ESA Strategic Initiatives

Accelerating the implementation of Strategy 2040

Sebastien Moranta, Strategic Initiatives Manager

Industry Space Days 2026

EUROPEAN SPACE AGENCY

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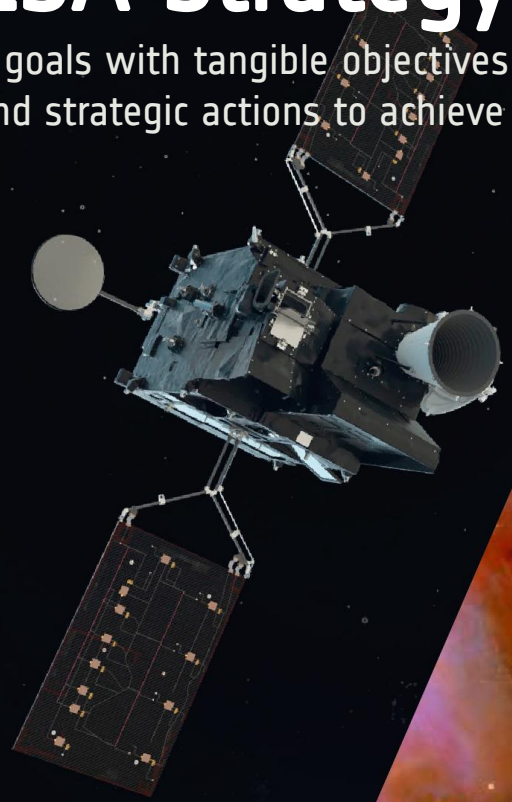
ESA Strategy 2040

5 goals with tangible objectives
and strategic actions to achieve them



GOAL 1
PROTECT
OUR PLANET
AND CLIMATE

GOAL 2
EXPLORE
AND DISCOVER

GOAL 3
STRENGTHEN
EUROPEAN
AUTONOMY
AND RESILIENCE

GOAL 4
BOOST EUROPEAN
GROWTH AND
COMPETITIVENESS

GOAL 5
INSPIRE EUROPE

Implementing CM25, preparing CM28

- **Record contributions** at CM25
- **22.3B€** (+30%)
- **New ERS programme** for federated architecture
- **Strong push** for technology and innovation
- **Clear mandate** for Security & Defence
- **Scientific leadership**
- And more…

Now: road to CM28

About ESA Strategic Initiatives

esa STRATEGIC INITIATIVES

Advance strategic priorities. Accelerate high-potential initiatives.

1 Turn strategy into action

Shape new initiatives that support Europe's strategic priorities.

2 Accelerate new initiatives rollout

Take new initiatives from bold ideas to programmatic elements.

3 Engage all stakeholders

Cooperate with the wider ecosystem, including non-space.

4 Support new solutions

Partner with top European teams to co-develop new concepts and solutions.

What it is

New ESA Basic Activity at CM25 under element SEED - Support to Strategy.

Who runs it

ESA Strategy Department, in support of ESA Programmes and Teams.

How it works

Strategic innovation framework, highly cooperative, supporting the full initiative pipeline.

First Strategic Initiatives: ISAM and SBDC

1

Strategic alignment

Is the initiative aligned with Strategy 2040 and the broader European strategy landscape?

- Fitness
- Relevance

2

Timing opportunity

Is the initiative opportune for the European space sector and for ESA?

- Desirability
- Momentum

3

Execution feasibility

Can the initiative be realistically executed within ESA programmes?

- Affordability
- Deliverability

4

Ecosystem readiness

Is the ecosystem ready to support and deliver the initiative?

- Support
- Maturity

5

Expected impact

Will the initiative deliver benefits commensurate with the effort required?

- Value for money
- Cost of inaction

Strategic Initiative on ISAM

In-space Servicing, Assembly and Manufacturing

Strategic Initiative on SBDC

Space-Based Data Centres

How to participate in an ESA Strategic Initiative

Phase 1
Shape the initiative

Request for Information
OSIP · open to all

Share your views and help define the initiative.

Strategy Forum
2 days · selected applicants

Join 100 experts to evaluate options and help define the next actions.

Phase 2
Advance your proposal

Call for Ideas
OSIP · open to all

Propose a solution that moves the initiative forward.

Innovation Sprint
5 days · selected teams

Advance your solution with ESA and partners, compete for the prize.

Phase 3
Accelerate your solution

Cooperative Agreement
ESA contract · winning team(s)

Win the contest and co-develop your solution with ESA.

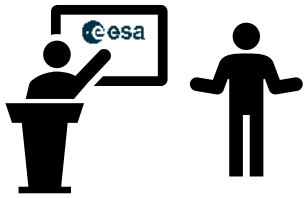
What you get
Funding and ESA technical support

Check out ESA's Open Space Innovation Platform (OSIP) for new opportunities – ideas.esa.int

Strategy Forum

DAY 1 – Exploration and Discussion

Framing



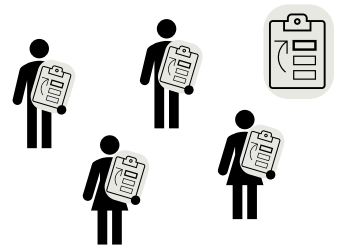
World Café Review

DAY 2 – Deep Dive and Assessment

Deep Dive

Assessment

Scoring



Participation

Register on event website · open to all

- 100 participants, limited seats
- Priority given to RFI contributors
- Mix of stakeholders

