



Inter-ministerial Board Workshop Poland

Space for 5G and Digital Transformation Space Systems for Safety and Security

Warsaw
29 May 2019

Hermann Ludwig Moeller, European Space Agency
ESA Directorate of Telecommunications and Integrated Applications
Head of Institutional and European Programmes Office

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European Space Agency

Digital Transformation



Digital transformation is the integration of digital technology (ICT) into all areas of a business and society, fundamentally changing how businesses operate and deliver value to customers



Connectivity as key enabler of Digital Transformation

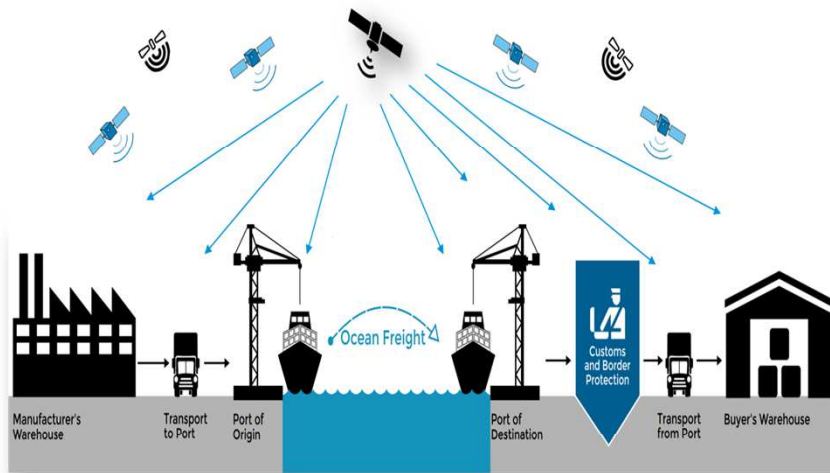


Connectivity:

- Anytime
- Anywhere
- Any Volume
- Any Thing (M2M/IoT)



5G Connectivity and Digital Transformation



Transforming Business Models

What will 5G bring you?	5G applications
<p>Amazing volume Amazingly fast</p>	<p>Hologram TV, immersive presence, augmented reality, ultra large volume transfers</p>
<p>Always best connected</p>	<p>Staying connected everywhere including high-speed trains, planes, ships, crowds</p>
<p>No perceived delay</p>	<p>Staying connected everywhere including high-speed trains, planes, ships, crowds</p>
<p>Massive amount of connected things and people</p>	<p>Internet of things, smart cities, connected cars, e-health</p>
<p>Energy efficiency</p>	<p>80% energy saving; deployment in developing countries</p>
<p>Flexible integrated programmable networks</p>	<p>New business models for provision of network functions, emergence of super MVNOs, pan-European hybrid networks, faster innovation in network services</p>
<p>Secure networks</p>	<p>Networks for police, civil protection, public safety and security professionals</p>

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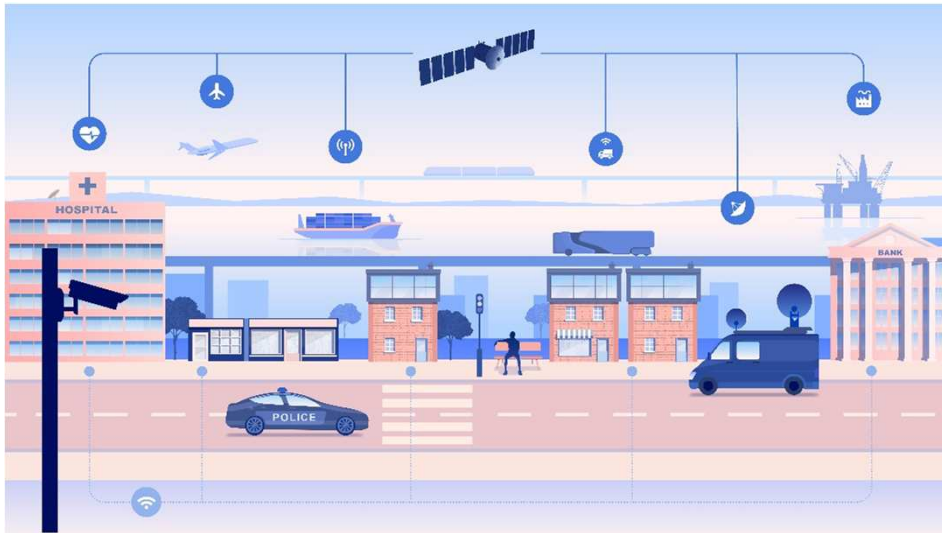


