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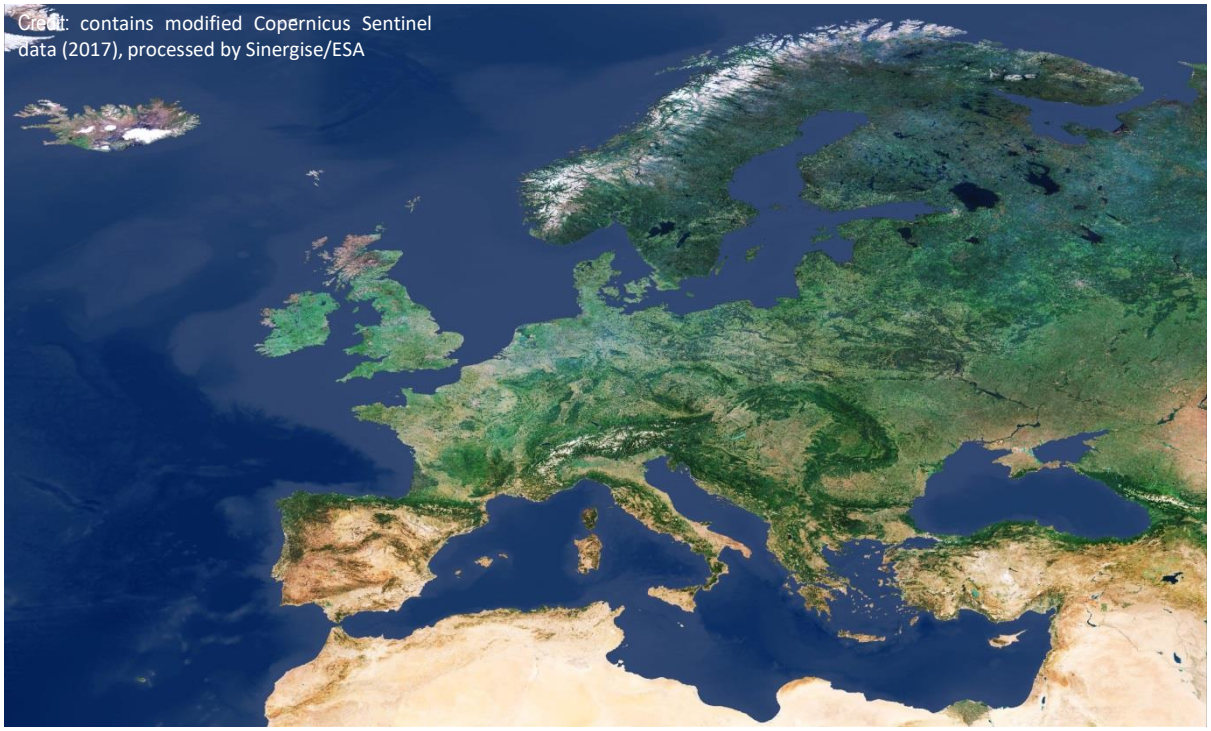

PLUS ÇA CHANGE - NEW SPACE AND REGULATION

Do smart technologies need new rules of the road?

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United Nations / Austria World Space Forum Access to Space for All

I. Overview

- What is impact of non-traditional Industry 4.0 space players on risk-sharing in modern space markets?
  - Is there a need for new rules on risk and risk allocation?
- Does increasing dependency on Artificial Intelligence (AI) in Efficient Space Operations also impact on current risk regulation?
  - Immense growth in dependencies on GNSS-driven, mobile-based downstream services
  - Growth in AI-based systems (e.g. CIMON)
- Do space-based services qualify as an Essential facility?
  - Are these now part of the 'Common Heritage' and 'Common Good'?
- Are new codes needed to regulate access & use of space?
  - As a further emanation of soft law trends (e.g. LTSG)