Format

Tabletop workshop · no slides, no roundtable

- Rotating teams supported by facilitators
- Review and improve strategy scenarios
- Assess options and propose next actions

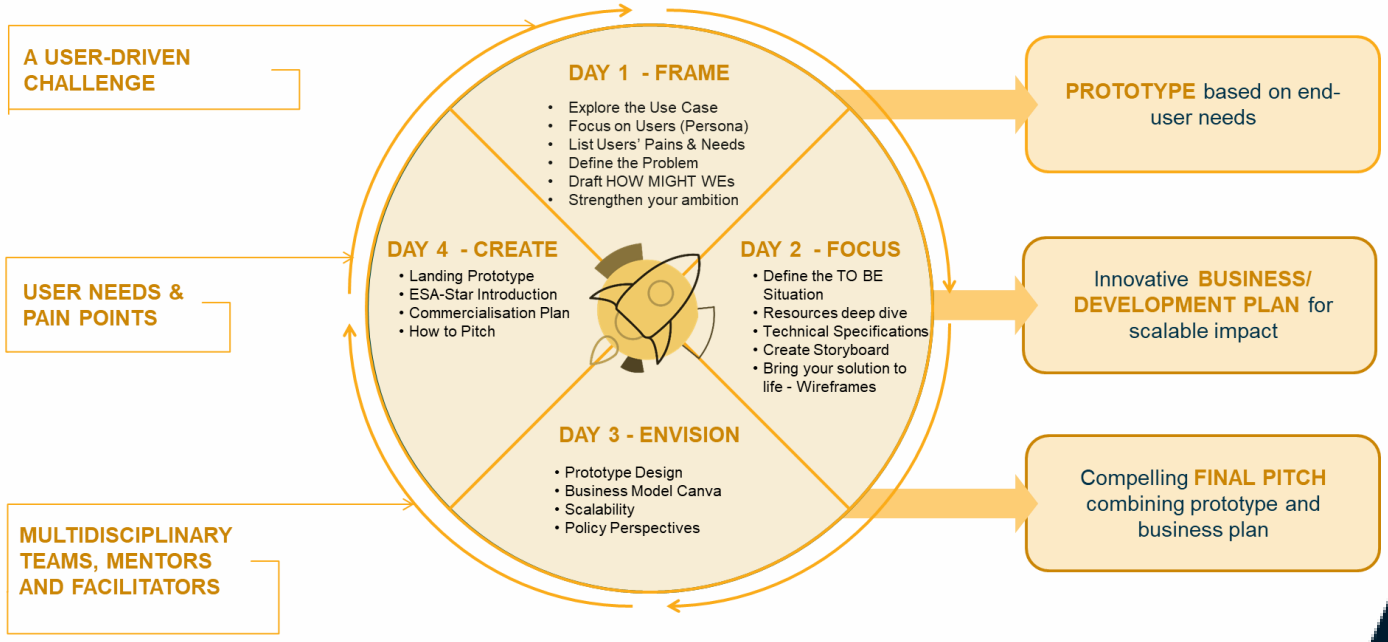
Outcome

Strategic Initiative Report · input for calls

- Chatham House Rules
- Support to ESA decision-making
- Executive summary on demand

Innovation Sprint

- **Fast-paced competition:** one intensive week to advance and pitch your solution.
- **Co-design with ESA:** support from facilitators, mentors and partner experts.
- **Cooperative Agreement:** structured cooperation with winning team(s) to continue developments beyond the sprint.



Strategic Initiatives Calendar

esa STRATEGIC INITIATIVES

ISAM
In-space Servicing, Assembly and Manufacturing

SBDC
Space-Based Data Centres

	2026						2027	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
ISAM	Strategy Forum: 2–3 Jul	Call for Ideas: 3 Aug	Deadline CFI: ~~14~~ 23 Sep		Innovation Sprint 1: 23–27 Nov			Innovation Sprint 2: TBD
SBDC		Request for Information: 13 Aug	Deadline RFI: 25 Sep		Strategy Forum: 12–13 Nov	Call for Ideas: TBD		Innovation Sprint 1: TBD

ESA Strategic Initiatives contribute to ESA's wider coordinated efforts and roadmaps. Check out related opportunities from other ESA programmes on ESA-STAR and OSIP.

