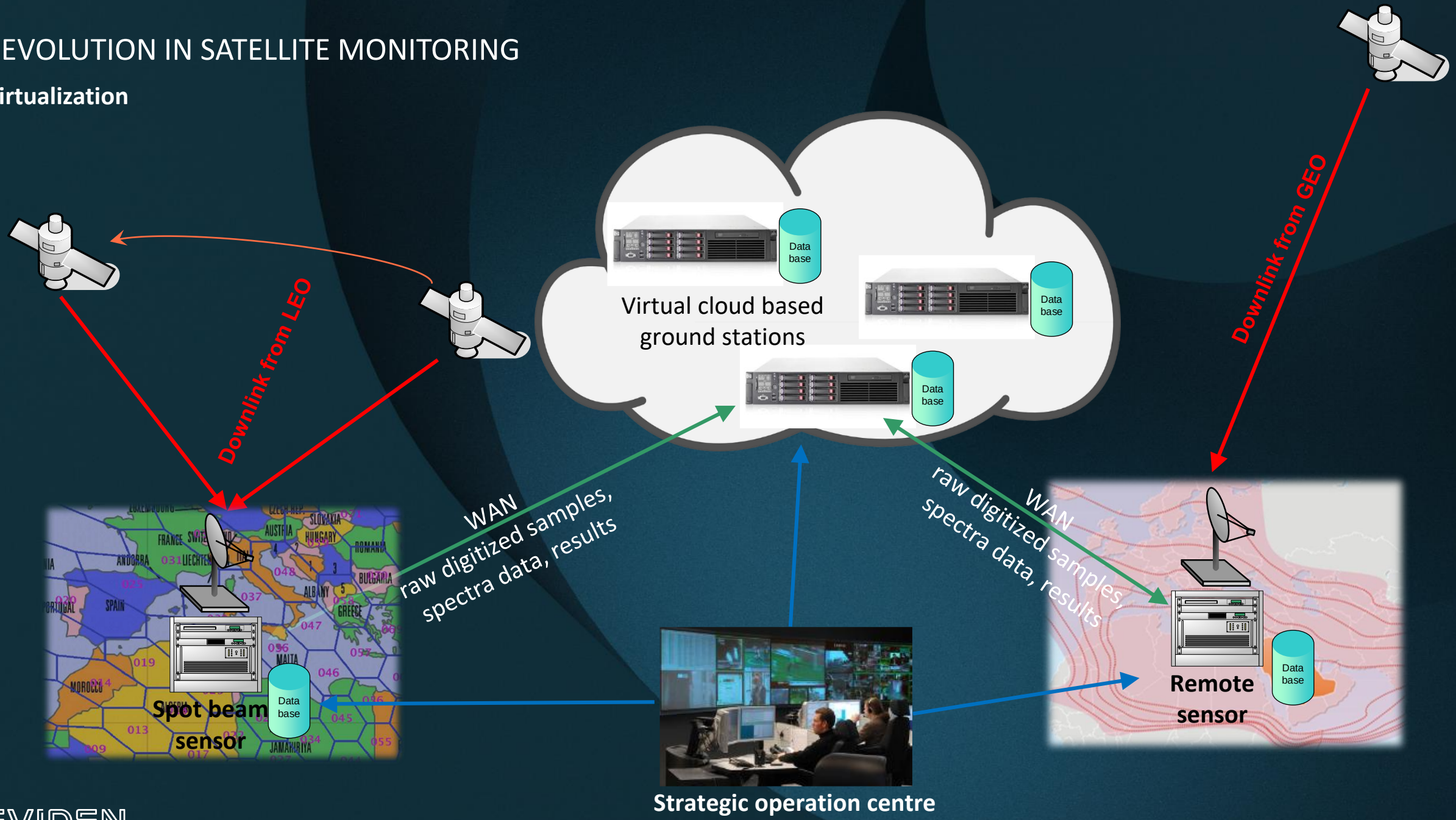




REVOLUTION IN SATELLITE MONITORING

Virtualization



REVOLUTION IN SATELLITE MONITORING

AI and machine learning in Satellite Communication

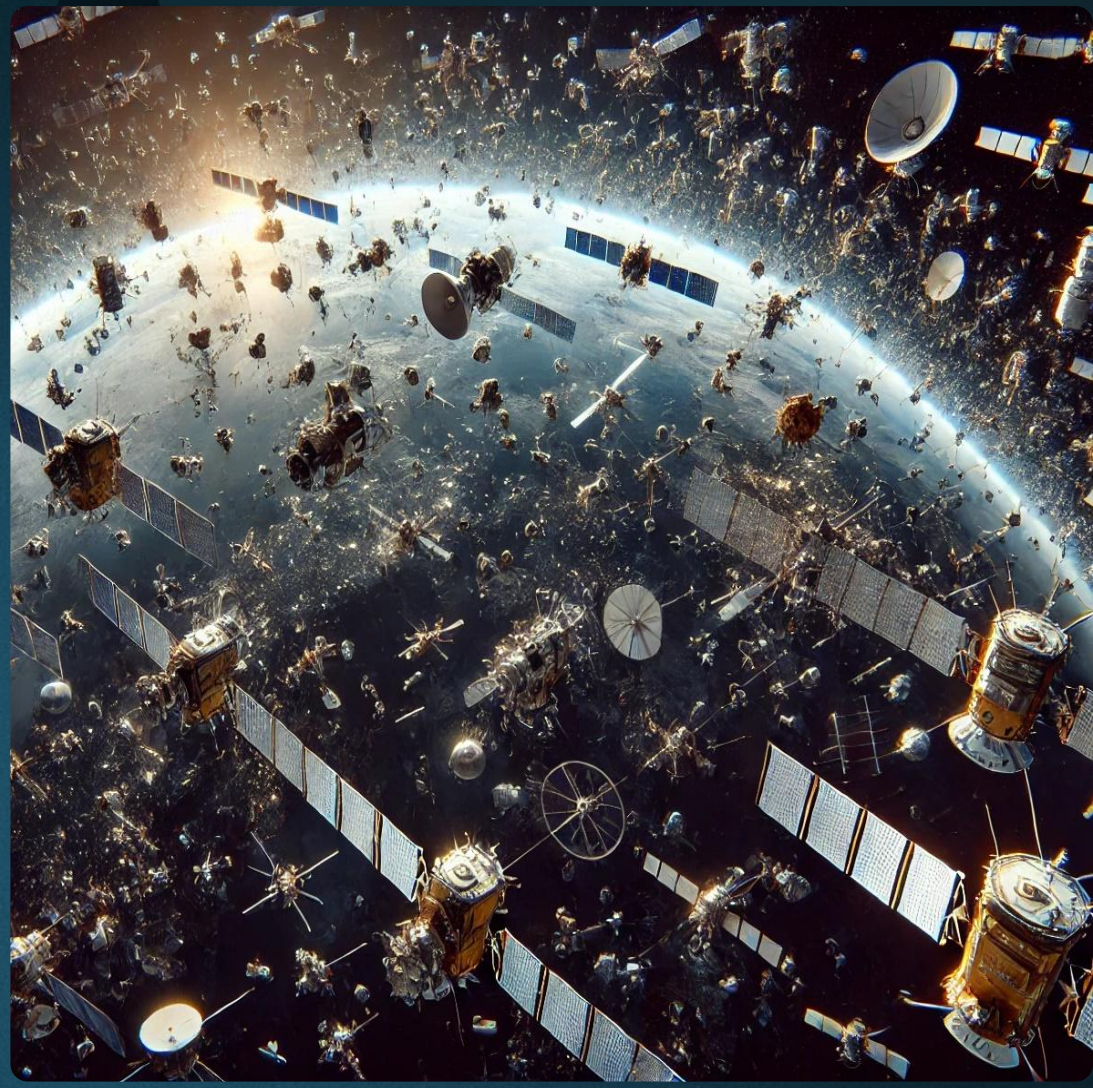
AI has the potential to be a game changer in the satellite industry

Satellite networks are becoming more and more complex with increasing number of satellites, with integrated terrestrial and non-terrestrial networks, demand for higher bandwidth

