BELSPO – ESA CM25

BELGIUM

David Phillips, Head of Systems, Strategic Programme Lines, and Technology

26.09.2025

Satcom Market Evolution & Geopolitical Context

EUROPEAN CONNECTIVITY: FAST MOVING CHANGE DRIVERS

- **Mega constellation** accelerating
- Scale accessible to only few
- European response: institutional IRIS² federating efforts

- **Large corporations** becoming satellite operators
- Mobile Network Operators **(MNOs)** investing in space for complementary coverage

- **Geopolitical shift**
- Security, resilience and sovereignty front and centre
- **Space capabilities play a key role because of their dual use nature**

$10B investment in Kuiper constellation
Different business model

New players challenging the market balance and disrupting competition

Growing and opening up policy shaping industrial activity
Technology readiness and **market penetration**

Connectivity and Secure Communications DNA

SUPPORTING COMPETITIVENESS

- Worldwide market
- Time-to-market
- Connectivity-growing need

INDUSTRY- & ESA-INITIATED

- Industry Initiated ca 60% (ESA in partnership)
- ESA initiated ca 40%

COMMERCIALISTATION & CO-FUNDING

- ESA technology risk
- Industry co-funds recurring and commercial risk
- Proposal to adapt to average 75 % co-funding for industry initiated

SECURE COMMUNINCATION

- Satcom market underpins entire space market, critical intervention
- Providing commercial or governmental solutions
- Dual-use emerging

FULL SPACE VALUE CHAIN

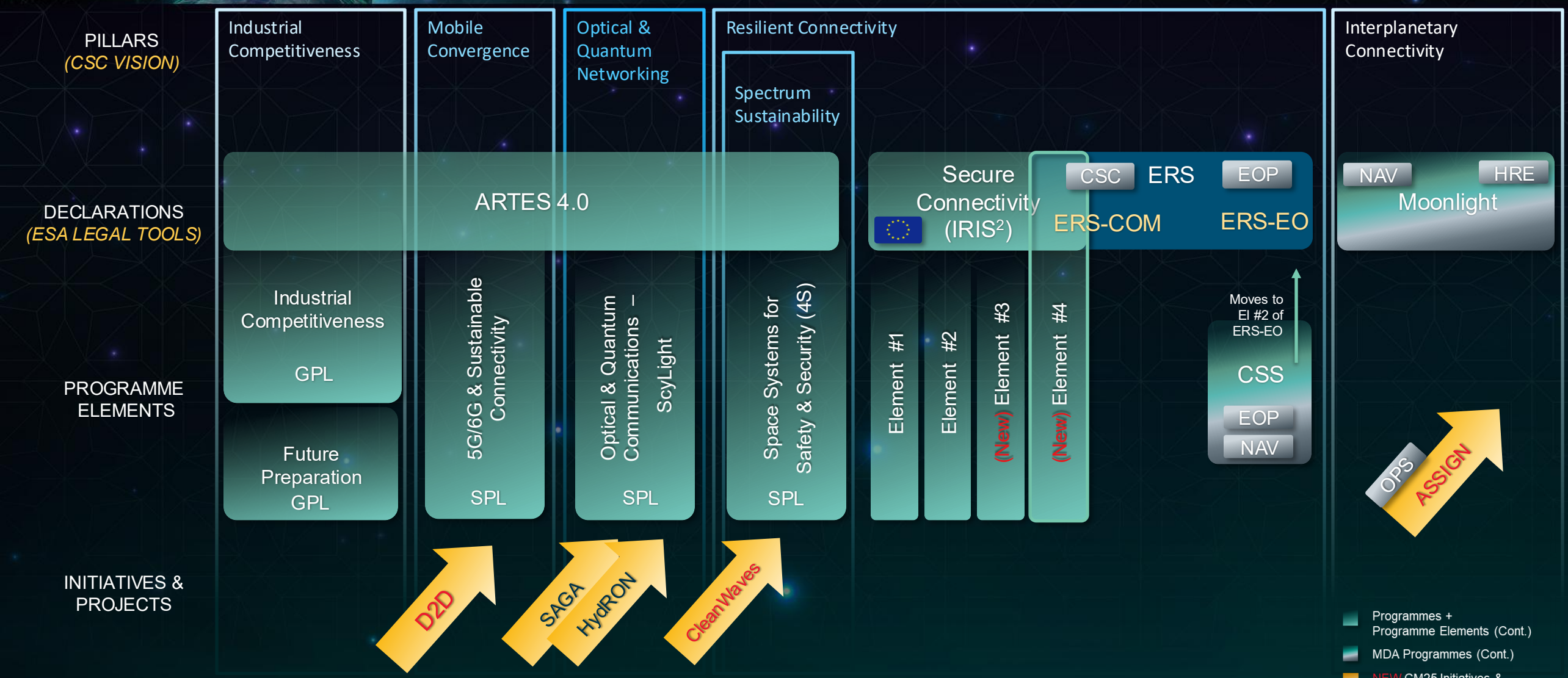
- Team up with full space value chain, including non-traditional space actors
- Preparation, technology, products, partnership projects, applications and services

