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Resilience, Navigation and Connectivity

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EUROPEAN SPACE AGENCY

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WE ARE FACING A DEFINING MOMENT

Space infrastructures are the invisible **backbone of our economy, security, and diplomacy** and they are **increasingly at risk**.

Autonomy

Secure and sovereign space systems safeguard our ability to **act independently** in crises.

Continuity

Space ensures **uninterrupted** communications, navigation, and coordination **when terrestrial networks fail**.

Collective Security

Integrated space capabilities enable **coherent civilian–defence responses** to hybrid, cyber, and kinetic threats.

Trust & Cooperation

Resilience is built through **shared investment and interoperability** — linking governments, industry, and allies.

A CHANGING GEOPOLITICAL PICTURE

54% **Defence share of global government space budgets**

Defence overtook civil space spending in 2022 and has led every year since

(NOVASPACE, 2026)

$8.7B **European Defence, Security, Resilience startups secured in VC**

This accounts a 55% year-over-year increase, freedom of operations & mobility, to awareness and decision making, and the security of critical tech.(Dealroom, Nato, 2026)

38% **European air traffic exposed to GNSS interference**

Share of en-route traffic flying through regions with regular jamming; 122,000+ flights affected in the first 4 months (2025)

(Eurocontrol, 2025)

140 **Chinese Launches Planned for 2026**

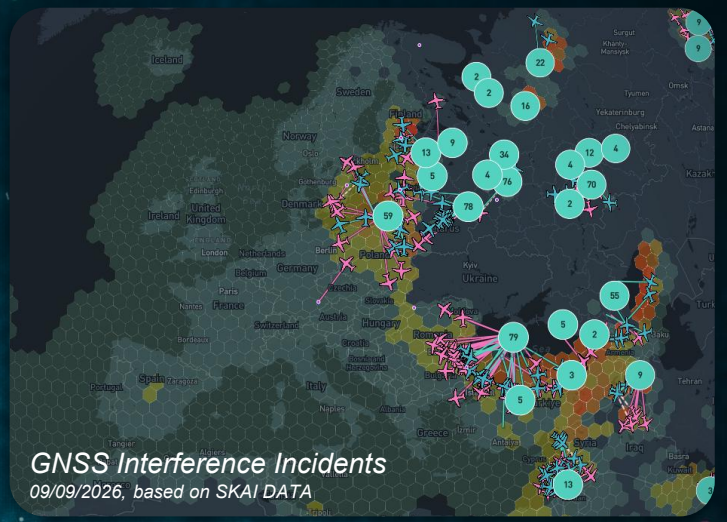
This accounts a 52% year-over-year increase, boosting its total on-orbit payloads to 1,506

(Spaceforce, 2026)

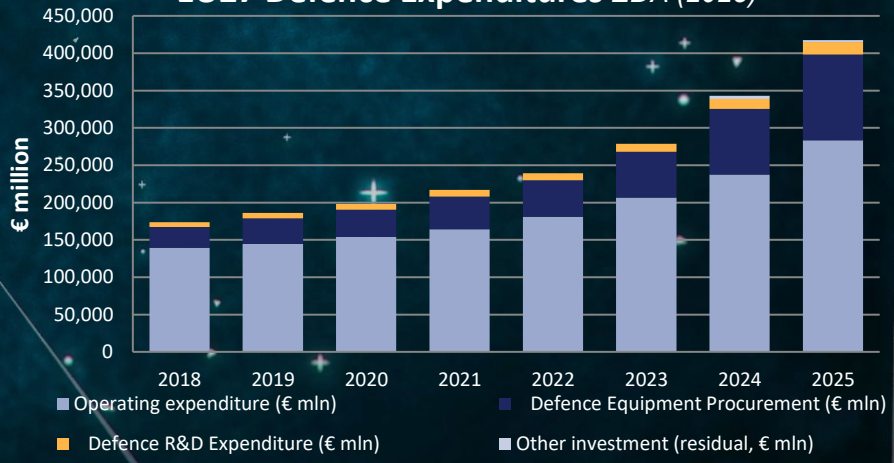
$9.8B **Allocated by U.S. Space Force for SATCOM in 2027**

SATCOM strategy emphasizes shifting toward resilient architectures, incl. expanding PLEO-SATCOM networks for tactical communications