Credit: ESA - D.Ducros

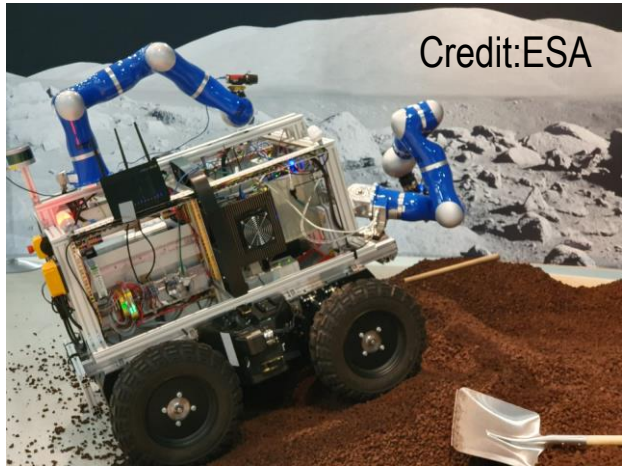
II. States as addressees of rules regulating space risk

Starting point for review: Treaty rules focus on own risk and third party liability

- Do 21st century developments still pair with the classic rules of international space treaty law?

Recent trends:

- Civil society's increased dependency on satellite connectivity, communication, Internet of Things (IoT), finance, energy etc, transport and much more falls under complex bundle of national norms.
- UN space treaties focus on clear state addressees for tangible risks (launches; conjunctions)
  - Yet intangible risks are equally probable
  - Economic losses expected to increase resulting from interference; debris; space-weather induced outage, etc.
  - Who is accountable? Should states implement greater commercial control over NewSpace businesses?

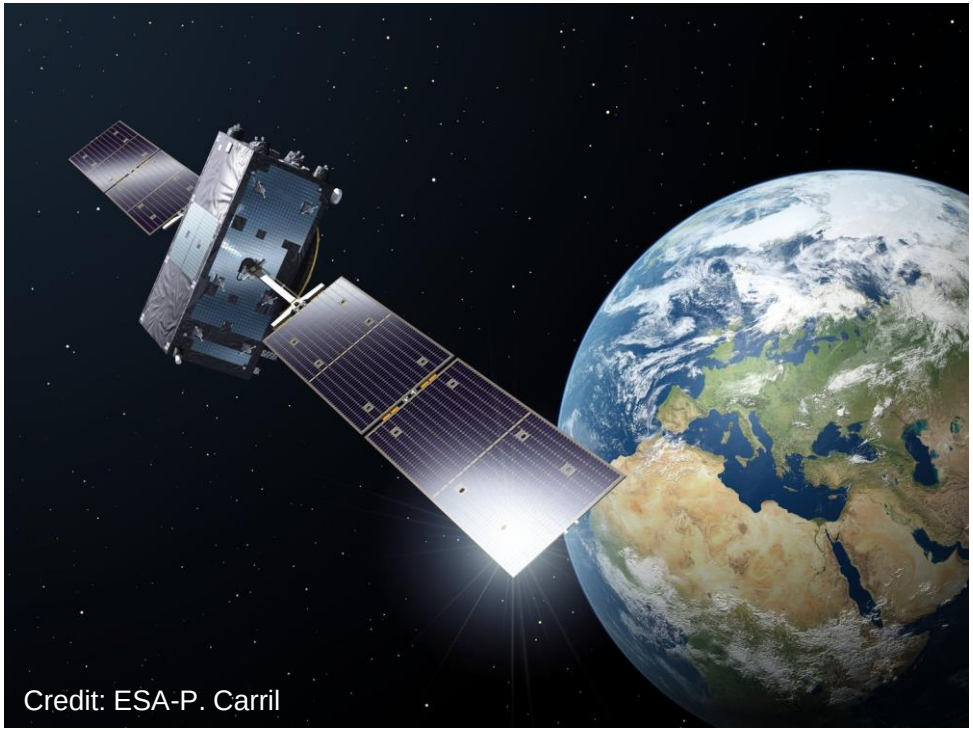


III. The loss currently lies where it falls – is this sufficient?

- **UN Treaty rules designed to ensure identification of responsible states that flow-down risk management at national level to their non-govt. entities**
  - Competing values : On-orbit activities subject to concept of 'assumption of own risk' – yet 'space benefits' are for all
  - No deterrent to deterioration of outer space environment
- Currently, no penalties applied for e.g. debris creation
- Rather, greater incentives are needed
- **Will the transition to NewSpace entities alter the probabilities or management of risk?**
- Should national law accommodate equitable and negotiable solutions for accessing space derived facilities through new technology codes?

