Space4Rail Downstream Applications in ARTES 4.0 (BASS, 4S, 5G) - webinar

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Agenda

✓ ESA overview

✓ Space4Rail Downstream Applications in ARTES 4.0 - call for proposals (CfP)

- Key Objectives
- Why space is important to rail
- Thematic domains and use cases
- How to apply

✓ Q&A

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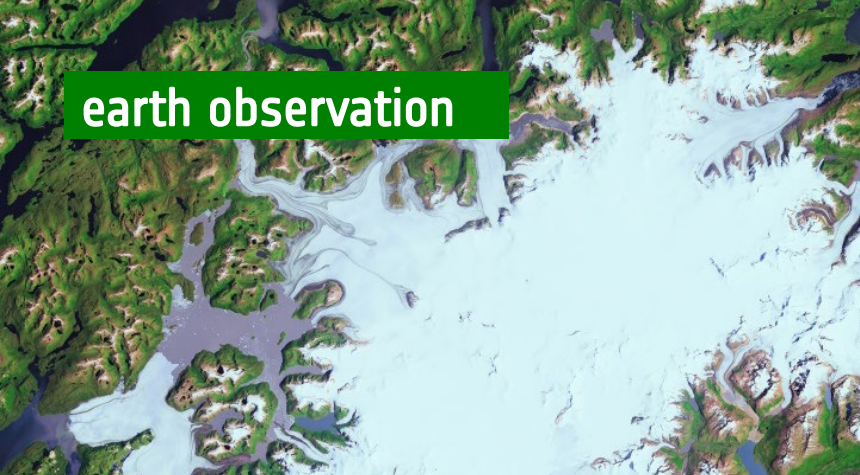
MARITIME