INDUSTRIAL RETURN OF 1

- ARTES, CSS, IRIS^2 – Guaranteed Return of 1
  → Funds returned if not used in specific MS
- Moonlight – Standard ESA Return

CSC Programmes at CM25

CSC Programmes in Six Pillars of Connectivity



ARTES 4.0

INDUSTRIAL COMPETITIVENESS

MOBILE CONVERGENCE

SPECTRUM SUSTAINABILITY

OPTICAL & QUANTUM

RESILIENT CONNECTIVITY

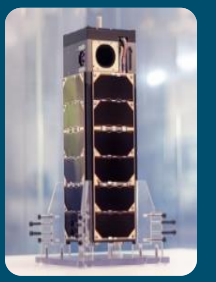
INTERPLANETARY CONNECTIVITY

ARTES 4.0 Industrial Competitiveness GPL

Partnership Projects Proposals for CM25

- Maintaining European leadership in GEO
- Developing next gen LEO/MEO constellations
- Developing multi-orbit connectivity – space & ground
- Introducing innovative space-based Services and Missions
- Boosting industrialisation
- Supporting national satellite projects ambitions

Enables disruptive satcom technology, products and systems
Enables Industry to lead future innovation



W-Band

Flat Antennas

Digital Processor

- VLEO
- High-Aspect Ratio
- Platform & Multi-Orbit
- Intelligent Systems, AI,
- Cloud Cognitive Systems,

→ Prepare Product Roadmaps & Work Plans

Partnership Projects - CM25 Opportunities

E-FLEX European Flexible Solar Array Initiative

- *FP System Definition Study under preparation*

Industrialisation (ADS, TAS, Swissto12, OHB…)

- *FP System Definition Study under preparation*

Novacom I, Novacom II

- *Competitiveness proposals in preparation*

Sunrise Phase 4 with EutelSatOneWeb

- *In preparation*

QKDSAT

E-FLEX

Novacom I

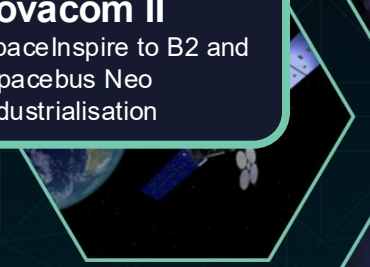
Loop Heat Pipes/deployable radiators/deployment mechanisms

Novacom II

Retrofit SpaceInspire to B2 and Spacebus Neo Industrialisation

Sunrise Phase 4

WS1 - System architecture and Next Gen Pilot Satellites
WS2 - Advanced Payloads
WS4 - Multi-orbit System & UT



ARTES 4.0
5G/6G SPL

esa

INDUSTRIAL
COMPETITIVENESS

MOBILE
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SPECTRUM
SUSTAINABILITY

OPTICAL
& QUANTUM

RESILIENT
CONNECTIVITY

INTERPLANETARY
CONNECTIVITY

5G/6G & Sustainable Connectivity

D2D

Sunrise

5G-Emerge

5G EMERGE

Next Generation Connected People

TN/NTN Convergence

Joint Communication & Sensing (JCAS)