IV. Space data and impact of society' s dependency thereon

- Space-based Data enables e.g. greater and more secure mobility, yet conditions of accessibility are not uniform, access is limited by market-driven rules
  - Objective is to ensure that space data help achieve SDG
  - Democratisation of data in some sectors (eg Copernicus)
- Increased market values and dependabilities
  - Artificial Intelligence (AI)
  - e.g. with GNSS Galileo-based services.
- Have space tools and become an 'Essential Facility'?
  - Definition: over-monopolisation in provision of core services & information
  - calls for control of monopoly or cartel type trends


Credit: ESA-P. Carril

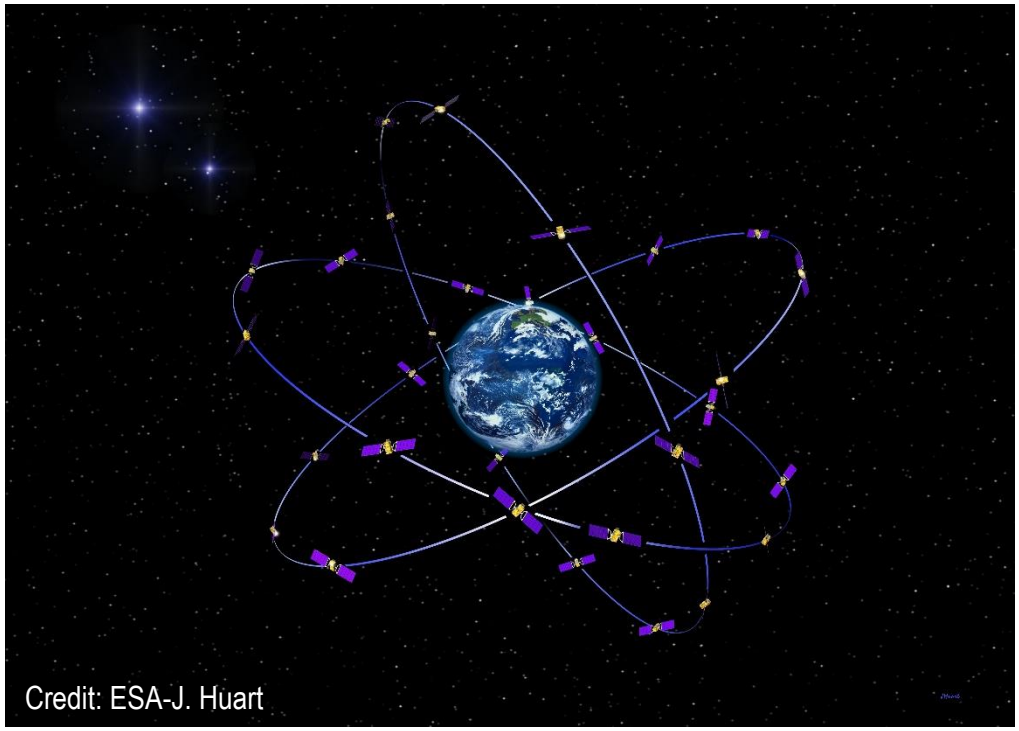
V. Impact of Quantum technologies

- Growth of satellite-based quantum technologies – e.g. cryptocurrencies, blockchain
- Development of decentralized autonomous organisations – DAO - in this sector
  - Such new systems good for escrow, funds, insurance, but not for managing classic risks
- Volume of space traffic means risk probabilities higher than before
  - But absence of consistent responses to commercial sector
- Need for new rules encompassing space traffic management now recognised