HEALTHCARE

TRANSPORT

ENVIRONMENT

AGRICULTURE

MEDIA

ENERGY

EDUCATION

AVIATION

FINANCIAL

SPACE WEATHER

EARTH OBSERVATION
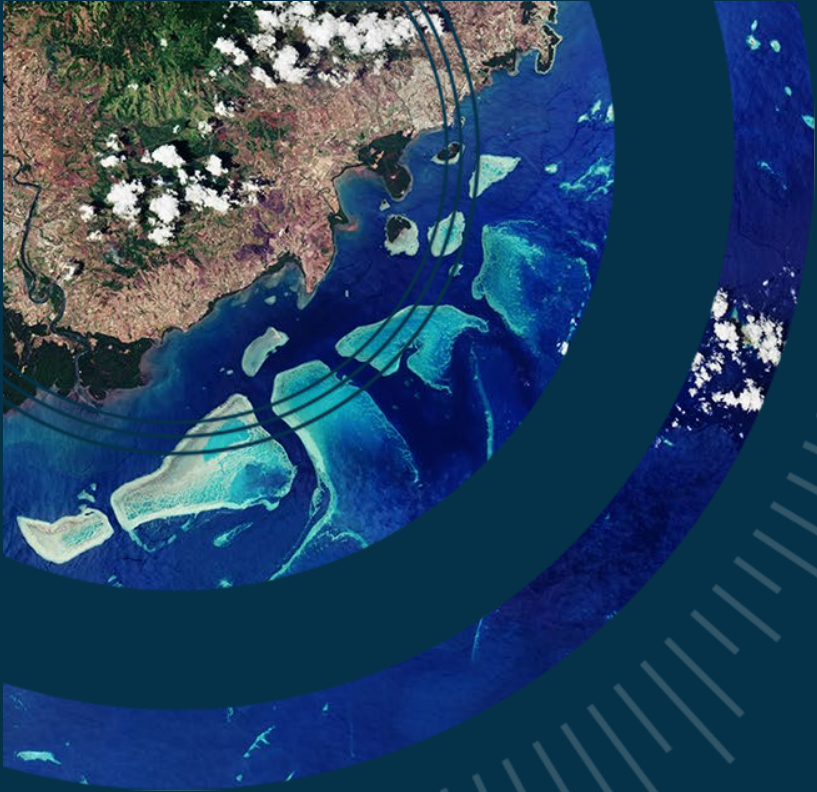
SATELLITE NAVIGATION

SATELLITE COMMUNICATION

HUMAN SPACEFLIGHT TECHNOLOGIES
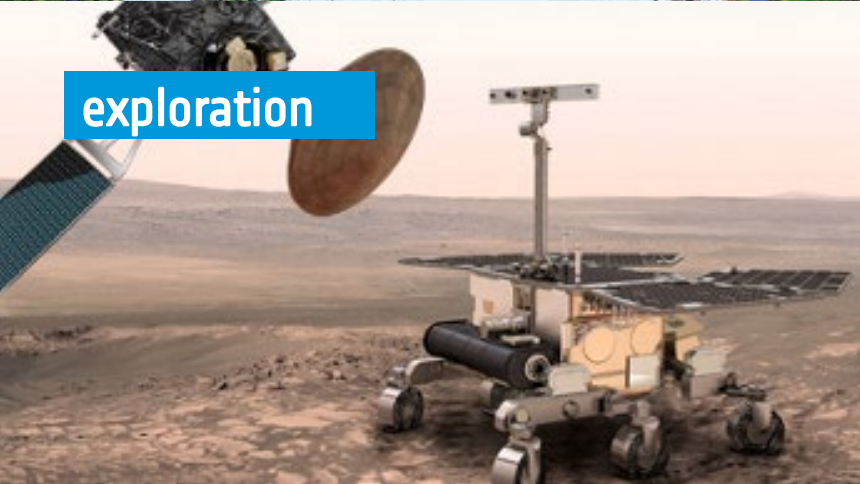