STRATEGIC INITIATIVES

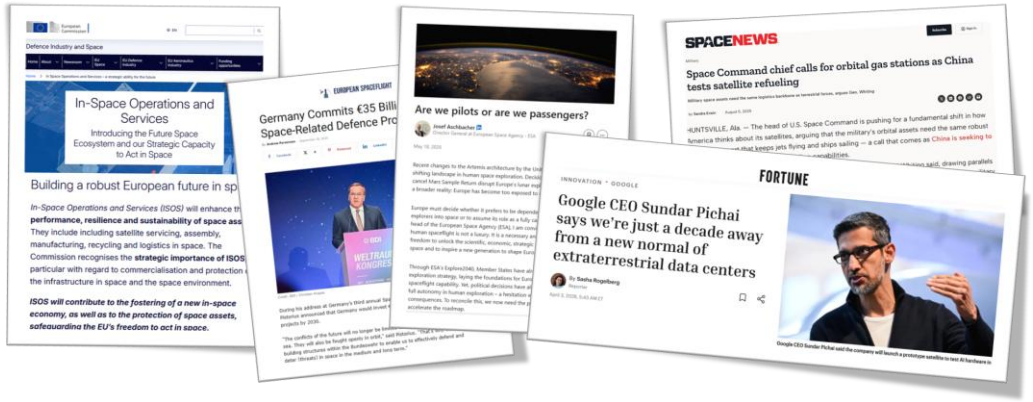
Strategic Initiative on ISAM

Tiago Soares, OPS

ELEVATING THE FUTURE OF EUROPE

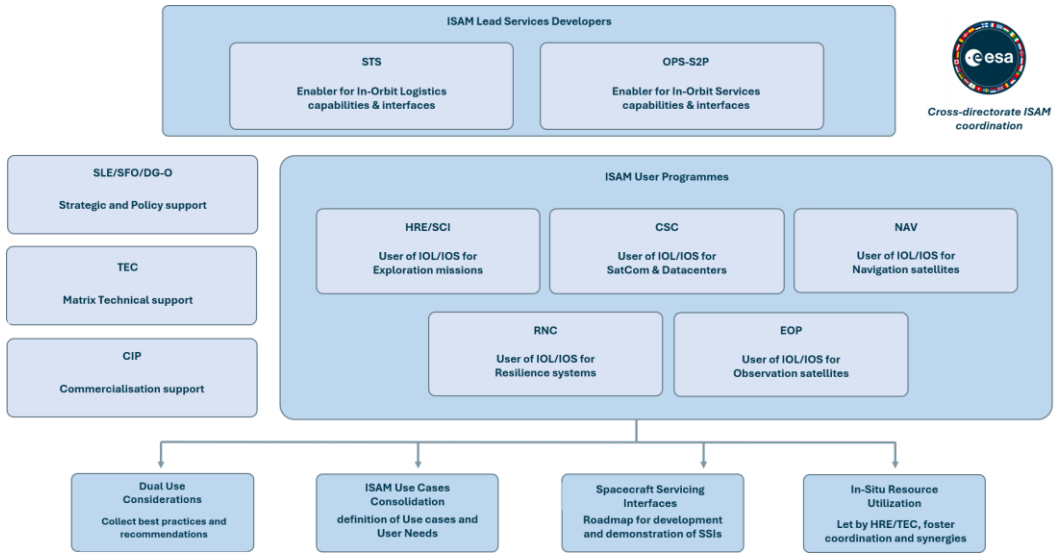
Motivation for Strategic Initiative on ISAM Use Cases consolidation

ISAM is an enabler for numerous new sectors and applications



Smart decision making in European capabilities and infrastructure requires a top-down understanding of user needs

ISAM is an enabler for several new sectors and applications



Proposed Steps for Consolidating Use Cases

Phase 1: Consultation

Internal coengineering with ESA User directorates
RFI via OSIP to external stakeholders

Q3 2025 - Q1 2026

Phase 2: Strategy Forum

Collaborative evaluation of use cases with the EC, Member States, industry, operators etc.

Q2 2026

Call for ideas

Phase 3: Innovation Sprints

Further definition of use cases, commercial potential, and technologies

Q4 2026 – Q1 2027

Phase 4: Activities

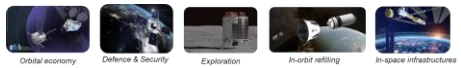
Small contracts for feasibility studies placed with winners of innovation sprints