Sustainability

Network Management

XR & Industrial Metaverse

AI

Next Generation Mobility

5G Future Releases

GSMA

GSOA

5GAA

3GPP

Standardisation

3D Networks

6G In-Orbit Laboratory

D2D Update 2025… becoming very crowded

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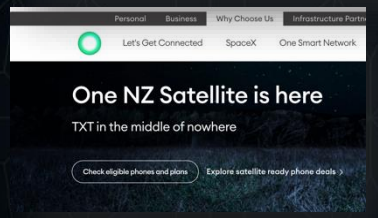
STARLINK

660+ D2D satellites in orbit (June 2025)

Apple and SpaceX link up to support Starlink satellite network on iPhones

Bloomberg • Last Updated: Jan 29, 2025, 12:07:00 PM IST



Start of D2D services in Japan with many data apps

EchoStar sells spectrum to SpaceX, cancels MDA satellite contract

by Jeff Foust September 8, 2025

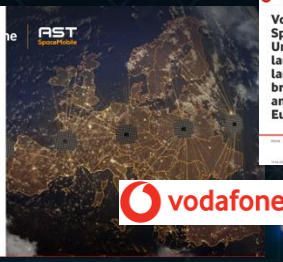
AST SpaceMobile

Market capitalization of AST SpaceMobile (ASTS)

Market cap: $15.26 Billion USD

As of July 2025 **AST SpaceMobile** has a market cap of **$15.26 Billion USD**. This makes AST

Vodafone and AST SpaceMobile Choose Luxembourg as Joint Venture Headquarters to Drive European-Wide Space-Based Mobile Broadband Coverage



Vodafone, AST SpaceMobile and University of Málaga launch new space and land mobile broadband research and validation hub for Europe

businesswire Newsroom Services & Solutions Resources For Journalists

Feb 26, 2025 9:00 AM Eastern Standard Time

AST SpaceMobile Secures $43 Million Contract in Support of U.S. Space Development Agency Through Prime Contractor

SES

SES and Lynk Global's strategic partnership for high-growth Direct-to-Device (D2D) services

MARCH 10, 2025

Next-Gen Globalstar: CEO Paul Jacobs Talks Growth in D2D, IoT, and Satellite/Cellular Convergence

Globalstar CEO Paul Jacobs investor day about how G

SPACENEWS 35 YEARS

Commercial

MDA Space to build satellites for Globalstar's Apple-backed next-gen constellation

by Jason Rainbow
February 10, 2025

Viasat SPACE42

SPACENEWS 35 YEARS

Commercial

Viasat and Space42 co-invest in shared direct-to-device satellite prototype

by Jason Rainbow
March 11, 2025

OQ TECHNOLOGY

NEWS • SATELLITE

OQ Technology launches MACSAT 2.0 mission

2 Min Read 23 hours ago

By launching this mission, OQ Technology becomes the first European company to target the Direct-to-Smartphone market using 3GPP-standardised NTN connectivity.

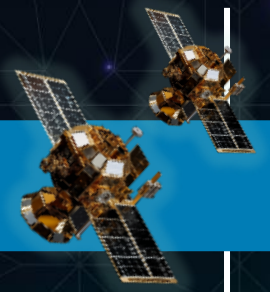
ESA D2D: Industry-initiated and ESA-initiated Activities

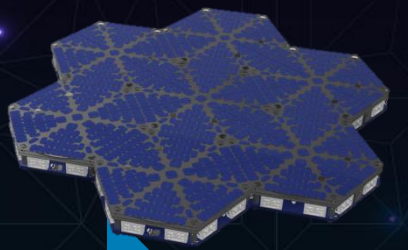
CM25

SES SELYCE

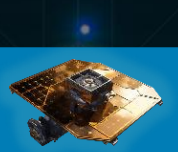
Viasat ELEOSYS

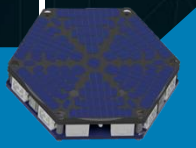
CM28





Industry-initiated





ESA-initiated

MFF28

EC-initiated D2D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CONNECTIVITY AND SECURE COMMUNICATIONS
ARTES 4.0
OPTICAL & QUANTUM

ScyLight – Optical and Quantum Communication

Optical Communication & Networking

- Optical Inter-satellite links
- Cross-atmospheric connectivity
- High thRoughput Optical Network (HydRON and Evolution)
- Beyond Earth optical communication

Intra-satellite Photonics

- Data distribution and processing on-board
- Microwave Photonics

Quantum Communication

- QKD – EAGLE Next, QKDSAT
- Quantum Information Networks (QIN)
- SAGA & EuroQCI

Work Plan 2026 approved by JCB!