Supporting the Development of
Services on Earth that Involve Space
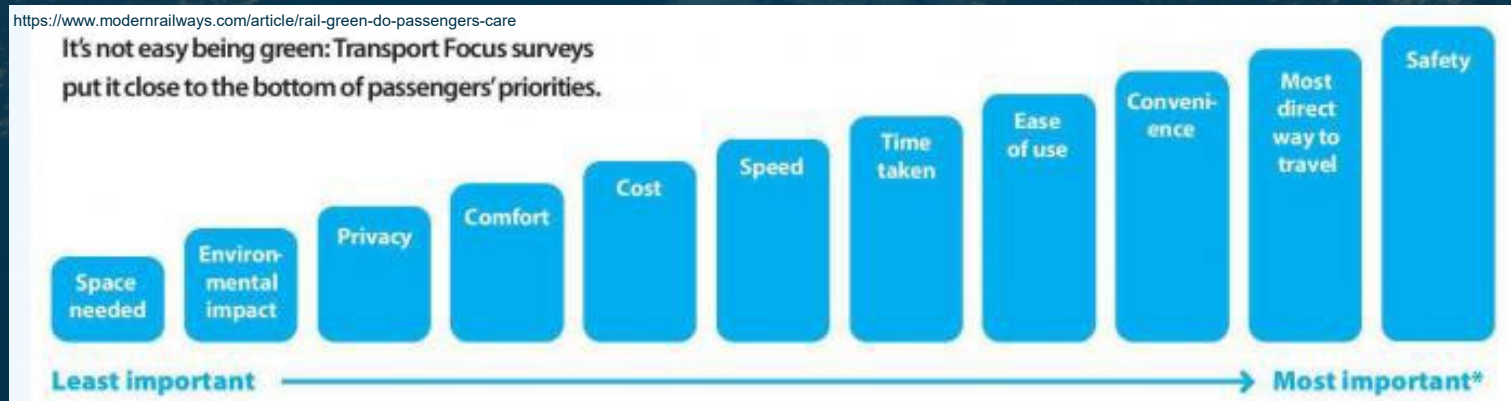
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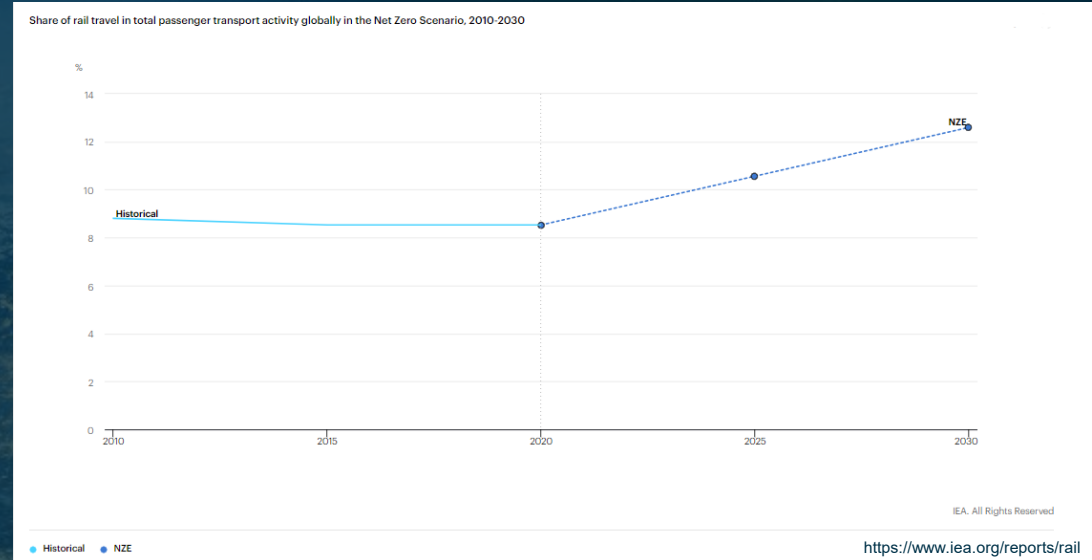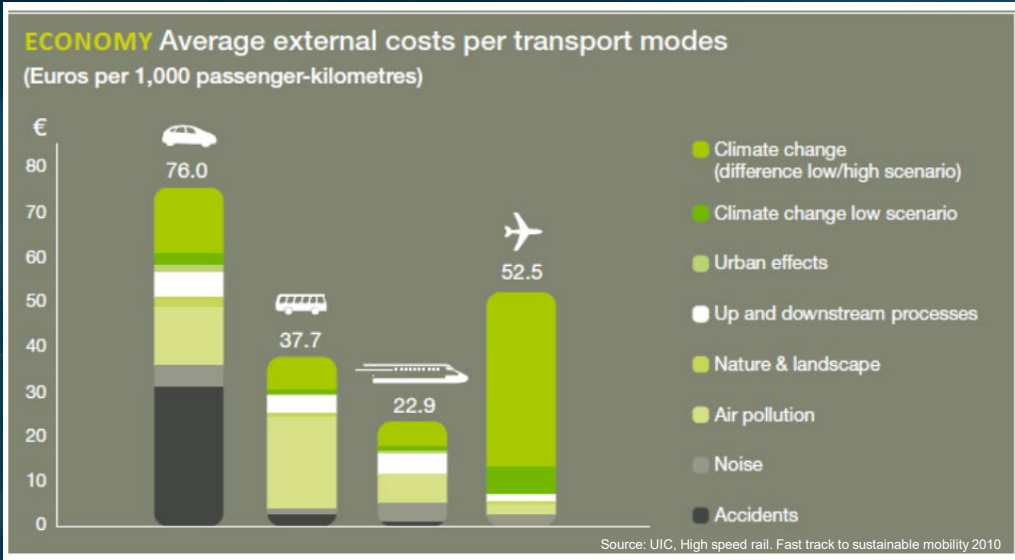
Space4Rail Downstream Applications CfP

