

Space Services for Missions and Operations: Opportunities and Challenges

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**International Digital Security Forum (IDSF22): Dependencies on Critical Space
Services - Space Infrastructure as a new Critical Infrastructure**

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   [bundesheer.at](https://www.bundesheer.at)



UNSER HEER



“Military Space Hype”

USA Space Forces	2019
French Space Command	2019
Italian Space Operations Command	2020
Weltraumkommando der Bundeswehr	2021
...	
NATO: Space as an operational domain	2019
<i>EU Space Programme</i>	2021



EU SPACE PROGRAMME OVERVIEW

EUROPEAN UNION | In partnership with **EUSPA** | **esa**

COPERNICUS
Earth Observation (EO) and monitoring based on satellite and non-space data

No.1 world provider of space data and information

GALILEO
Global satellite navigation and positioning system (GNSS)

10% of the EU GDP enabled by satellite navigation

EGNOS
Reliable navigation signals for safety of life use

Operational in 30+ airports & helipads in 23 countries

SSA
Space situational awareness monitoring and protecting space assets

Providing surveillance and tracking services to 210+ satellites

GOVSATCOM
Secure satellite communications for EU security actors

Delivering rapid support over crisis areas

BOOSTING THE ECONOMY

30+ EU-owned satellites in orbit for EO and GNSS

EU Investment in space €14.8B

€11 billion in 2020

€5 billion in 2019

with a value added estimated at **€48-54 billion**

www.esa.int/gov/estm/estm2020

250,000+ jobs supported by EU Space

Over 2 billion Galileo-enabled devices

60% of the European EO companies use Copernicus data

enabling over **10%** of the income in the sector



A holistic approach to multi-domain operations is as important as ever for NATO in an increasingly sophisticated world.



Why this „space hype“ now?

We have been using satellites and space services for generations!





„Space Assets“ versus “Space Services”

Space Assets: number of “security/defense” satellites

USA: several 100++

FRA: ~25

DEU: ~20

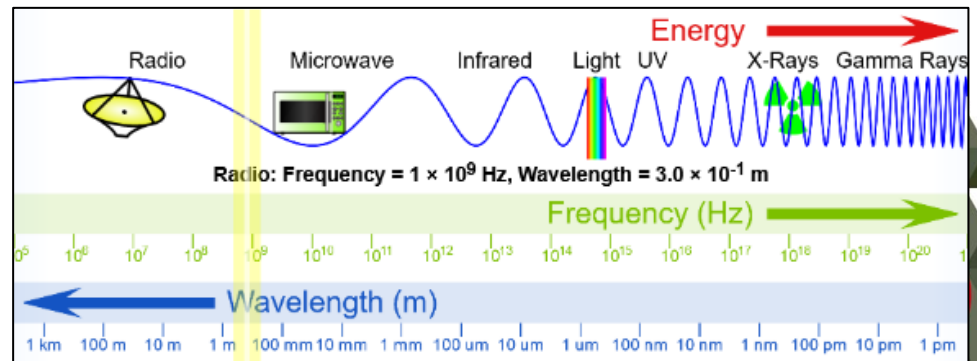
ITA: ~15

AUT: still 0



Space Services: supported by the satellites

- ▶ Sat-Nav
- ▶ Sat-Com
- ▶ EO/RS





Why this „space hype“ now?

Space Asset (satellite) View:

1. Space is more and more competitive, congested and confrontational
2. New risks for the satellites (e.g. debris)
3. New threats against the satellites (e.g. ASAT)