HydRON Demonstration System

Overview of the HydRON-DS Elements

HydRON Demonstration System

Request for Quotations

Element 1
- LEO ring layer

Element 2
- LEO to MEO/GEO extension

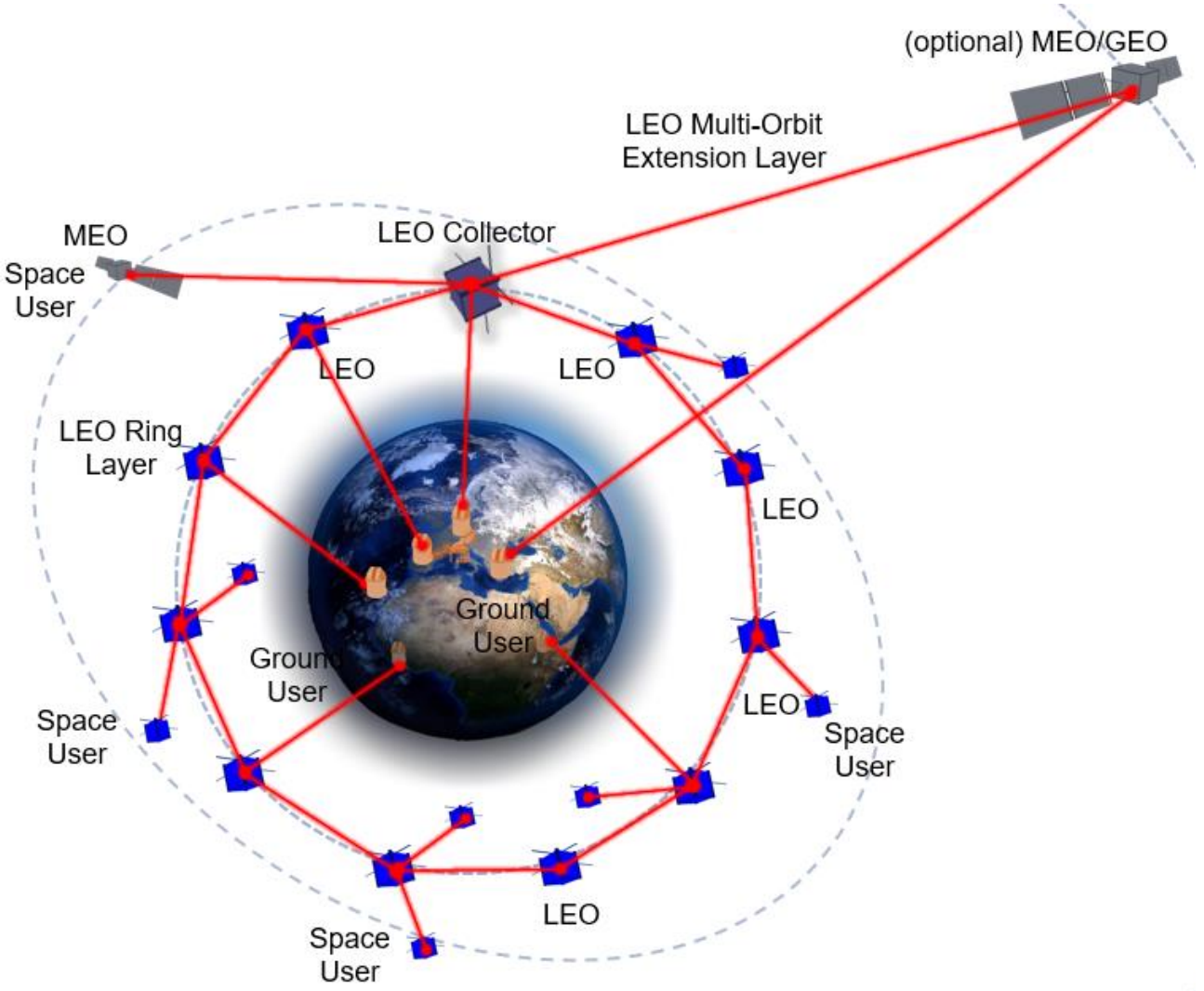
Call for Proposals

Element 3
- User segment & Evolution

Selected Primes

KEPLER

ThalesAlenia Space
a Thales / Leonardo company



- User data rate
- Total throughput
- Cost per bit/sec
- Global coverage
- Optical feeder link availability

ARTES 4.0

Space Systems for Safety & Security (4S) SPL

Space Systems for Safety & Security (4S) SPL

CM25 – on the way to 2030

CM25 Programme Proposal

Preparing the future	Technology development	Development new infrastructures	Application domain
Resilience by design Disruptive concept studies	**Cybersecurity** Reinforce supply chain & aim for European leadership	**Aviation & Maritime** Communications and surveillance infrastructures for traffic management and safety	**CleanWaves** Protecting infrastructures from interferences and guaranteeing access to spectrum

Beyond these recommended focus areas, all areas under 4S SPL perimeter (4S strategic plan) can be of course supported by MS

Why Air and Maritime Traffic Management and Safety?

Traffic growth and disruptions pushing ATM to the limit

Advanced
European space-based solutions

Global safety-of-life digital communications

Global surveillance for aircrafts and vessels

- ✓ Greater capacity & coverage
- ✓ More resilience with addition of space pillar to terrestrial pillar in coastal or continental areas
- ✓ Increased sovereignty

Mature technologies and solutions
Very active ecosystem

Sea vessels require contact with land for safety, security and operations management

CLEANWAVES

Towards Spectrum Sustainability

RF Spectrum & Implications for Europe