Q1 2027 – Q3 2027

Phase 5: CDF

Concurrent design study to converge on optimised in-orbit architecture

Q3 2027



ISAM Use Cases

Member States

Missions, building-blocks, SSI

Industry Workshops

Use-Cases selection

Member States

Innovation Sprint
Competition followed by small contract

Activity
Definition of architectural concepts

Innovation Sprint
Competition followed by small contract

Activity
Definition of architectural concepts

Innovation Sprint
Competition followed by small contract

Activity
Definition of architectural concepts

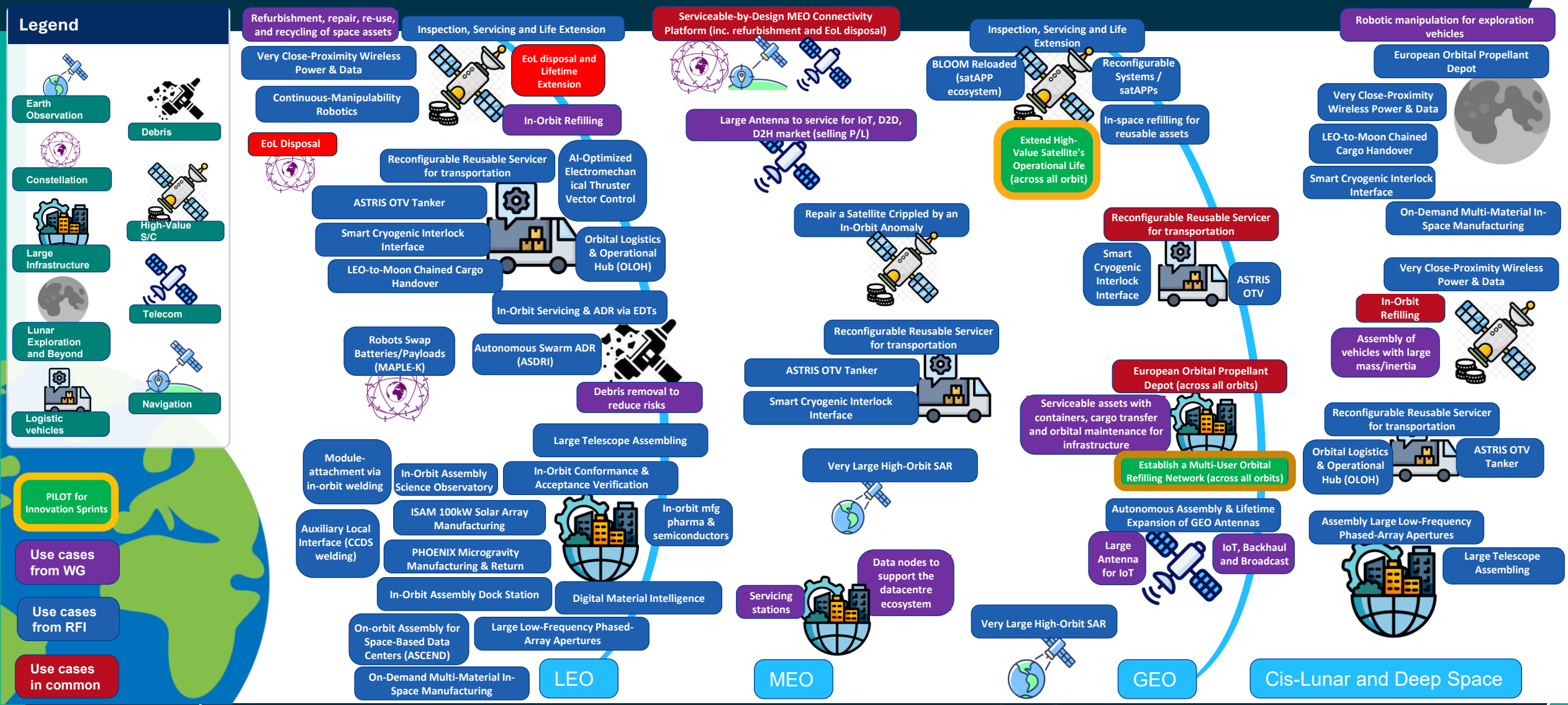
Member States

Concurrent Design Study

Market Studies
Business & Commercialisation Plan

Vision for European In-Space Service infrastructure

Overview of identified ISAM Use Cases



Forum: 12 Use Cases Across 6 Capability Domains

1 SERVICING & SUSTAINABILITY

UC1 **Constellation End-of-Life Services**

Fleet-scale disposal of LEO constellation satellites to meet post-mission disposal regulations economically

UC2 **High-Value Satellite Life Extension**

Extend GEO satellite service life through servicing, avoiding premature replacement of otherwise functional assets.

2 REFUELLING & LOGISTICS

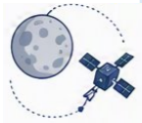
UC3 **Multi-User Orbital Refilling Network**

Shared GEO propellant depot and refuelling ecosystem enabling scalable in-orbit logistics.

UC4 **Affordable Lunar Cargo Delivery**

Reusable multi-leg transport architecture reducing the cost of cargo delivery from LEO to lunar destinations.

3 CISLUNAR AUTONOMY



UC5 **Autonomous Cislunar Assembly**

Robotic construction of modular infrastructure beyond Earth orbit without continuous ground control.

UC6 **Autonomous Cislunar Contingency Management**

Multi-asset autonomous re-planning to maintain mission schedules during communication blackouts and failures.

4 ADAPTIVE SATELLITES

UC7 **Demand-Responsive GEO Satellites**

Upgrade and reconfigure operational GEO spacecraft to match evolving market needs.

UC8 **In-Orbit Satellite Repair**

Repair non-serviceable constellation satellites after anomalies, recovering capacity and reducing replacement needs.

5 NEW SPACE ECONOMY

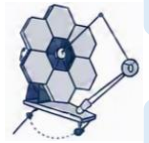
UC9 **Orbital Data Centre**

Assemble and operate large-scale orbiting compute infrastructure exploiting abundant solar power and radiative cooling.

UC10 **Microgravity Manufacturing**

Produce high-value materials in orbit whos equality cannot be achieved under Earth gravity.

6 LARGE ASSEMBLY



UC11 **Large EO Radar Apertures**

Assemble ultra-large low-frequency radar systems for climate monitoring, biomass assessment and security applications.

UC12 **Next-Generation Science Observatories**

Assemble far-IR telescopes and other infrastructures too large to be launched or deployed from a single spacecraft.

Forum: Method Overview

½ DAY 1 – Exploration and Discussion

½ DAY 2 – Deep Dive and Assessment

Introduction

09:00-09:45

- 15min – participant's arrival
- Short introduction and presentations on ISAM and challenges by ESA

World Café – Use Case Exploration

09:45-13:00

- Each challenge domain includes an initial set of pre-identified use cases as a starting point for discussion. Participants will analyse, challenge and enrich these use cases while working on dedicated canvases.

Use Case Deep Dive

09:30-11:30

- Team formation – each team studies and assesses one use case in detail or a group of use cases.