Therefor, interference remains a major problem within the satellite sector today, and with increasing number of satellites the interference cases will increase

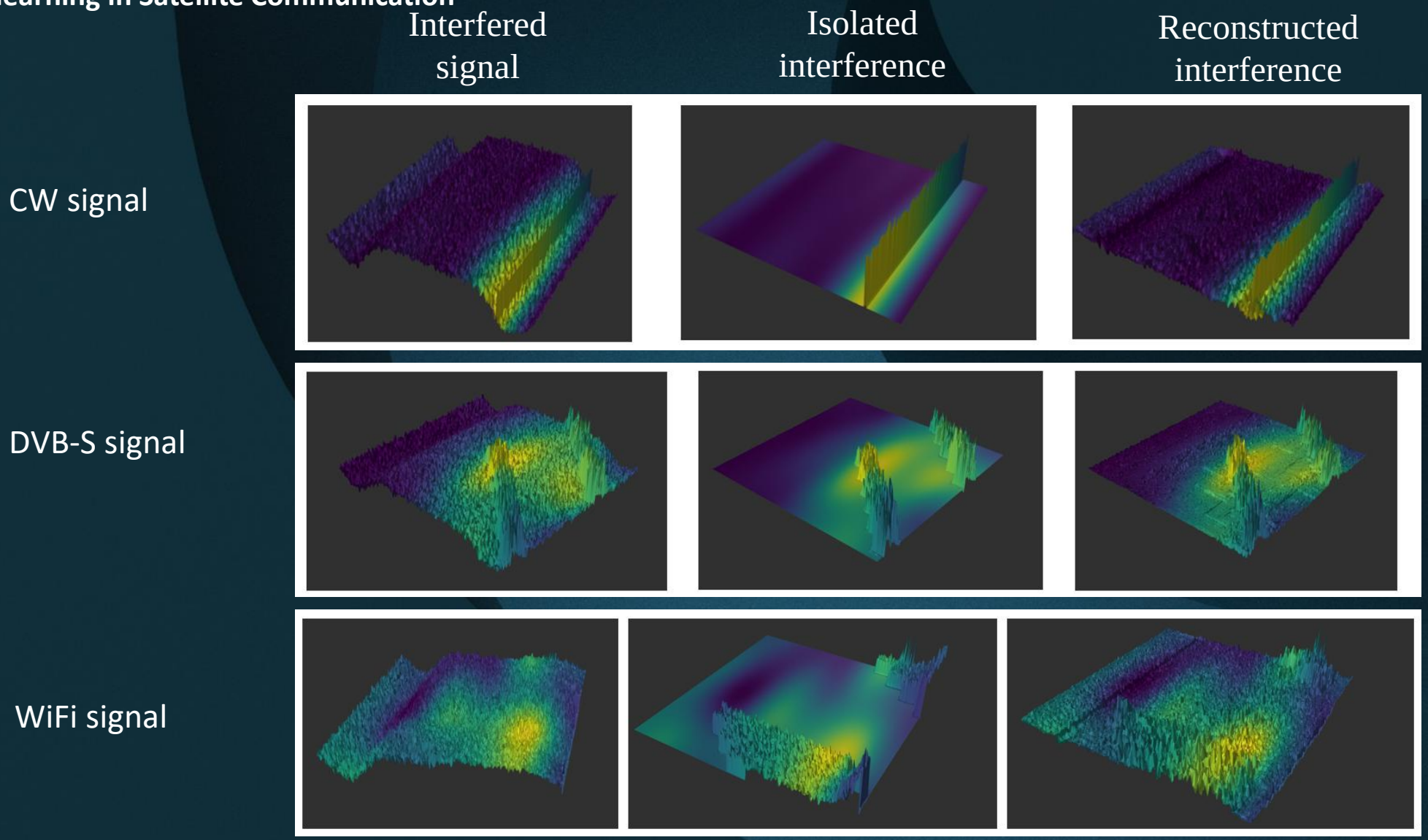
AI can help to:

- enhance security in satellite communications, detecting cyber threats and mitigating interference for safer networks
- process vast satellite data and improving real time decision making
- ensuring uninterrupted satellite communications by predicting and mitigating interference sources



REVOLUTION IN SATELLITE MONITORING

AI and machine learning in Satellite Communication



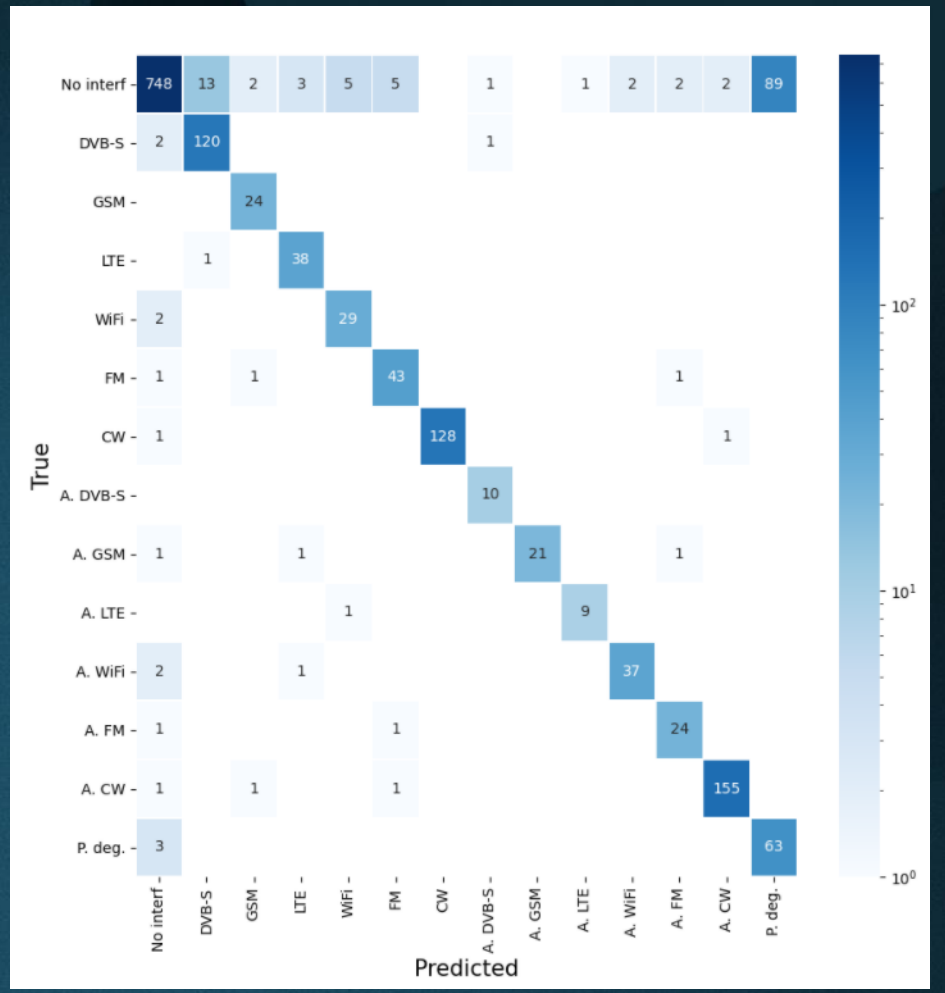
REVOLUTION IN SATELLITE MONITORING

AI and machine learning in Satellite Communication

Interference classification for following interference types:

- DVB-S/S2
- GSM
- LTE
- WiFi
- FM
- CW
- Power degradation

Success rate: >99%



REVOLUTION IN SATELLITE MONITORING

AI and machine learning in Satellite Communication

Interference detection and classification

The results of this project showed that AI can help to automatically identify and classify satellite interferences. For the integration additional interference sources like Radar signals, noise insertion, passive intermodulation, etc. shall be considered.

Interference detection caused by NGSO satellites

Combining measurement results over several coverages and additional information like the ephemeris data of NGSO satellites could identify a NGSO satellite causing interference.