RF interference: increasing likelihood of impacting connectivity services

→ **Threatens also critical services**

Complex European regulatory framework: compared to larger nations

→ **Slows down ability to more efficient and flexible use of spectrum**

Limited insights into spectrum usage: restricted capabilities, especially from space

→ **Further insights needed to make well-informed regulatory decisions**

Dependency on non-European players: reliance on foreign technology and services

→ **Raises concerns about sovereignty, security and long-term autonomy**

CLEANWAVES

Addressing strategic needs for Europe

esa

Consolidating ESA Member States industrial competences to:

- Protect European infrastructures from rising sources of interference
- Use spectrum resources more efficiently
- Reduce dependency on non-European technologies and infrastructures
- Advance the readiness and adoption of space-based capabilities in support of European regulatory frameworks

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ERS-EO Element 2:

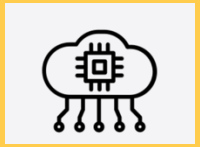
Space Resilience Nodes

Former Crisis Resilience & Security from Space (CSS)

ESA Multi-Domain Activity

Focus on Space Resilience Nodes

Information Service


Edge Computing


Testbed


Secured Data Lakes


Capacity Building

Real time Actionable Info

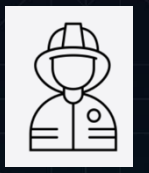
User Support

Advanced Stats/Analytics/ Decision Making + Edge Computing

Public Protection & Disaster Relief (PPDR)

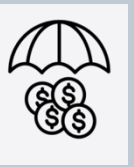
Resilient Secured Connectivity

Civil Protection/ Cities/ First Responders



Digital Market Place

Certification of Services



Insurance, Reinsurance, Dev Banks

Heritage GOVSATCOM

Data Services


Earth Observation (EO)