Assessment Presentation

11:30-12:30

- Each team presents the results of their study and assessment

Informative Scoring

12:30-13:00

- Each participant individually scores 'anonymously' all use cases based on the presentations

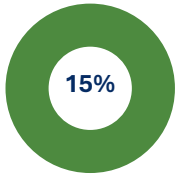
Participation and outcomes of Forum

Community, Stakeholders and Participants

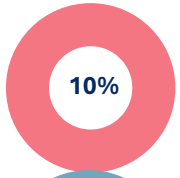
- 40+ participants
- 34 organizations

Satellite Operators

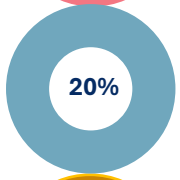
Large Space Industry



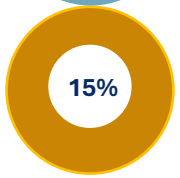
ISAM and Service Providers



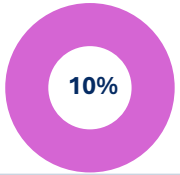
Investors / Insurances



SME and New Space Actors



Academia and Research Organisations



Institutional Actors.

Evaluation and Conclusions

- Users and Needs
- Value Proposition and Expected Impact
- Value Chain and Key Stakeholder
- Core Concepts and Enabling Capabilities
- Commercial and Delivery Considerations
- Programmatic Implementation and Risks

Critical Analysis and Next Step

2 Pilot Use Cases CALL OPEN

a) **MultiUsers Orbital Refilling Network**- a shared and evolutive refilling ecosystem enabling scalable inorbit logistics across different orbits.

b) **Extending The Lifetime of High Value Assets** - a mission infrastructure addressing the needs of highcost missions to maximise their usable lifetimes.

More use cases will follow

Innovation Sprint on In-orbit Servicing, Assembly and Manufacturing (ISAM)

Choose one of two strategic challenges and advance your idea with ESA experts during a 5-day Innovation Sprint:

- **Challenge A: Establish a Multi-User Orbital Refilling Network**
  A scalable, interoperable refilling ecosystem across different orbits.

- **Challenge B: Extend the Lifetime of High-Value Space Assets**
  Servicing concepts for relocation, repair, recovery and life extension.

The winning teams will enter into a Cooperative Agreement with ESAto continue developments:

- **6-month cooperation** with ESA
- **Up to €200,000** funding support

1- Scan the QR code
2- Submit your idea and team via OSIP
3- Be selected to join the Innovation Sprint
4- Win the competition and enter into a Cooperative Agreement with ESA

STRATEGIC INITIATIVES

Strategic Initiative on SBDC

Ian Carnelli, TEC-S

ELEVATING THE FUTURE OF EUROPE

What do we mean by Space-Based Data Centers ?

1 Data Storage
Store data in orbit

- Passive storage
- Delayed downlink
- Lower complexity

2 Cloud Processing
Process data in orbit

- Compute near source
- Reduced downlink
- Moderate complexity

3 AI Inference
Run AI models in orbit

- Real-time insights
- Low latency
- Higher complexity

4 AI Training
Train AI models in orbit

- Massive compute
- Highest power need
- Future potential

INCREASING COMPUTE & POWER REQUIREMENTS

Earth Data Centres
Mature, scalable, but constrained by power, land, cooling and connectivity.

SBDC are not about replacing terrestrial infrastructure, but complementing it.

Not all space computing concepts are equal.

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Why now?

The SpaceX story: SpaceX + xAI = 85.7 B$

Vertical integration is the real story

1. Transport Network (Starlink)
2. Launch (Starship)
3. Compute (Ai sat mini/Tesla)
4. AI models (xAI)
5. Chips (Terafab/partnerships)

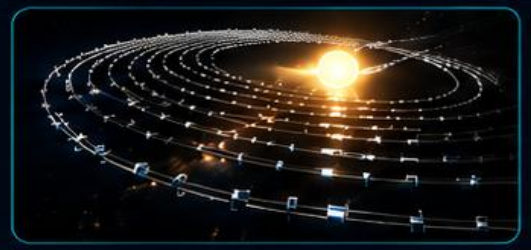
→ Unprecedented system-level control
→ Captures entire value chain margin

Phase 1 (now): signaling + positioning

- Large FCC filings
- Demonstrations (e.g. Starcloud)
- Narrative building

Phase 2 (late-2020s): initial deployment

- In-orbit data processing
- Defense use cases
- Early commercial pilots



Phase 3 (2030s+): scaling, conditional to:

- launch cost collapses
- power density improves
- autonomous operations mature

Orbital compute as a strategic layer of future infrastructure, initially for **space-native** and **defense** applications
(with potential long-term spillover into broader AI infrastructure if launch economics fundamentally change)

Europe's Integration Gap

Capabilities vs coherent infrastructure

Many national assets
Fragmented and disconnected

CAPABILITIES
→
COHERENT INFRASTRUCTURE

United by a common backbone
Interoperable, resilient, sovereign

Shared data
Shared awareness

Interoperable systems
Common standards

Stronger together
Resilient and sovereign

Europe possesses many assets. The challenge is connecting them.