(DoW, 2026)



EU27 Defence Expenditures *EDA (2025)*



ESA'S STRUCTURAL RESPONSE TO NEW SECURITY ERA

- Results at CM25 proved the strategic and critical role of space with a record 22.3B EUR subscription – 31% more than in the previous ministerial Council
- CM25 affirmed a security & defence mandate for ESA
- Creation of the RNC Directorate

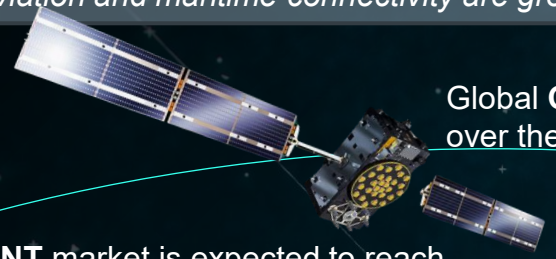
THE RNC DIRECTORATE

- Brings together **strong navigation and secure connectivity domains**, with further resilience responsibilities.
- Mandated to accelerate developments and **strengthen ESA-EU cooperation**.
- Manages and **coordinates the European Resilience from Space (ERS) system-of-systems**, leading to proposals for evolutions of existing ESA programmes.
- Prepares **ESA's resilience portfolio** with focus on defence of space (in-orbit resilience).
- **Contributes to the seamless management** of **resilience, defence and security** related programmes.

CONNECTIVITY & PNT MARKET GROWTH - FROM EARTH TO ORBIT

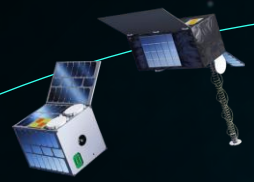
More and more industries get connected on Earth, esp. mobility markets like automotive, aviation and maritime connectivity are growing fast

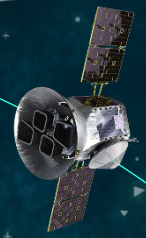
The nascent in-orbit industries (e.g., satellite servicing, in-orbit manufacturing + assembly, data centres) require connectivity for their remote operations



Global **GNSS market revenues** are forecast to rise from €300B to over **€580B** over the decade spanning 2024 to 2034.

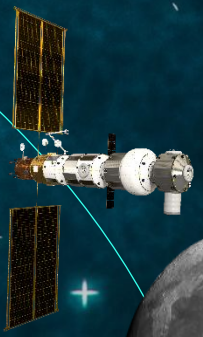
LEO PNT market is expected to reach an estimated **$5 - 7B by 2035**





$0.4B in 2024 to $2B in 2031 of satellite cloud connectivity

Lunar connectivity + PNT is a prerequisite *for all lunar exploration and commercial activity*



$688M market opportunity in lunar communications within 2025-31

$222M in 2023 to $677M in 2032 of connected vehicles services

$3.0B in 2023 to $8.6B in 2033 of aviation operator and service revenues

$530M in 2024 to $831M in 2032 of optical ISL applications

$2.7B in 2023 to $5.0B in 2033 of maritime operator and service revenues

Sources: Novaspace Prospects for In-Flight Connectivity 2024, Novaspace Prospects for Maritime Satellite Communications 2024, Euroconsult Optical Communications Market 2024, NSR Moon Markets Analysis 2022, NSR Cloud Computing via Satellite 2022, EUSPA Market Report (2026)

RNC PROGRAMME PORTFOLIO

NAVIGATION

Galileo
Europe's Global Navigation Satellite System

EGNOS
Augmenting GNSS for safer Skies

Galileo & EGNOS R&D
Shaping the next generation of EU PNT

Genesis
Improving the Int. Terrestrial Reference Frame

Celeste
Adding a new PNT layer for resilience

NAVISP
Driving PNT Innovation

Fut. PNT Dem.
Demonstrating the Future In Orbit

Moonlight
Offering lunar navigation & telecom services

CONNECTIVITY

IRIS²
Connecting Europe, Connecting the world. Securely.