KEY OBJECTIVES:

✓ To support the exploitation of space-based assets in applications/services related to future control, command and signalling in the European Rail system

✓ To support the exploitation of space-based assets in innovative applications/services improving performance and attractiveness of the railway

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Why space is important to rail

ECONOMY Average external costs per transport modes
(Euros per 1,000 passenger-kilometres)

Legend:
- Climate change (difference low/high scenario)
- Climate change low scenario
- Urban effects
- Up and downstream processes
- Nature & landscape
- Air pollution
- Noise
- Accidents

Values: 76.0, 37.7, 22.9, 52.5

Source: UIC, High speed rail. Fast track to sustainable mobility 2010

Share of rail travel in total passenger transport activity globally in the Net Zero Scenario, 2010-2030

IEA. All Rights Reserved

https://www.iea.org/reports/rail

https://www.modernrailways.com/article/rail-green-do-passengers-care

It's not easy being green: Transport Focus surveys put it close to the bottom of passengers' priorities.

Bars (Least important → Most important*):
Space needed, Environmental impact, Privacy, Comfort, Cost, Speed, Time taken, Ease of use, Convenience, Most direct way to travel, Safety

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Why space is important to rail

Earth Observation

Providing an **effective** and **frequent** way to **monitor land** and **resources**, and can also facilitate **change detection**.

Facilitates applications related to the **monitoring** of **railway assets**, **infrastructure** and **surrounding areas**, or augmented reality applications **enhancing** the **user experience**.

Satellite Navigation

Enabling **global positioning** functions.

Supports applications such as **enhanced train localisation** for **eco-driving & signalling**, **interactive mapping**, **surveying** and **predictive maintenance**.

The use of sensors with satellite navigation may improve the position and velocity performances (relative and absolute).

Satellite Communications

Supporting **5G** architectures, that is key to the **Future Railway Mobile Communication System**, superseding the current GSM-R infrastructure.

Providing **ubiquitous coverage**, enabling an extension of **reliable** and **secure connectivity** to complement terrestrial communications, including satellite-based **Internet of Things** for rail freight and cargo monitoring, and satellite broadband for enhanced on-board and in-station connectivity.

https://space4rail.esa.int/projects

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S4R Downstream Applications CfP – Thematic Areas

Open Call for Proposals (CfP) for innovative and sustainable <u>Applications/Services</u> based on at least one space asset (e.g. SatEO, SatNav, SatCom)
<u>Three Thematic Areas</u>

Future CCS Applications in the European Rail System

Improving the Performance of the Railway

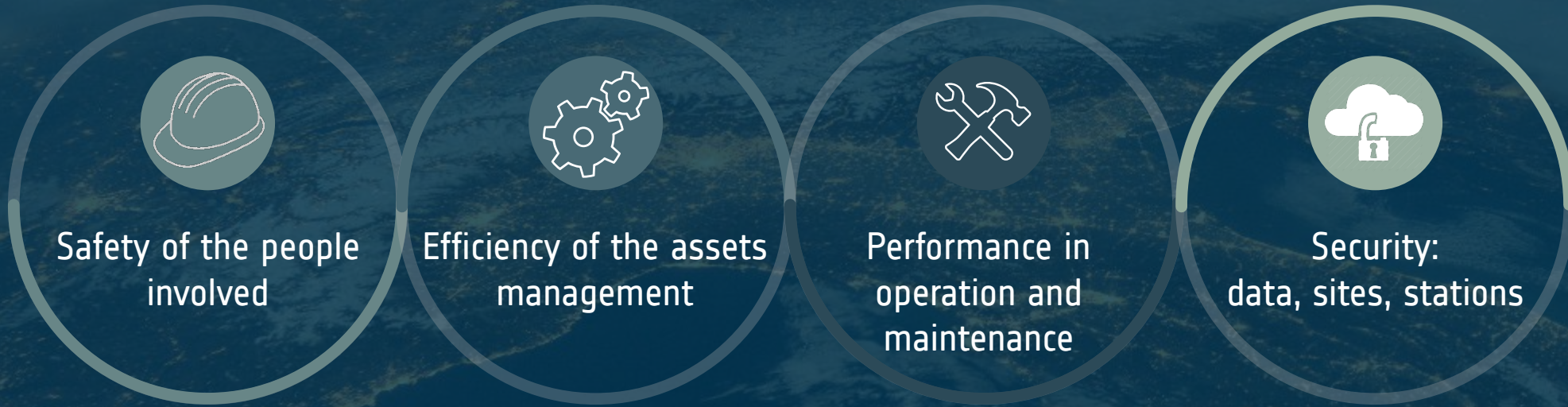Improving the Attractiveness of the Railway

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Control-Command and Signalling (CCS) Applications

Targets activities that exploit space-based assets to improve the business case of ERTMS through increased operational performance and/or cost reduction

Advanced Train Positioning

Next generation communication system(s)