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Role of Satcom in 5G and the Digital Transformation

Space for 5G provides:

- ✓ Ubiquitous coverage
- ✓ Resilience
- ✓ Security

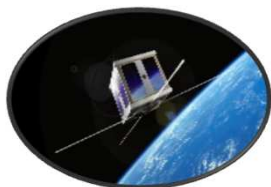


Seamless Integration of Space and Terrestrial Connectivity and Services

ESA SPACE19+ Strategic Programme Line S45G



Technology developments



Applications & Services



Validations Trials
Vertical Pilots



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ESA SPACE19+ Strategic Programme Line S45G



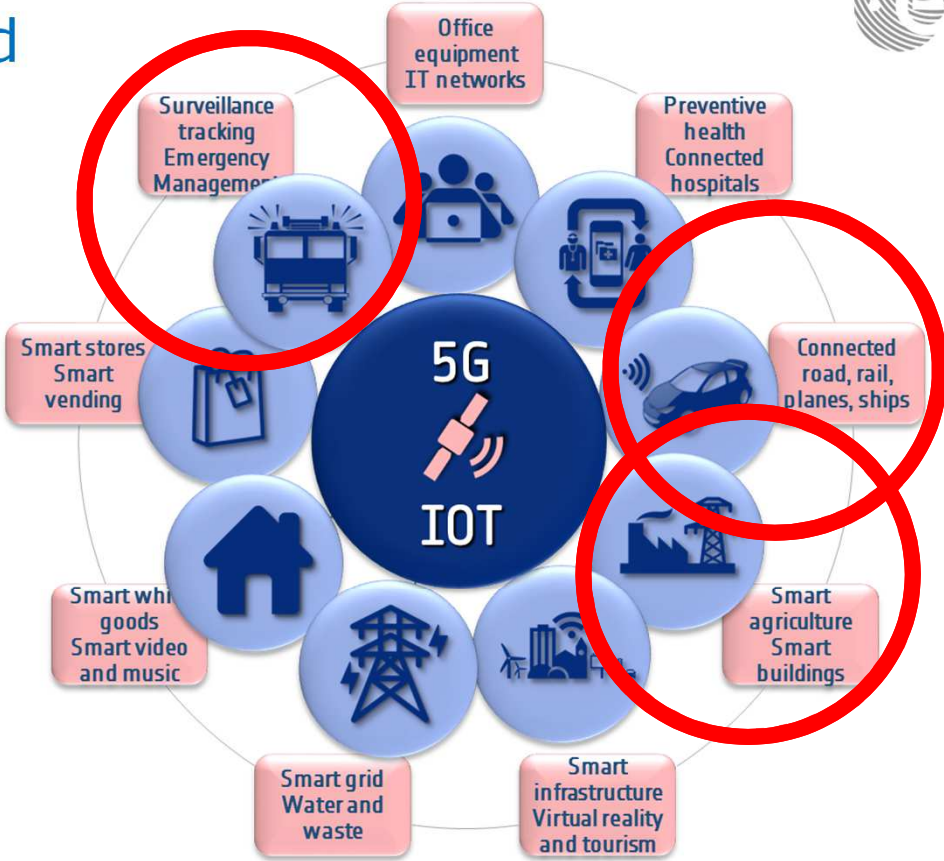
1. Develop & Demonstrate seamless integration 5G space/terrestrial technologies
2. Enable 5G Satellite services
3. Reach out to the 5G terrestrial community and standardisation bodies to promote awareness and integration with satellite
4. Coordinate with 5G national and international bodies
5. Promote User Trials and Pilots to support terrestrial and satellite 5G services into user segments