Credit ESA

VI. Reviewing risk equation

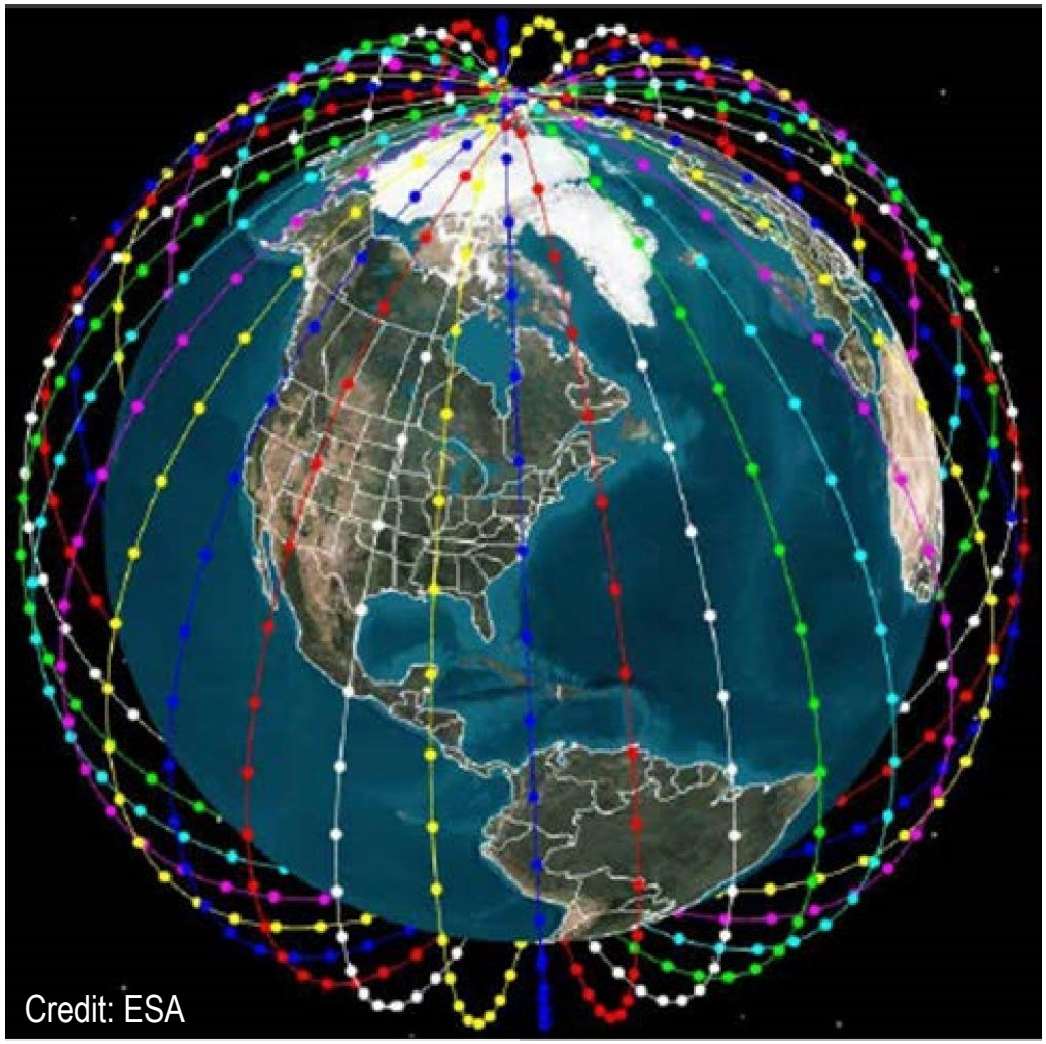
- Is there a need for a new space technology code?
- Data is now a commercial commodity
  - e.g. Transition to satellite based cloud storage
- Increased need for Cyber sensibility
- Does increased vigilance implicate increased regulation?
- Increasing lack of sustainability does impact on risk equation, simply because of core dependibilities of society on space-based services