ARTES
Advanced Research in Telecommunications Systems

- Future Prep.
- Industrial. Comp.
- Space Systems for Safety & Security
- Optical & Quantum – ScyLight

RESILIENCE

FROM DEMONSTRATION PROJECTS…

High thRoughput Optical Network Demonstration System

Space-based quantum key distribution (QKD) system + Eagle-neXt

Demonstration mission of EC EuroQCI

Optical Synchronised Time And Ranging In-orbit Demonstrator

Demonstrator mission towards first lunar-based differential, geodetic, and timing station

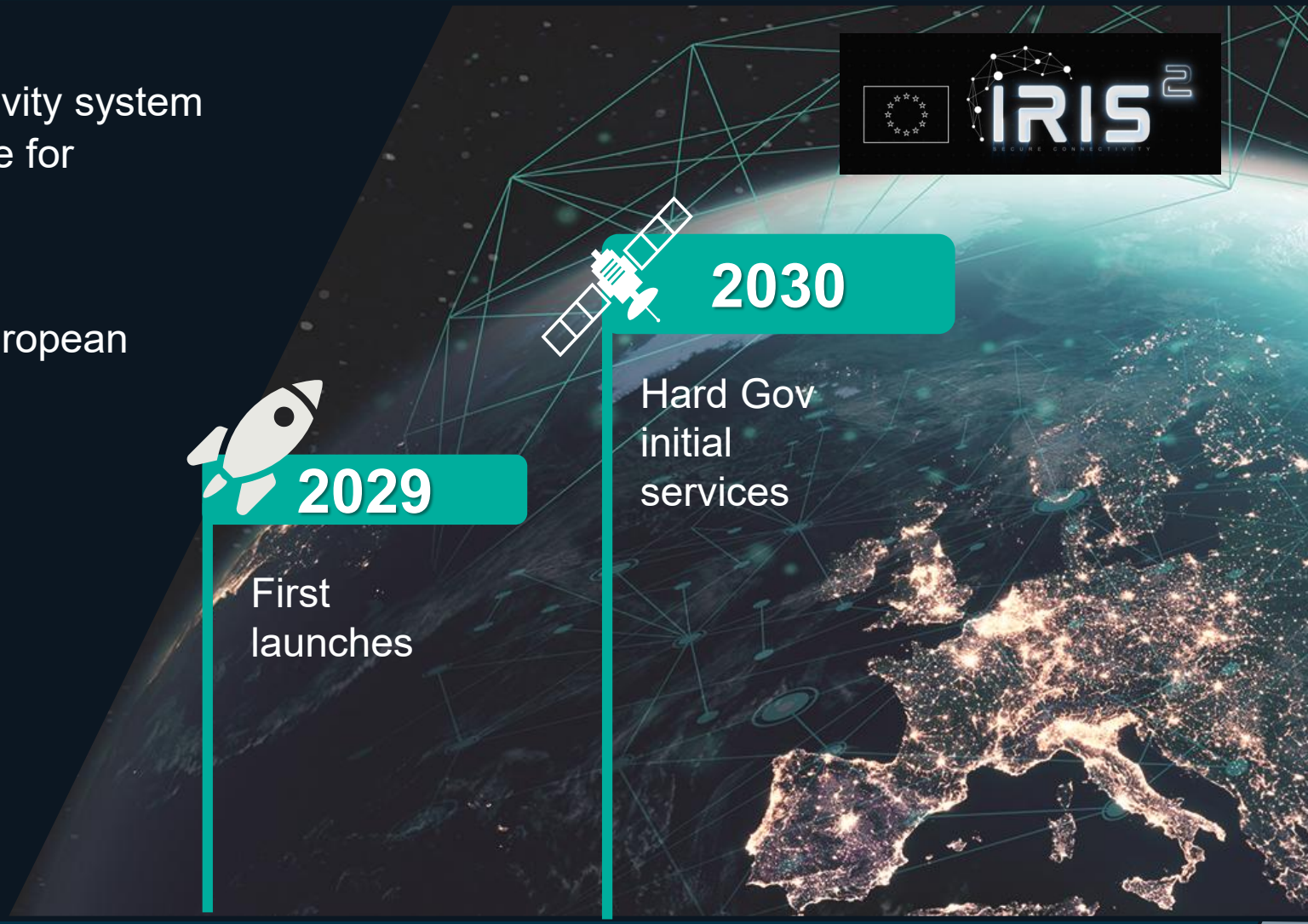
Mission to strengthen Earth's International Terrestrial Reference Frame

Small LEO satellite constellation to augment Galileo/EGNOS. To demonstrate new services

…TO MISSIONS FOR THE BENEFIT OF EUROPE.