Interference Prediction

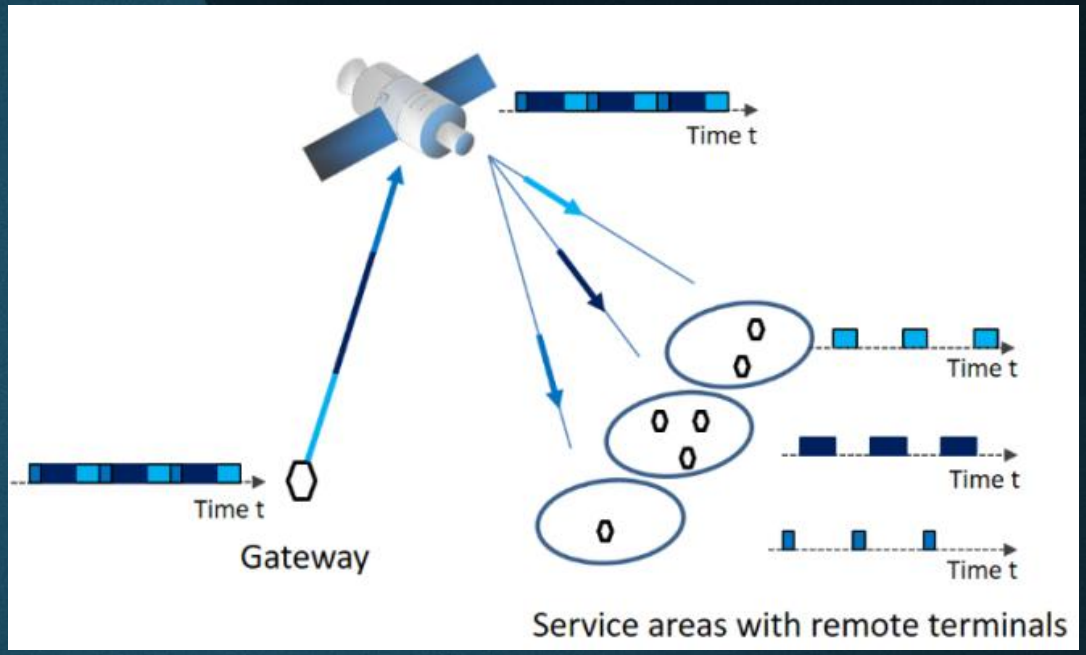
Using detected interference cases in combination with the information that led to this interference can enable AI/ML to predict interference cases. This requires the use of additional information like upcoming events or weather information to enable AI/ML the prediction of an interference case.

REVOLUTION IN SATELLITE MONITORING

Monitoring of high dynamic SDR satellites

- The era of High Throughput Satellites (HTS) made it possible to deliver high-speed broadband data (with speeds of 100 Gbps) through narrow spot beams — enabling spectrum to be used, and reused, more efficiently
- But with demands to deliver even higher data rates, satellite manufacturers have their sights set on the next iteration of HTS —super-high-capacity satellites (frequently referred to as Very High Throughput Satellites (VHTS) that can deliver up to one terabyte of data

SkyMonNG supports **onboard spectrum monitoring** as well as **monitoring of beam hopping**.