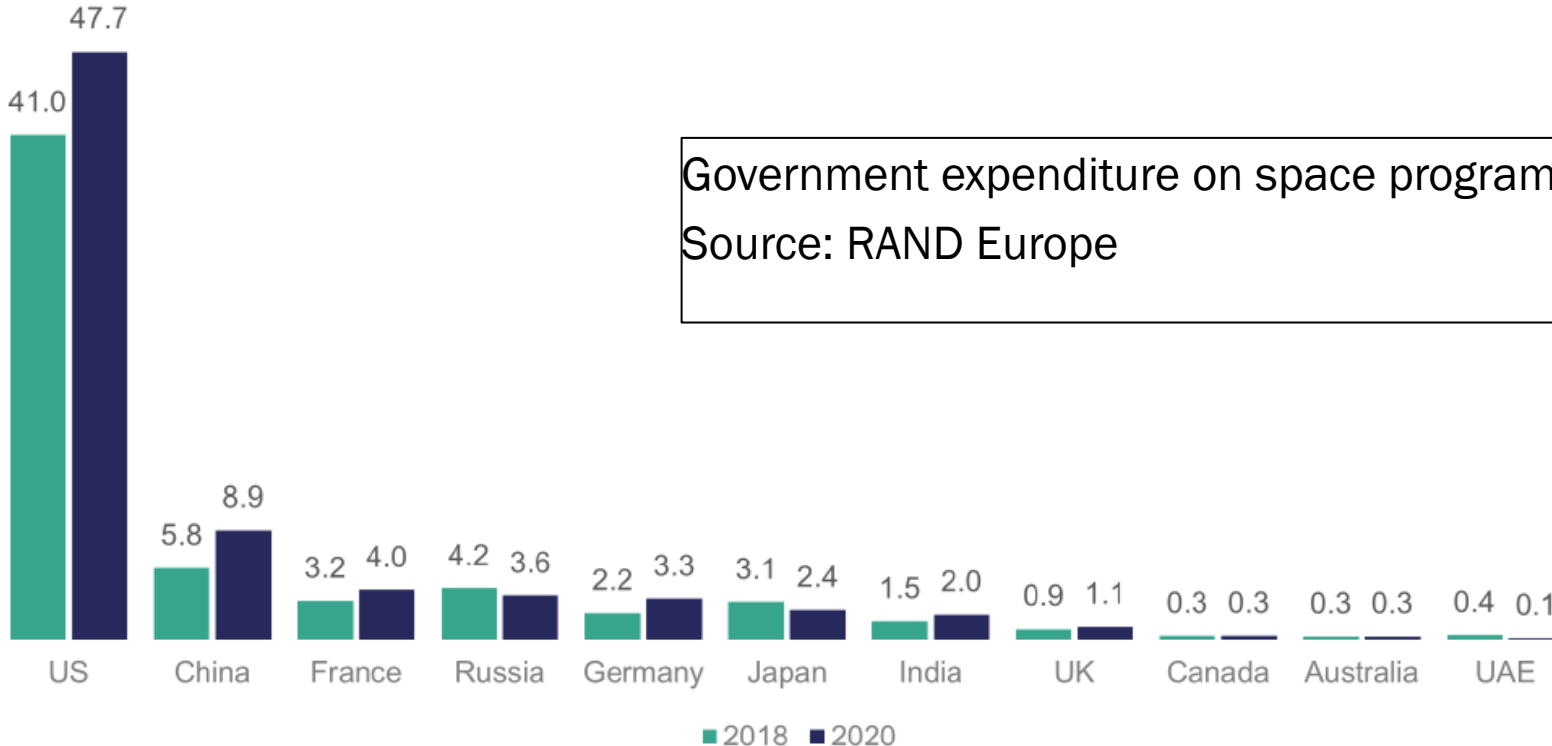
Space Services View:

1. **Many more satellites, services, data, users – more stakeholders**
2. **Holistic approach (from R&D to downstream services)**
3. **Very high reliance on space services, especially for security**