EU SECURE CONNECTIVITY - IRIS²

- Highly secure satellite-enabled connectivity system and Europe's flagship space programme for sovereign, resilient, and secure satellite communications.
- The EU and ESA are partnering with European industry to deploy the EU-initiated IRIS² programme.
- Advanced, multi-orbit constellation, featuring software defined payloads enabling efficient and advanced broadband communications worldwide.
- Programme Rendez-vous 1 concluded August 2026



EUROPEAN RESILIENCE FROM SPACE

Connect

Trusted Transport Layer with secure global communication links

At any time

From any location

Observe

Persistent

All-weather

Real-time

Rapid tasking

Frequent revisit

Low latency

Navigate

Resilient positioning and timing resistant against:

Jamming

Spoofing

→ An integrated system-of-systems to address critical gaps in Europe's strategic abilities and autonomy

FUTURE RESILIENCE NEEDS ARE RAPIDLY EVOLVING

Observe | Connect | Position | Protect

Interoperability

European, national and commercial capabilities operating together by design while preserving ownership and sovereignty.

Common Enabling Infrastructure

Future-ready transport, processing and orchestration services, common simulation environment developed ahead of emerging needs.

Scaling Europe's resilience while creating new market opportunities

OPPORTUNITIES FOR NEW & ESTABLISHED PLAYERS

Institutional demand is shifting to resilient sovereign capabilities delivered at speed

New System Concepts

- LEO Satcom +PNT constellations
- Multi-orbit satellite systems
- Multi-domain satellites
- Use of terrestrial frequency bands

New Technology

- Micro-GEO platforms
- Software-defined satellites
- Large phased array antennas
- Low-cost consumer terminals

Supply Chain Innovation

- Volume production of satellites
- Chipsets for Satcom
- Demands for interoperability

Market Consolidation

- Mergers and acquisitions
- Verticalisation
- Operator Partnerships

Established Players

New Entrants & Scale ups

Speed ***demonstrators and constellations delivered at speed***

New Service models
Data, Capacity, As-a-Service to governments

From contracts to serial production
needs growth capital, not alone grants

Capacity ramp-up
production lines, secure facilities, staff

FROM TODAY'S RNC TO TOMORROW'S CAPABILITIES

Needs x Capabilities x Ambition = A stronger Europe

Autonomy

Trust & Cooperation

Continuity

Collective Security

Emerging capabilities & Areas of innovation

- **Optical & Quantum**
- **Integrated PNT + Connectivity**
- **In-Orbit Resilience & Autonomy**
- **New Resilience Activities**
- **…**

WORK WITH US

ARTES 4.0 Work Plans:
- Advanced Technology,
- Space Systems for Safety & Security (4S)
- Optical & Quantum Communications – ScyLight

NAVISP El. 1 - Innovation in Satellite Navigation Work Plan

Future PNT Demonstrators

AI and Quantum Work Plans

Moonlight

Advance Technology Work Plan

2027 Work Plans coming soon!

AVAILABLE WORK PLANS

esa-star Publication ITTs and Calls:
- All Tender Actions

ARTES 4.0 Standard Calls:
- Preparatory Activities
- Technology & Product Developments Activity

NAVISP Standard Calls:
- El. 2 - Competitiveness in PNT
- El. 3 - Support to Member States

STANDARD OPEN CALLS

Call for Ideas

ESA's yearly Work Plan preparations

National and Sporadic Calls

ESTOL

ESTOL - ESA SPECIFICATION FOR TERABIT/SEC OPTICAL LINKS

OTHER OPPORTUNITIES

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EUROPEAN SPACE AGENCY

THANK YOU!

Questions for the team?

Visit us at the RNC booth!

Stay tuned for more RNC presentations in the ESA ISD Programme!

Resilience (16/9 | 12:00 – 12:50 | Conference Hall B)

ARTES (17/9 | 11:10 – 11:35 | Conference Hall A)

NAVISP (17/9 | 14:55 – 15:20 | Conference Hall A)