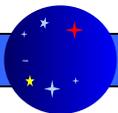


United Nations / United Arab Emirates High Level Forum  
Dubai, UAE, 20-24 November 2016

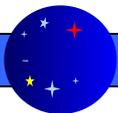
# **Global Challenges and Space Technology: Towards Space 2030**

Prof.Dr. Marius-Ioan Piso  
Romanian Space Agency



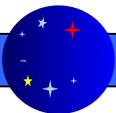
# Space@2030

- One decade up to 2030 - not very relevant for normal space programs and missions
- Disruptive technologies will become implemented, as:
  - Micro- and nano-systems
  - Mega-constellations and large number of formation flying satellites
  - Programmable (on-demand) satellites and spacecraft
  - Additive manufacturing of artefacts (ISRU 3D printing)
  - Quantum communications and quantum teleportation
  - Gravitational astronomy
- Asteroid utilisation (mining)
- Lunar permanent access and Mars exploration
- Space tourism (limited - suborbital)



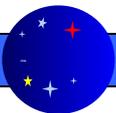
# Space@2030

- One decade up to 2030 - changes in governance - from local to global
  - Increasing commercialisation of space
  - New relevant space actors and polarisation - accretion - towards larger space agencies
  - Standardisation and OTC market
  - Relevant global actions: climate change, disaster management, global space services, global humanitarian and security services
  - Appropriate new legal framework: code of conduct, space traffic management, legal measures for the Moon, asteroids and other outer space bodies



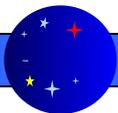
# Space and Security

- Space systems contributed to bilateral / horizontal security during the Cold War
- Since 1990, major contributions to global security and global issues:
  - Climate changes
  - Disaster monitoring
  - Space Weather
  - Planetary defence
  - Space security
- Space systems became critical infrastructures for planet Earth
- Space for Security and Space Security



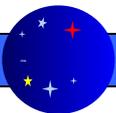
# Space and Security

- **Precision agriculture / farming**
  - Lack of satellite data - most developed economies decreasing agricultural production with 20-30% - export for other countries - famine.
- **Positioning / Navigation / Timing (PNT): Banking**
  - Failure of satellite PNT infrastructure generates significant fall of banking security
- **Climate changes: Global parameters**
  - More than half of the global parameters are measured exclusive by space technology



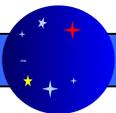
# Space and Security

- **Space weather**
  - Failure of early warning spacecraft might conduct to serious incidents within critical infrastructures as the power networks and satellites
- **Potential dangerous near earth objects**  
(asteroids, comets)
  - Lack of observational data from space (e.g. objects incident from the position of the Sun), and
  - Lack of space-born NEO deflection technology can conduct to global catastrophes.



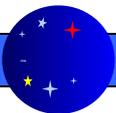
# Space@2030

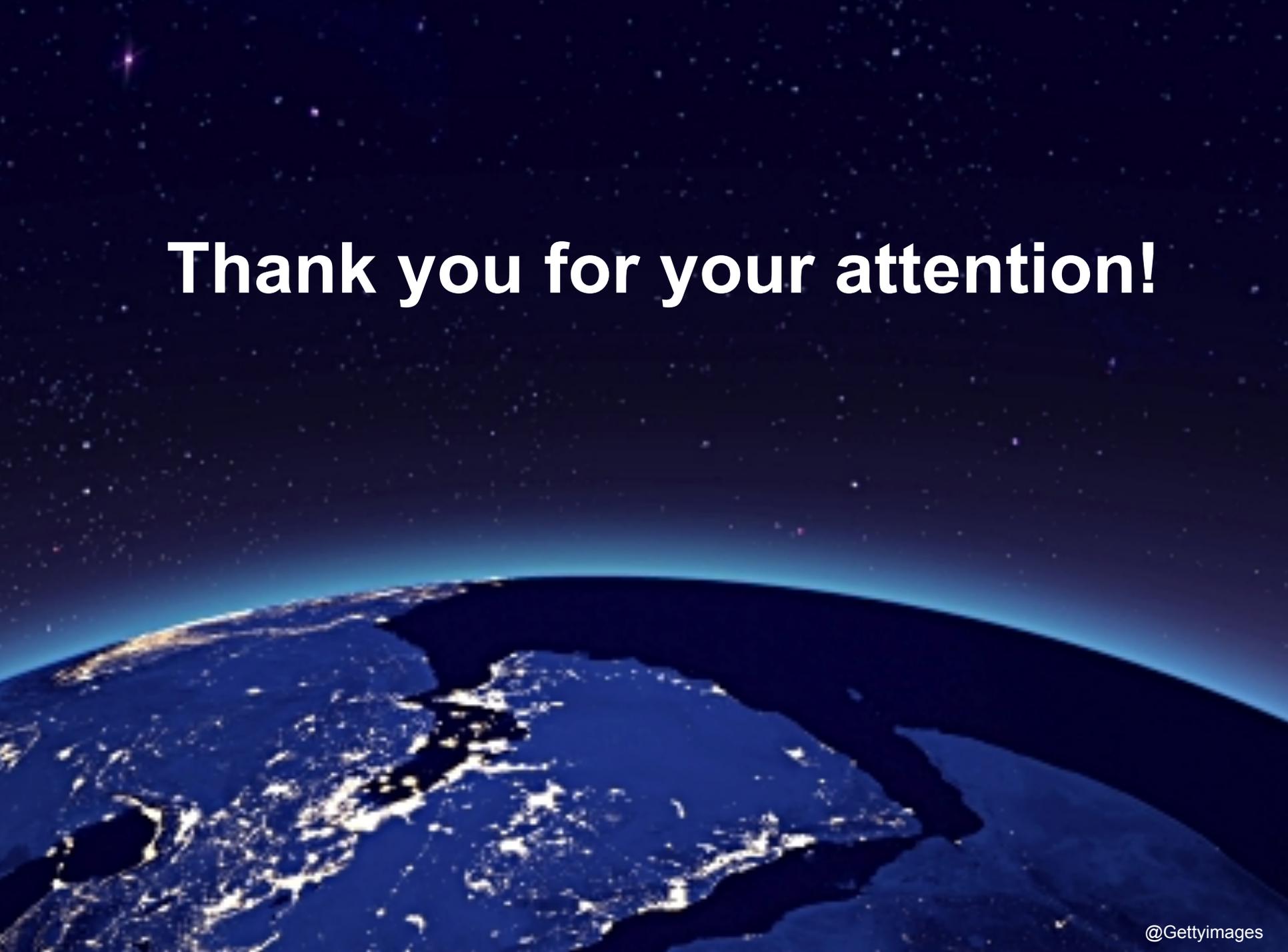
- For politicians - space systems are essential to global security and stability
- For finance ministers - space - driving role in the economy - multiplication factor in national economies - from 4 to 15
- For science and knowledge - space even directs the humankind



# Space@2030

- ESA, EU and the EU Member States are developing a new strategy for space which included developments towards security and stability
- In Romania the area “ICT, Space and Security” is a national priority and considered as a “Smart specialisation” in the EU terminology
- The coordination role of the UN - COPUOS and its executive Office for Outer Space Affairs would substantially increase as the forum for global space affairs and UNISPACE+50 would be a good opportunity to build elements of a new strategy.



A view of Earth from space, showing the curvature of the planet and the atmosphere against a starry background. The Earth's surface is illuminated, showing continents and oceans. The atmosphere is a thin blue layer. The background is a dark blue/black space filled with stars.

**Thank you for your attention!**