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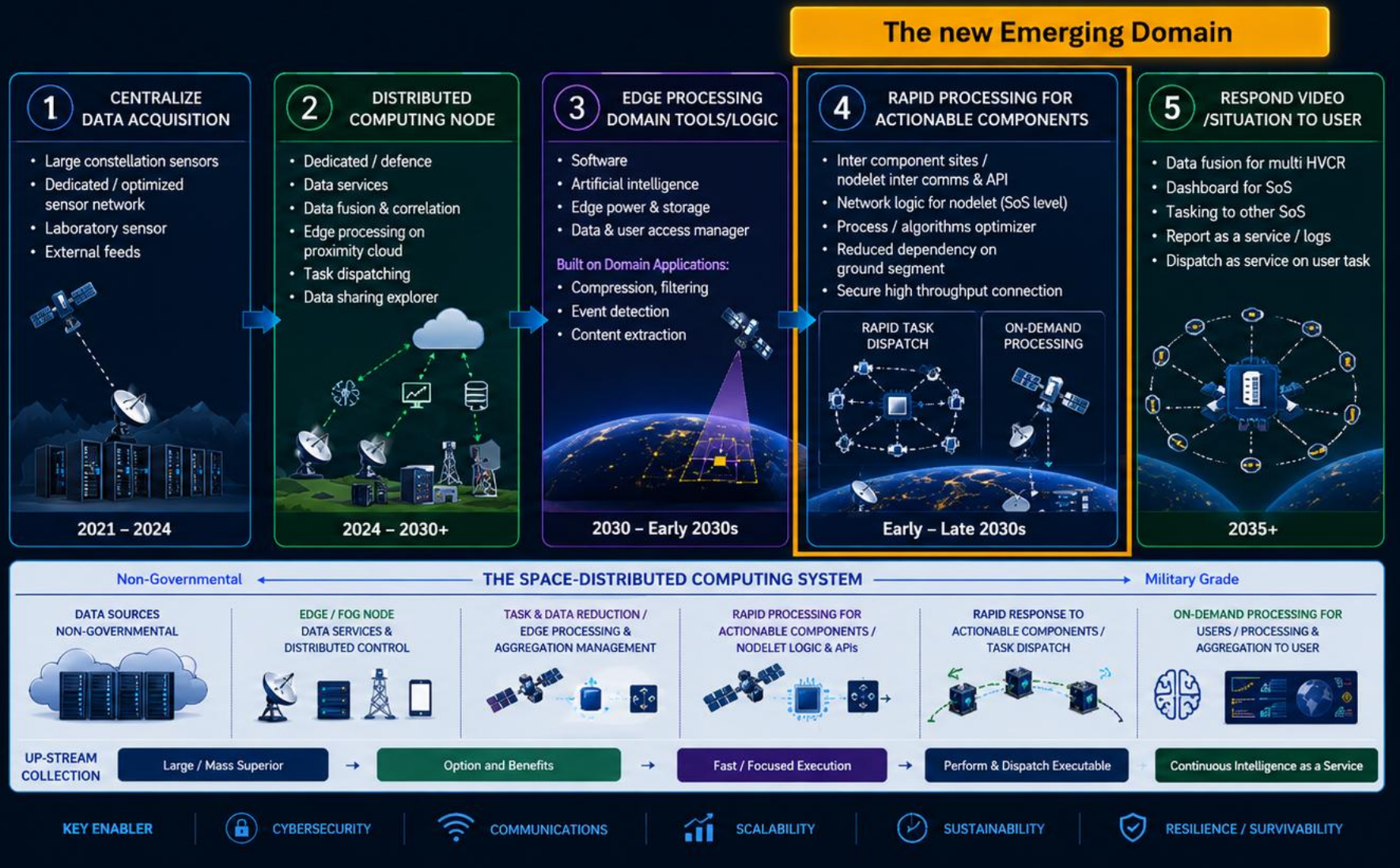
Distributed In-Space Processing: a strategic infrastructure

- Capability distributed over a **constellation** acting as **processing nodes**
- **Aggregates data** from federated in space sensory components, perform edge processing, **create intelligence and awareness** at SoS level, dispatch results to the users and task to the actionable components
- Can host **continuous dedicated processing** for the SoS functions, accept on-demand processing task from the users
- In **continuum** with Ground / User Processing intelligence



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Examples of DISP use cases

Tip & Cue

- SNC Vindlér 2.0
- Xingshu Plan – DISP already in place
- BAE Systems Azalea
- European Space Shield!?

Cross-cueing between sensing assets and tasking chains

RF Monitoring / SIGINT

- HAWKEYE/ SPIRE
- Yaogan ELINT Constellations
- CERES ELINT Constellation
- European Space Shield!?

Detection and localisation of RF sources and signals

Bodyguard Satellites

- Ares (Action et Résilience Spatiale) programme
- Ares Shield (private)
- EDF Bodyguard project

Threat detection, proximity awareness and response triggering

Early Warning

- Golden Dome
- ODIN'S EYE II/ TWISTER /HYDRIS
- Huoyan-1 (Fire Eye)/TJS satellites