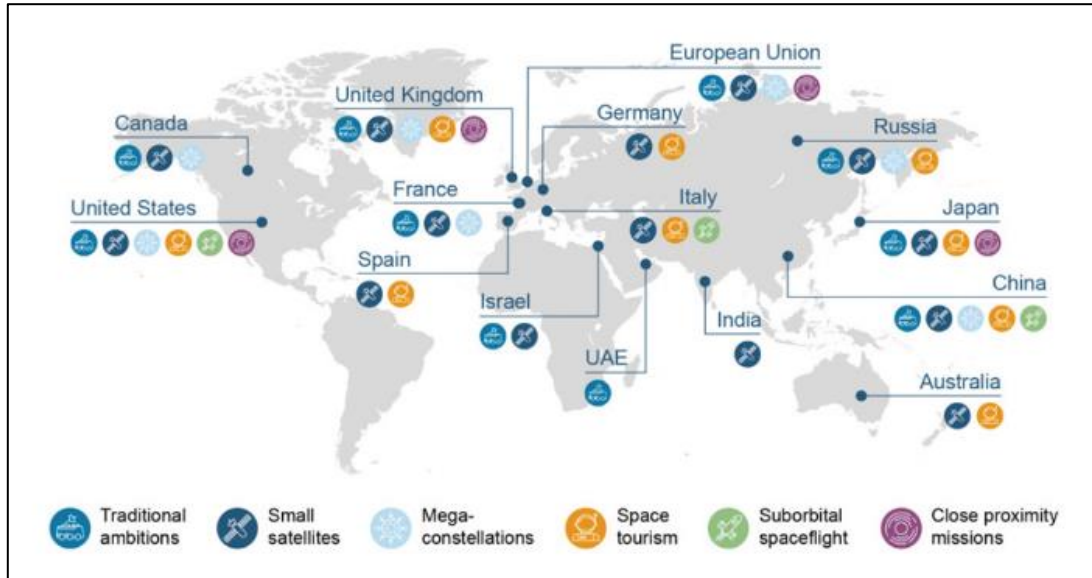


The Big Space “Players”





Is Space only for the big “Players”?



Examples of aspirations of commercial and civil actors for the future use of space
Source: RAND Europe

- If YES, than create a “Space G8” (more than 99% of all space expenditures)
- **If NO, than focus on the space services**



„Space Service“

Outer
Space
Exploration

Human
Space
Flight

Merging and Fusion of Capabilities
z.B. SARSAT / COSPAR

Supporting Services:
R&D, policy, legal, ...

Earth
Observation
(EO / RS)

Positioning
Navigation
Timing
(GNSS)

Satellite
Communication
(SatCom)

„Space
threats“

Space Situation
Awareness (SSA)

Primary Satellite Triad

Satellite Navigation (PNT)

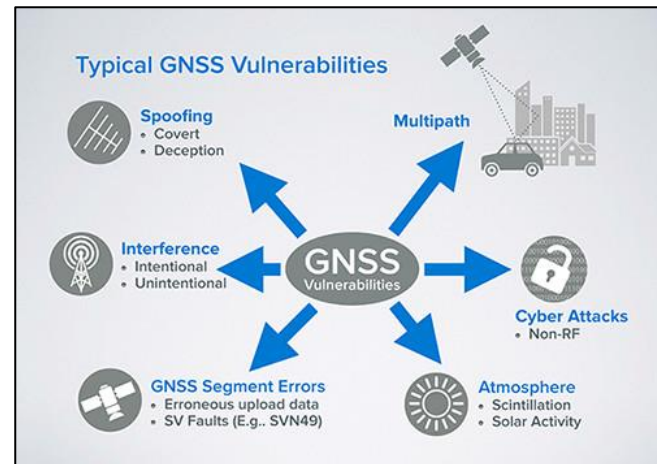
Position-Navigation-Timing

USE GALILEO.EU

FIND A GALILEO-ENABLED DEVICE TO USE TODAY

Galileo is Europe's Global Satellite Navigation System (GNSS), providing users with improved positioning and timing information.

Click on the icons to find Galileo-enabled devices.