5G Verticals and Use Cases Considerations for Poland



Satellite integration in 5G will drive much of the growth in these verticals



Space as enabler of the “Digital Transformation” in Poland Connectivity for key sectors of industry and society



5G Use Cases: Examples

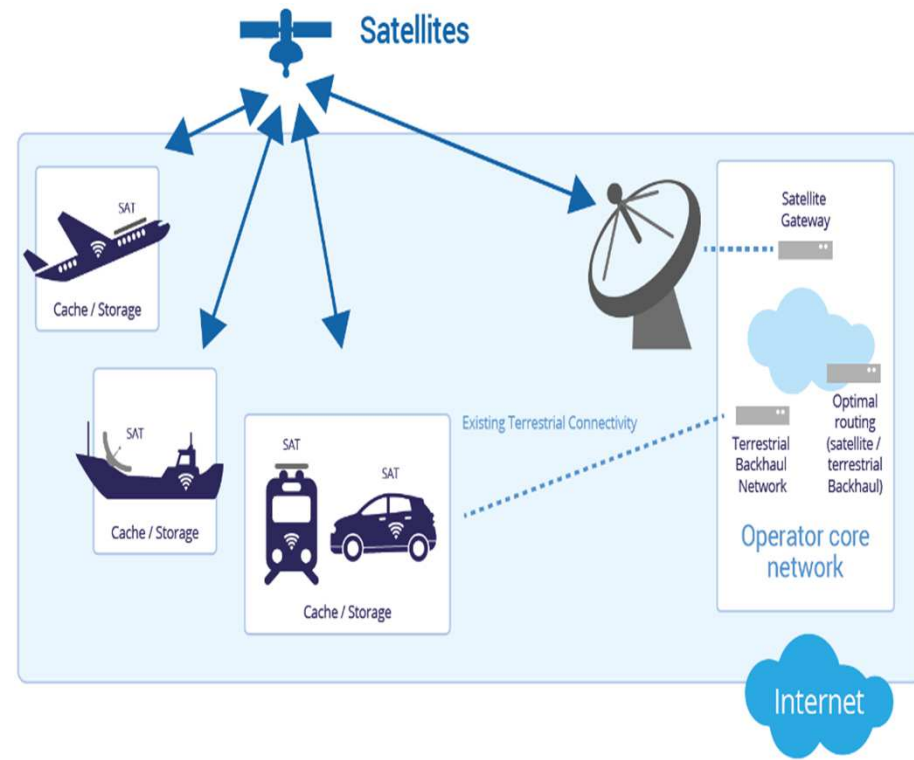


Maritime Transport

- Asset tracking & cargo logistics
- Remotely connected sensors
- Fleet management
- Autonomous shipping

Digital Divide

- Provide 5G connectivity to underserved and remote regions



S45G – Technological Opportunities for Poland



- S45G is software centric
 - Opportunity for spin-in from ICT SW industries into Space sector
- S45G requires seamless integration of terrestrial and space communications
 - Opportunity for spin-in from TELCO



<https://artes.esa.int/satellite-5g>

5G@esa.int



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ESA Space Safety & Security



in Space

Debris

SWE

Planetary Defence

Collision avoidance autonomy

Space Safety
– a single programme

from Space

Maritime

Disaster Management

Food

iris

QKD

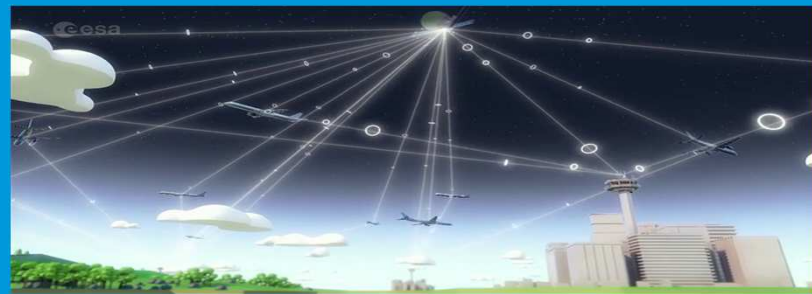
Safety and Security Applications
– several programmes



