

Satellite Communications for Safety & Security

Workshop of the European Inter-parliamentary Space Conference

ESEC

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European Space Agency

ESA Telecommunications & Integrated Applications

Advanced Research in Telecommunications Systems (ARTES)



Development of products, services and applications in partnership with industry

- highly competitive global market for satellite communications;
- technical, commercial and operational approaches close to market readiness;
- Building partnerships;
- Improving our daily lives across almost domains, from health to transport and from civil protection to energy and environmental services.

ESA ARTES SATCOM for Safety & Security



A Programme Framework in support to ESA Space & Security Pillar

- Protection of humanity and assets on Earth
- Services from space
- Maximising integration of space into European society and economy
- Synergies between civilian & security activities in navigation, communication and observation, incl. for big data applications
- Including border and maritime surveillance, civil protection etc.

ESA SATCOM for Safety & Security

Elements of an ESA Framework & EU Context

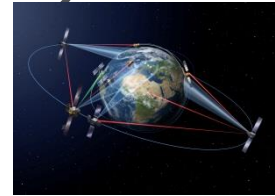


➤ EU GOVSATCOM



→ ESA GOVSATCOM Precursor (PACIS)

➤ EU COPERNICUS



→ ESA European Data Relay System (EDRS)

➤ EU Single European Sky



→ ESA Air Traffic Management by Satellite (IRIS)

EU GOVSATCOM & ESA GOVSATCOM Precursors (PACIS)

http://www.esa.int/spaceinvideos/Videos/2017/06/Govsatcom_pooling_civil_and_secure_satcoms

ESA GOVSATCOM Precursor Programme - ARTES



- ESA ARTES PPP
- Industry-driven
- Develop innovative technologies
 - Ground Segment for Pooling & Sharing
 - Space Segment flexible P/L
- Demonstrate in support to market development
 - Guided by GOVSATCOM High Level User Needs



A Federation of Projects - The PACIS Projects



- 6 PACIS projects are being set up, in partnership with 7 European Operators/Service providers with the support of industry and 10 ESA Member States.
- The following projects were created at or after CM16 (December 2016):
 - PACIS 1 (SES) Current MS Participation: **LU, BE, UK, PT**
 - PACIS 2 (Hispasat) Current MS Participation: **ES**
 - PACIS 3 (Hisdesat) Current MS Participation: **ES**
 - PACIS 4 (Telespazio) Current MS Participation: **IT**
 - PACIS 5 (ADS CIS) Current MS Participation: **BE**
 - PACIS 6 (Inmarsat) Current MS Participation: **UK, NO, RO**
- Member States can always join existing PACIS projects or establish new ones.
- Program envelop of 85MEURO (PPP) + 50% industrial co-funding
- ESA/EDA Implementing Arrangement (ESA Precursor-EDA Demonstration)

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EU COPERNICUS & ESA European Data Relay System (EDRS)