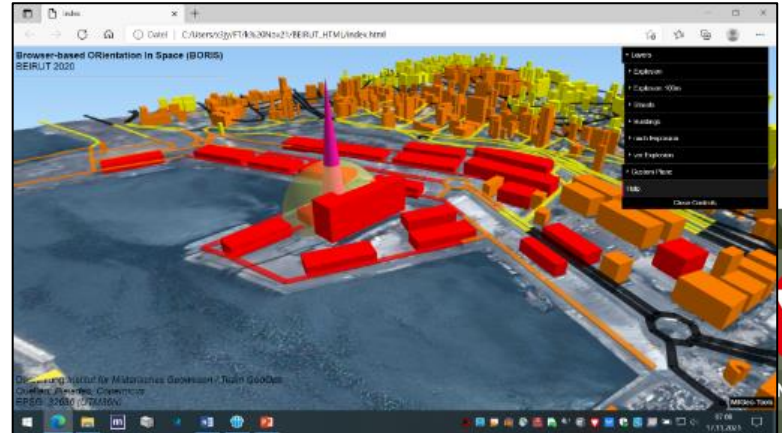
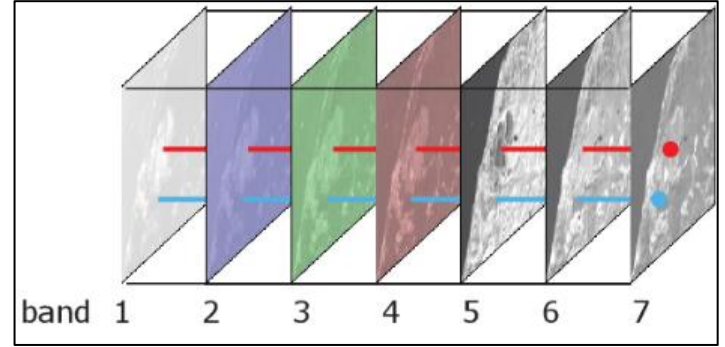




Remote Sensing / Earth Observation

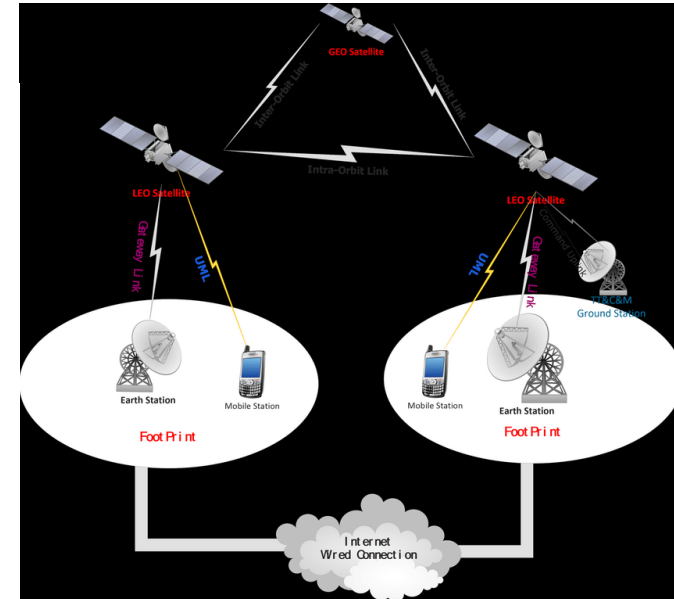
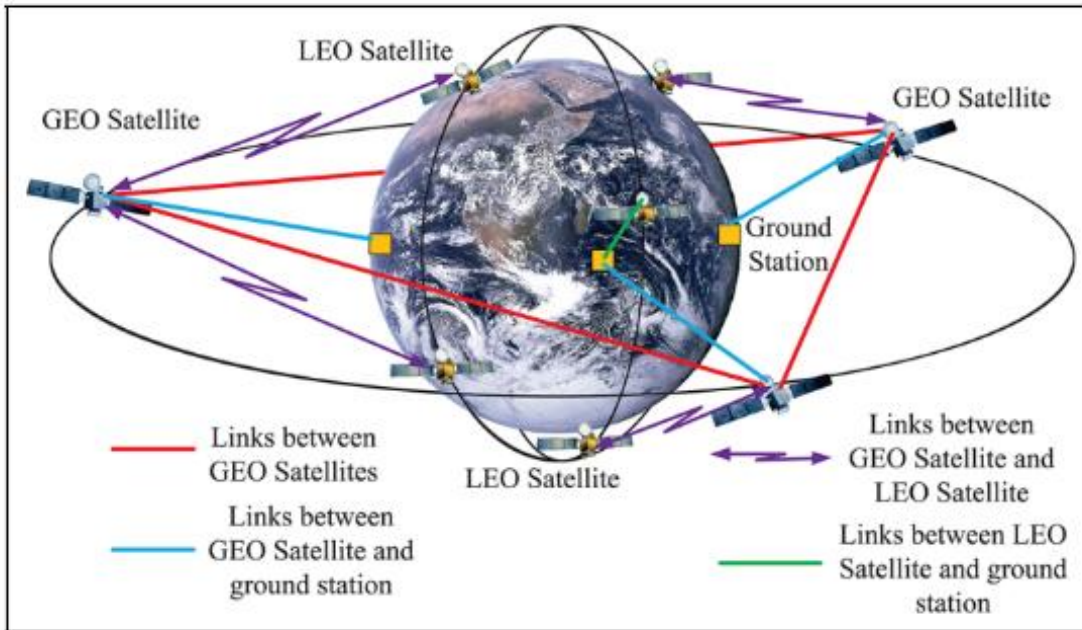
Satellite images (passive and active sensor)