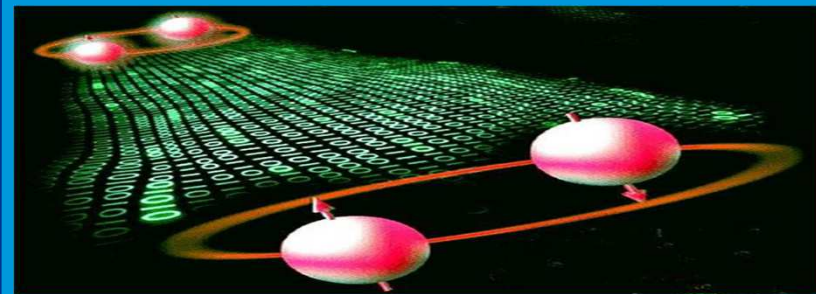
Cybersecurity of all activities



ESA Space Systems for Safety & Security (4S)



TRANSPORT



CRITICAL INFRASTRUCTURE



SPACE



GOVERNMENTAL



4S Use Cases: Examples



Transport

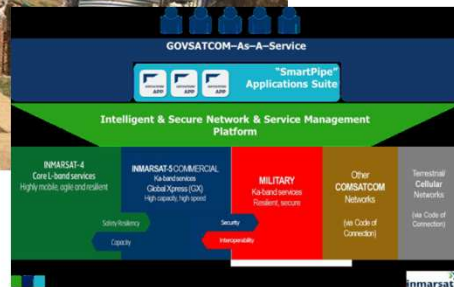
- Maritime Safety

GOVSATCOM

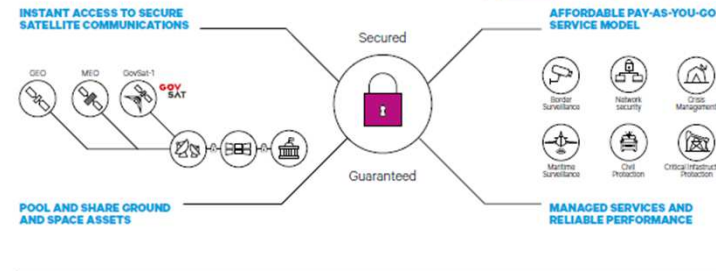
- Border Control
- Crisis Management
- Common Security and Defense Policy (CSDP) missions for peacekeeping operations and conflict prevention



ESA GOVSATCOM Precursor – PACIS Projects



Next-generation GovSatCom solutions



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ESA Secure Satcom for Safety & Security Applications ESA Announcement of Industrial Opportunity



- ESA AO issued 1 February 2019
- Objective: Industrial Outline Proposals for SPACE19+
- Covering 2020-2025 timeframe and preparation 2025-2030
- Addressing R&D/Product development/Core Competitiveness, Secure Satcom Projects and GOVSATCOM-related Project, as well as Business Applications
- ESA Industry AO Workshop on 4 April 2019 in Bucharest
- Specific Eastern Europe Industry WS considered for September 2019
- SPACE19+ ambition: 250MEURO