Drones HAPS


IoT Sensing/ positioning

Open Data Crowd sourcing


Forecast

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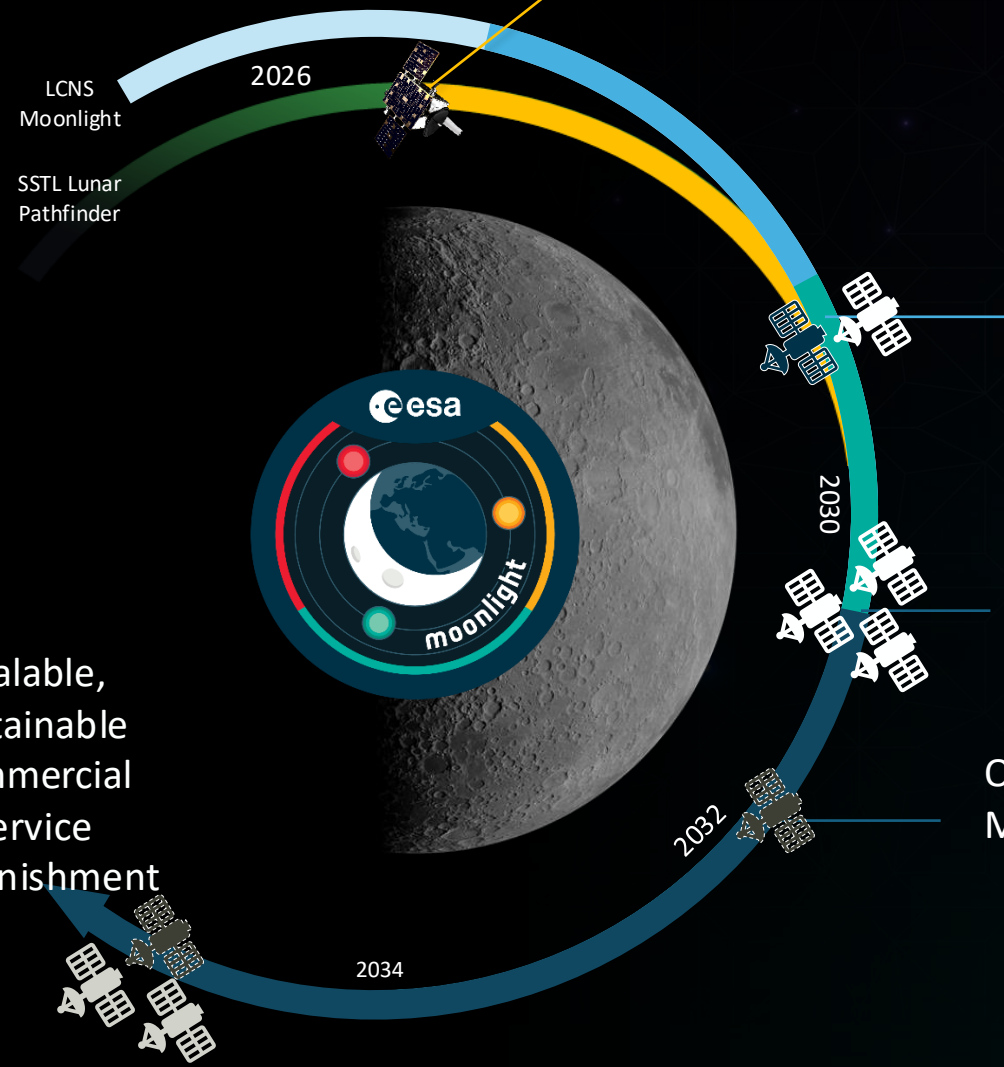
Moonlight and ASSIGN

ESA Multi-Domain Activities

The Road to Moonlight

Bringing connectivity and navigation to the Moon



SSTL Lunar Pathfinder

Moonlight LCNS IOC (1x COM, 1x NAV)

Moonlight LCNS (3x NAV)

Optional Launch of 2nd ML COM SAT

Scalable, Sustainable Commercial Service Replenishment

Public-Private Partnership (PPP)

TELESPAZIO
a LEONARDO and THALES company

Viasat

hispasat

Strongly address four of five Strategy 2040 Goals of ESA

- Explore and Discover
- Strengthen European Autonomy and Resilience
- Boost Growth and Competitiveness
- Inspire Europe


CSC
CONNECTIVITY AND SECURE COMMUNICATIONS