- ▶ Base for GeoDaten
- ▶ Intelligence





Satellite Communication





Space Services for Security and Defense

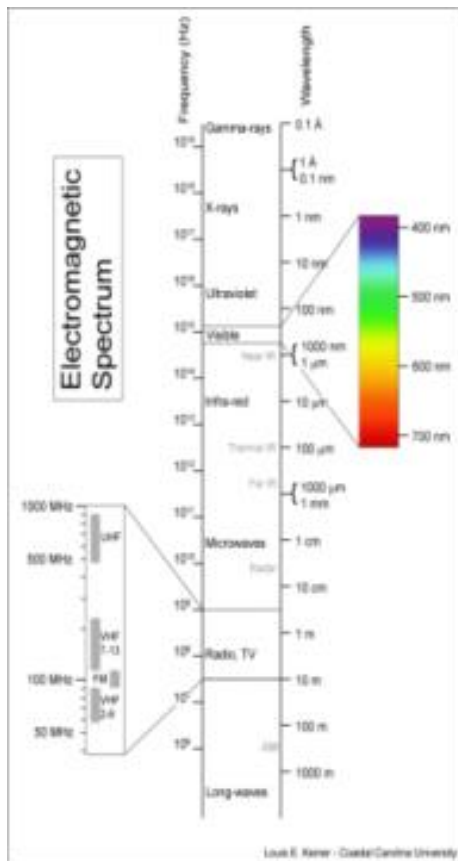
Space Service	Opportunities and Challenges for Missions and Operations
Sat-Nav	Command and Control (C2) Common operational picture (COP - Friendly Force Tracking) Timing for all mobile networks (PNT) PNT for autonomous vehicles and robotics
Earth Observation	Eyes and ears for foreign missions two work strands: Intel and Geo
Sat-Com	Dominant communication option between radio and land-line especially worldwide and very flexible
SSA	Protection of space assets (satellites) early warning (e.g. space weather) for sensitive technologies



Space Services for society

1. Position (navigation, supply chain, tracking, ...)
2. Timing (mobile networks, globalization, finance, ...)
3. Robotic – UAV – drones – autonomous vehicles (secure PNT)
4. Environment, climate change, agriculture, land development, maritime shipping, exploration, monitoring, predictions, (Earth Observation – Remote sensing)
5. Network – secure connectivity – remote access (SatCom)
6. M2M (machine to machine)
7. Critical Infrastructure





Questions?

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