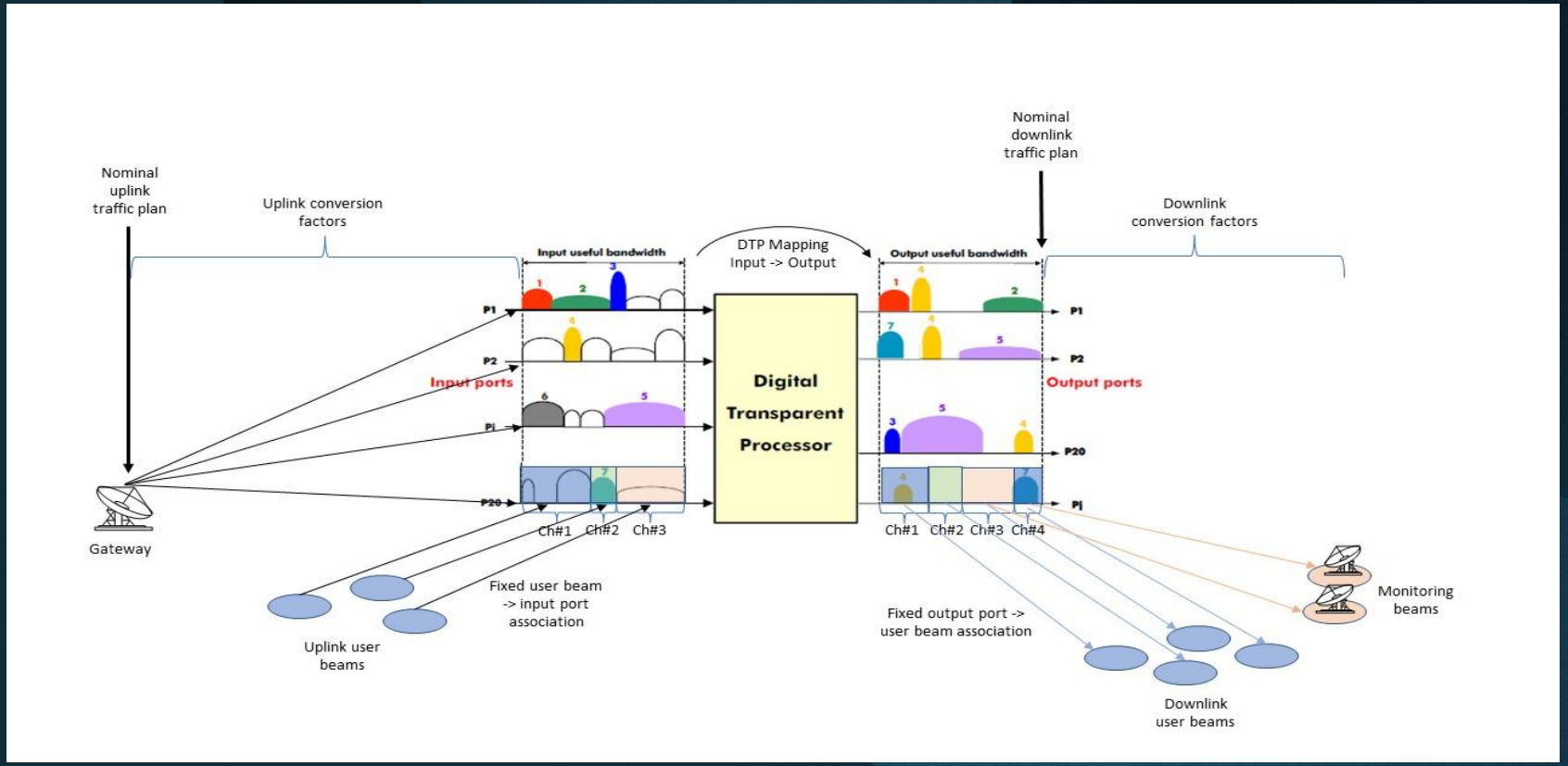


REVOLUTION IN SATELLITE MONITORING

Monitoring of high dynamic SDR satellites

SkyMon carrier monitoring system provides on-board digital spectrum monitoring through dedicated telemetry data and ground carrier monitoring spectrum measurements done through the ground segment.

SkyMon CSM performs the on-board spectrum and ground spectrum measurements and compare them both with the planned traffic and in case of deviations will generate corresponding alarms.



Revolution in Satellite Monitoring

SkyMonNG – next generation payload monitoring system

SkyMonNG, a next-generation satellite monitoring solution designed to address the evolving needs of modern satellite operations including enhanced security, AI and cloud readiness. SkyMonNG represents a transformative leap in satellite monitoring, equipping operators with advanced, cloud-ready capabilities that bring flexibility, efficiency, and cutting-edge digital functionality.

Supporting the monitoring of the new dynamic behavior of VHTS (Very High Throughput) satellites including onboard processing and beam hopping, the system is designed to keep **operators at the forefront of modern satellite management**, particularly when it comes to dealing with the escalating demand for higher data rates, reaching the terabyte scale.

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