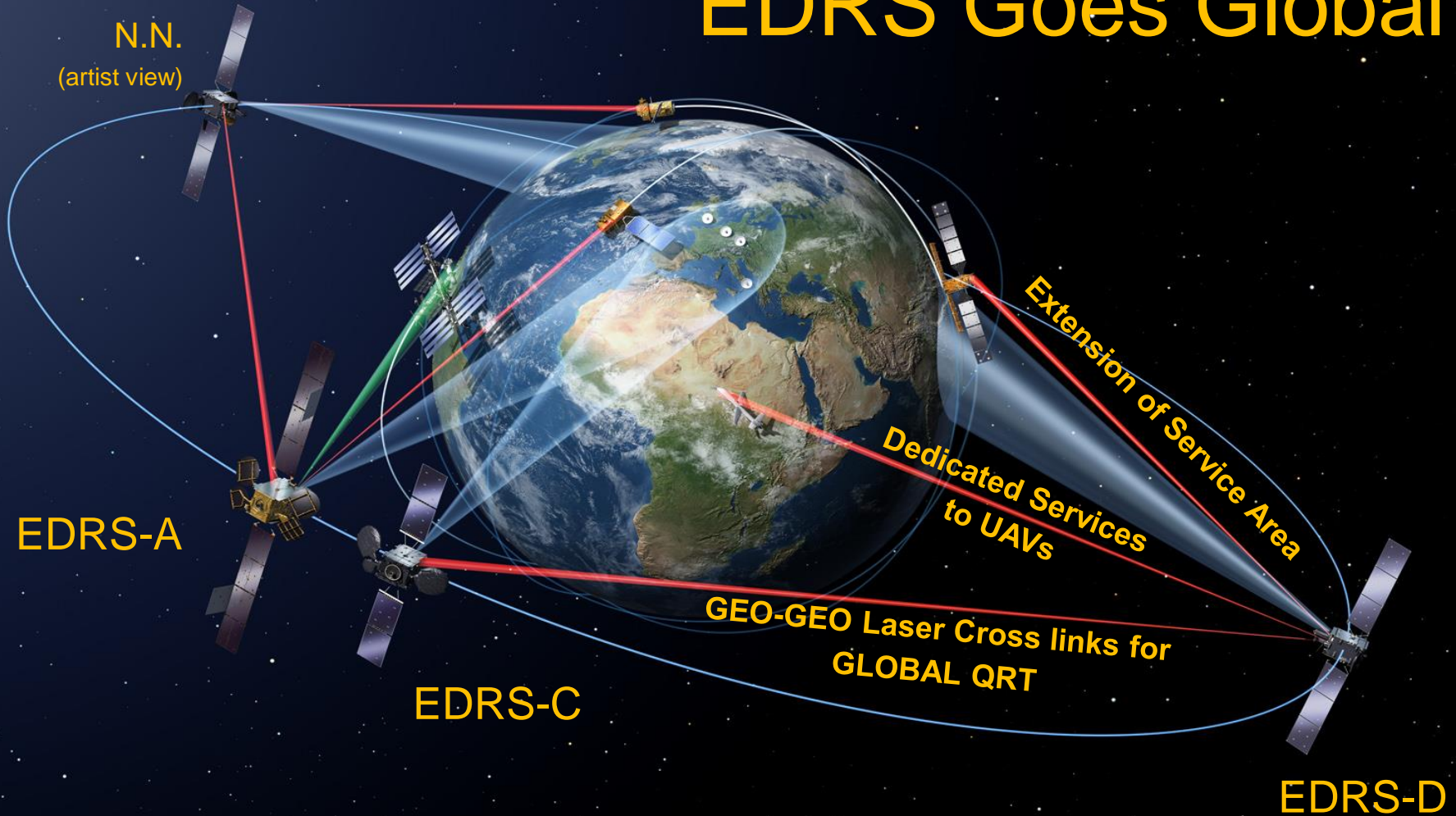
[http://www.esa.int/spaceinvideos/Videos/2016/01/Space data without delay](http://www.esa.int/spaceinvideos/Videos/2016/01/Space_data_without_delay)

EDRS Benefits



- Increases the speed and amount of data (3TByte/day for Copernicus operational since 2016/17) that can be transmitted to Earth
- Provides quasi-real time access (<15min) to time-critical acquired by Earth observation satellites and airborne platforms, improving both the monitoring of and response to natural disasters such as forest fires and floods as well as environmental monitoring
- Provides encrypted distribution of sensitive data
- Strengthens Europe's independence by transmitting data directly to ground stations in Europe, thereby eliminating the reliance on ground stations outside Europe

EDRS Goes Global



EU Single European Sky & ESA Air Traffic Management by Satellite (IRIS)

http://www.esa.int/spaceinvideos/Videos/2016/03/Iris_-_Air_traffic_management_communications_via_satellite

IRIS Benefits as part of SESAR



- 4D trajectory management via satellite (precursor 2020; Fully operational by 2028)
- Continental European (14.4M flights by 2035) as well as oceanic airspaces
- Safe & reliable service via robust data links complemented with conventional voice communications between pilots& controllers
- SESAR has an objective to save between 8 and 14 minutes per flight, as well as, up to 500 kg of fuel and up to 1575 kg of CO2 on average
- SESAR plans also to reduce ATM-related costs by half.

Conclusions & Outlook



- SATCOM as commercial market (traditionally TV Broadcast)
- SATCOM increasingly serving also institutional needs
- EU GOVSATCOM as new European pillar including big data needs, e.g. EO, IoT
- ESA already partnering with industry in support to specific components, e.g. Data Relay; ATM, 5G
- Further ESA R&I initiatives are underway, e.g. Arctic coverage, optical communications, RPAS, Quantum Key Distribution
- Cooperation in partnership between ESA SATCOM for Safety & Security (2019-) and EU GOVSATCOM (2021-)