Credit: ESA-J. Huart

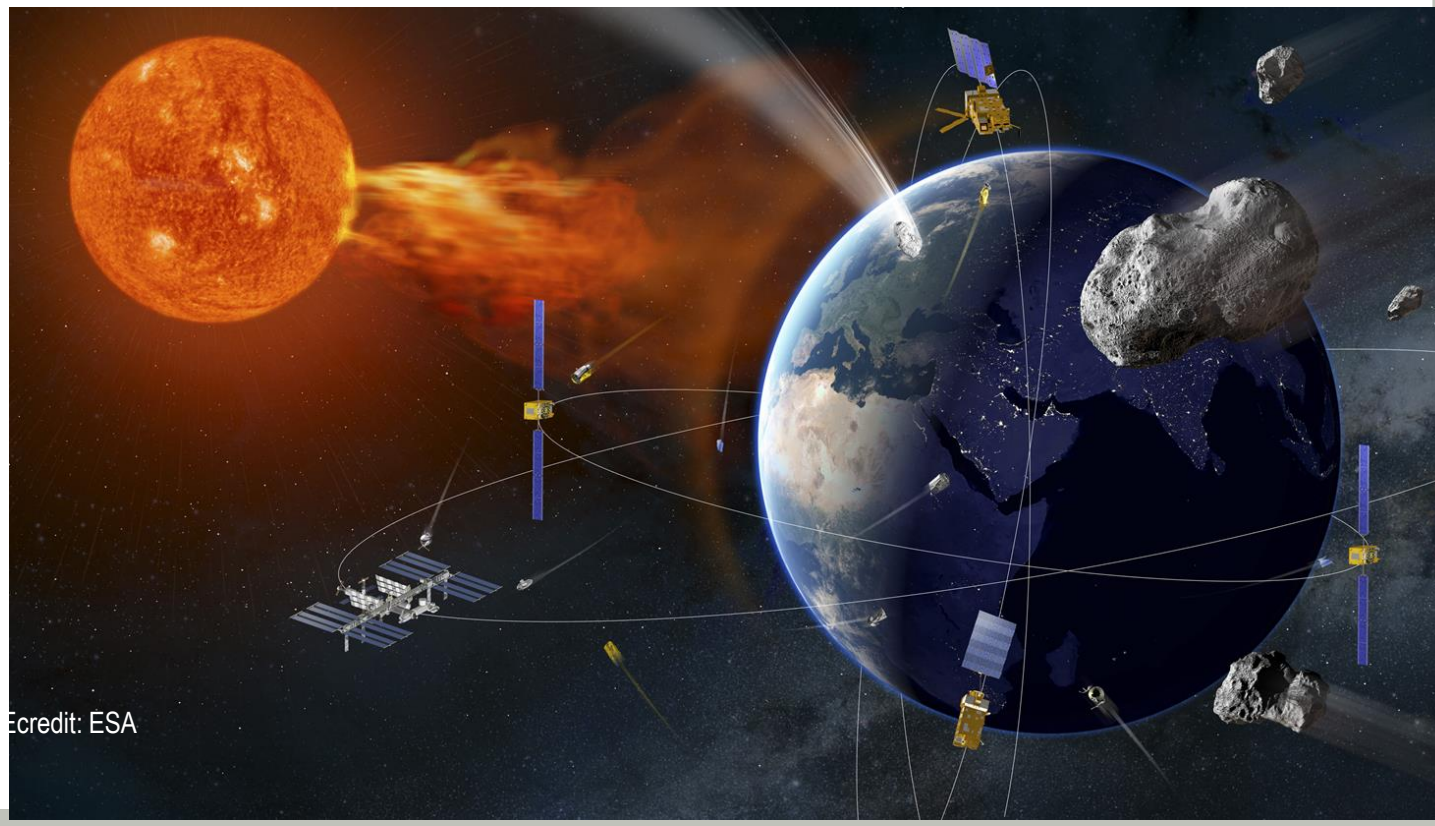
VII. ITU WRC, Sustainability Guidelines as way forward

- Impact of downsizing of space objects but massive increase in number
  - Mega-constellations
- Need for new rules encompassing space traffic management meanwhile recognised (STM)
- Should this system extend to rules for coordinated register of space services, space data collection, access and management?


Credit: ESA

VIII. Final remarks

- Technology codes could help secure accountability and equitable access and benefit to space-derived data and services at national level
- STM required for future space safety & security
- Secure greater consistency in monitoring and enforcement at national level to ensure sustainability of space



Credit: ESA, https://www.esa.int/ESA_Multimedia/Images/2019/10/Distribution_of_space_debris_around_Earth