ESA Secure Satcom for Safety & Security Applications

ESA Announcement of Industrial Opportunity



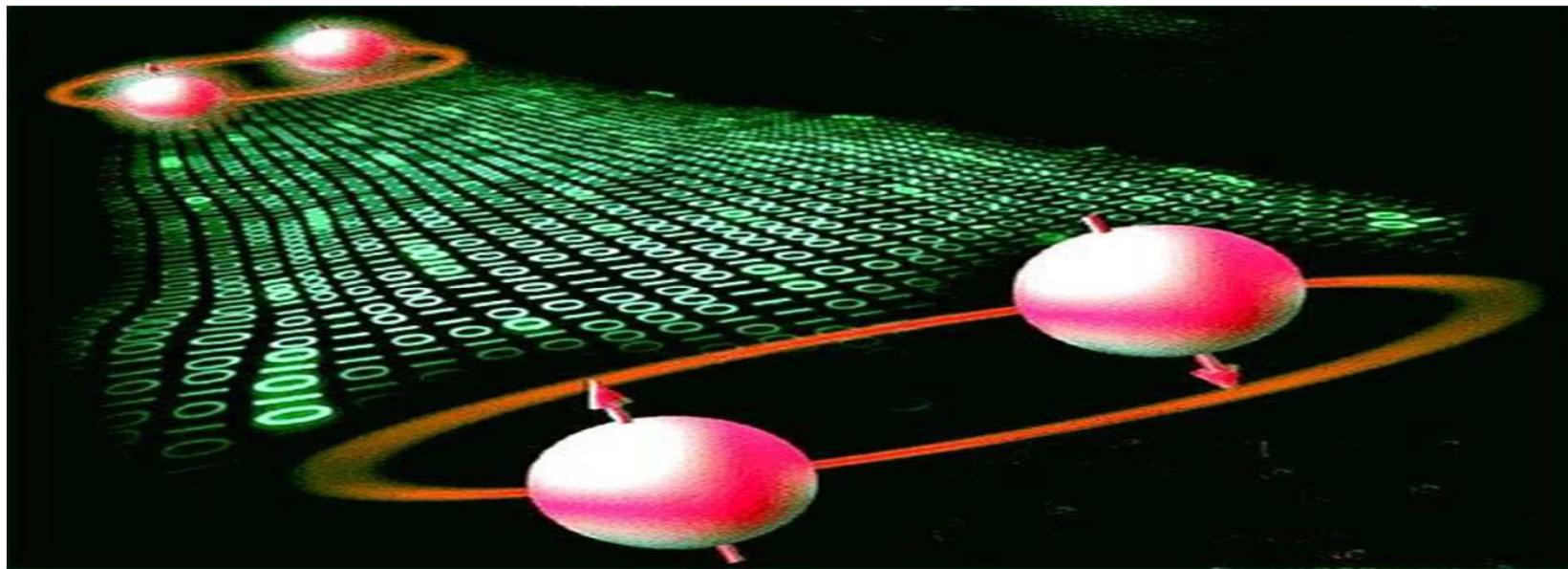
4S Theme and activity areas vs. timeframe		Evolution of existing (>2019)	Generation of new (2020-2025)	Preparatory work (2025-2030)
CORE COMPETITIVENESS for 4S (including ScyLight)		e.g. European protected waveform	e.g. ScyLight for institutional QKD	e.g. Technology for NG Secure Satcom
Secure Satcom Projects	IRIS	IRIS for ATM Deployment	e.g. Beyond ATM e.g. Cockpit services	e.g. Digital Sky
	EDRS Global	EDRS-Global Phase C/D/E1	e.g. EDRS for NG Copernicus Sentinels, RPAS Precursor	e.g. NG Data Relay
	Institutional QKD	/		e.g. Part of NG secure Satcom
	OTHER			
GOVSATCOM-related Projects	Precursor Phase 2	Integration into Pooling & Sharing Hubs; Extension of demonstrations and downstream service developments	e.g. Arctic Precursor	/
	Pooling&Sharing HUB	Phase A/B	Version 1 Hub Implementation	Version 2 Hub Implementation
	Space Component Segment 1	/	New National secure Satcom assets; Security augmented commercial secure satcom assets; IOVIOD	NG Secure Satcom System; Additional space infrastructure
	OTHER			
BUSINESS APPLICATIONS for 4S		e.g. Extension of Precursor PACIS demonstration downstream to create demand pull from civilian user base	e.g. development of new vertical sectors; AI; RPAS/HAPS	
GENERIC			e.g. Cybersecurity	



Outlook – Cutting Edge for Secure Communications



➤ Institutional QKD Precursor Mission - SAGA



THANK YOU