Rapid detection and alerting for emerging threats or events

Processing in Space

Detect → Classify → Fuse → Predict → Re-task → Alert

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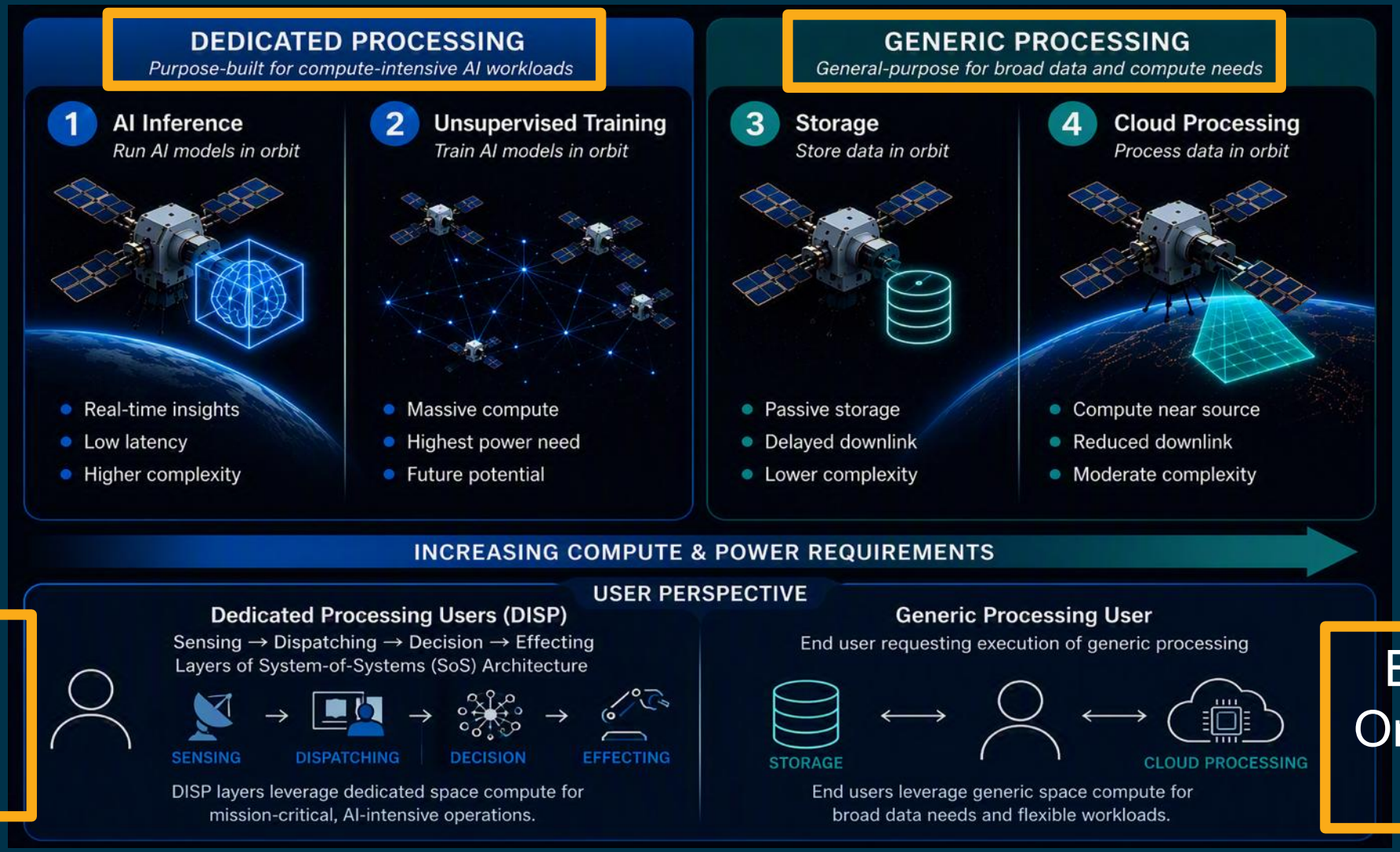
What can DISP offer

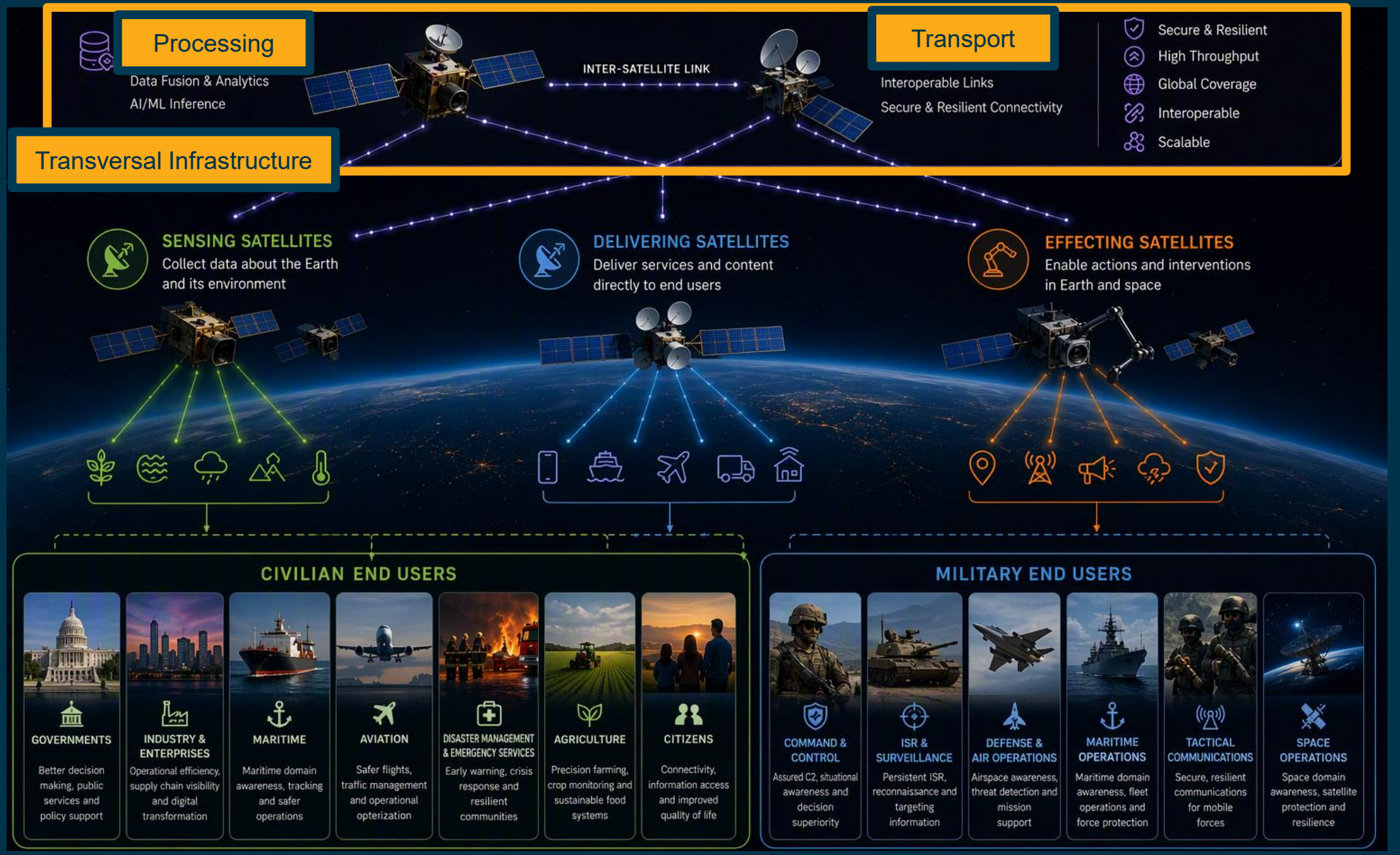


System of System Task

End User On Demand Task

STORAGE	CONNECTIVITY	COMPUTE	MISSION SERVICES
• Buffering and caching	• Inter-satellite exchange	• Signal and image processing	• Sensing support
• Data replication	• Space-to-ground routing	• AI inference	• Autonomous response
• Distributed archives	• Data relay	• Data fusion	• Tasking and processing chains
• Store-and-forward services	• Resilient network paths	• Mission-specific applications	• Secure or sovereign workloads

DISP as part of the global SoS of System Architecture



Near-Term Industrial Engagement Opportunities for Resilience

Preparatory Phase

Institutions

Consultation

- MSs Delegates (including MoDs rep.) in PBs and bilateral workshops
- EC European Space Shield WG

Involvement

- Seconded personnels from MoDs to be integrated in project offices
- Dedicated Expert Working Groups

1- Consultation and analyses — Q2-Q4 2026

- Mapping of space resilience capability development plans of National and Industrial actors
- European Capabilities roadmap to enable Resilience vision (possibly in cooperation with EU)

2- Exploration / incubation — ~40-50 M€ — Q1-Q4 2027

- Architectures studies
- Simulator & Digital Twins
- Interoperability standards & protocols
- Techno Dev & early Demo missions

3- Preparation of CMIN 28 Proposals — 2028

- Definition of Resilient Initiative Architecture
- Preparation of Program proposal for CMIN28

Industries

On Going

- DG/CEO meeting in June /September
- Consultations with Industry
- Industrial Forums to cover definitions, opportunities, priorities (e.g. Strategy Forum on Space-Based Data Centres)

Involvement

- On-going (1-13572 ITT for Resilient High Elliptical Orbit link)
- Contracts and/or RFIs in preparatory phase

CMIN28

- TECNOLOGICAL DEMOSTRATOR
- IOV
- EUROPEAN COMMON INFRASTRUCTURE ELEMENTS ??
- NATIONAL CLUSTERS ?

Near-Term Industrial Engagement Opportunities for DISP – Distributed In-Space Processing

SHORT TERM OPPORTUNITIES: ARTES IC WORK PLAN 27

- Resilient in-orbit data centre
- Testbed for a mixed orbital and terrestrial data centre cluster for cloud services
- Scalable building block for orbital secure data processing and storage
- ASPIRE FedSatcommLab - Autonomous Space-based Processing for Interconnected REsilient Federated **Satcom**
- DISP System Study (TBC)
- Security Building blocks in GSTP

TIMING: KO Q1 2027

Engage now to shape next generation of European Resilience

Strategy Forum on Space-Based Data Centres (SBDC)

- **Save the date:** November 12-13, ESTEC
- **Register:** online until Sep 25
- **100 Participants selected:** space industry, digital ecosystem, institutions, finance, research…
- **Format:** Tabletop workshop, no slides or roundtables, co-build & prioritise strategy scenarios

Help shape the Strategy Forum by contributing to ESA's Request for Information on OSIP and share your views on the future of Space-Based Data Centres:

- Edge computing technologies
- Distributed In-Space Processing (DISP) architectures
- AI-enabled space computing
- Sovereign and resilient infrastructures
- Hybrid space-ground ecosystems
- Industry and supply chain development
- ...and more

1- Scan the QR code
2- Submit your input to the RFI
3- Register to attend the Strategy Forum

*RFI contribution is not required to register, but contributors get priority if demand exceeds capacity

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THANK YOU!

strategic.initiatives@esa.int

ELEVATING THE FUTURE OF EUROPE