Supporting ERTMS
"Game changing" functionalities

ERTMS Level 3

ATO GoA4

Improving the performance of the Railway

Safety of the people involved

Efficiency of the assets management

Performance in operation and maintenance

Security: data, sites, stations

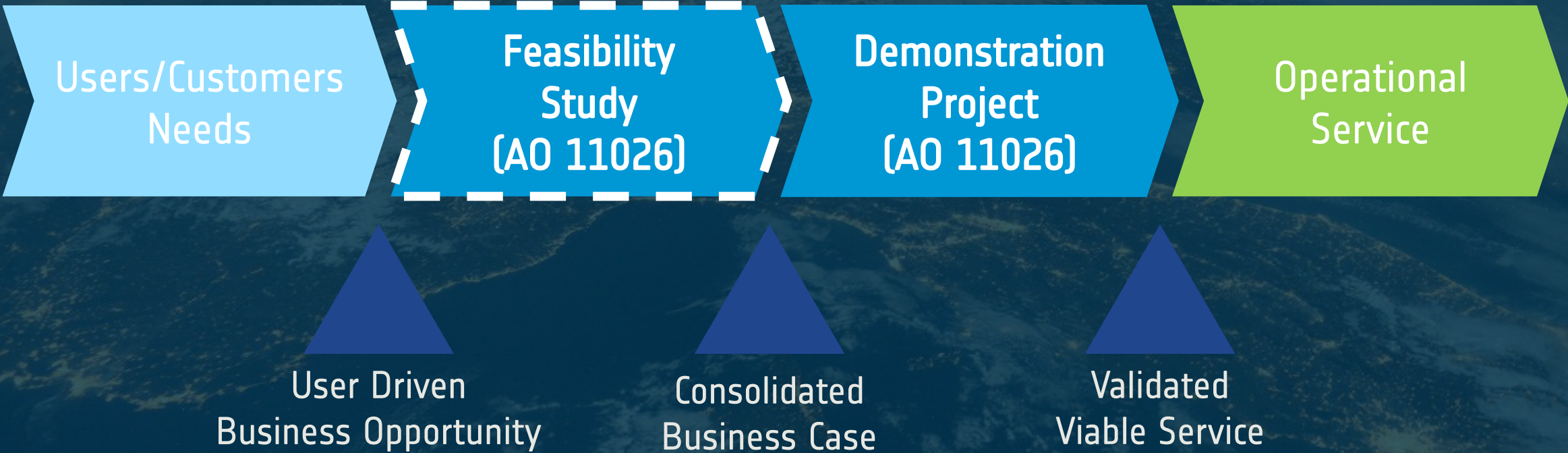01 SAFETY 02 EFFICIENCY 03 PERFORMANCE 04 SECURITY

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Improving the attractiveness of the Railway

FREIGHT USERS
Speed up the implementation of new services for cargo user and shipper

PASSENGERS
Increase the user experience

STATIONS
Promote the development of Smart Stations

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Activity implementation

Users/Customers Needs → Feasibility Study (AO 11026) → Demonstration Project (AO 11026) → Operational Service

User Driven Business Opportunity

Consolidated Business Case

Validated Viable Service

Activity implementation

✓ Feasibility studies (FS): to investigate and assess the business opportunity and technical feasibility of the new applications/services in the railway domain

    ✓ Be user driven

    ✓ Benefit from the use of at least one space asset (SatNav, SatCom, Earth Observation)

    ✓ Aim to evolve the targeted applications and services to pre-operational roll out, potentially through a DP

✓ Demonstration projects (DP): to implement and validate pre-operational services in the railway domain

    ✓ Be user driven (including user involvement and contribution) and potential customer engagement

    ✓ Benefit from the use of at least one space asset (SatNav, SatCom, Earth Observation) proven in a pre-operational context

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Funding scheme

	Feasibility Study	Demonstration Project
Activity Cost	max. 500'000 EUR (limited to acceptable cost)	case by case assessment (limited to acceptable cost)
ESA Co-Funding		
Baseline	max. 50% of company's cost	max. 50% of company's cost
Micro, Small and Medium-Enterprises[5]	max. 80%[5] of enterprise's cost	max. 80%[5] of enterprise's cost
Universities and Research Institutes with no commercial interest in product/service	max. 100%[5] of institute's cost and max. 30% of activity cost	max. 80%[5] of institute's cost and max. 30% of activity cost
Industry Co-Funding	Remaining part of the cost to carry out the activity	

✓ ESA will bear up to 50% (non SME) or 80% (SME) of the eligible cost *pending support from National Delegation*, and the remainder has to be financed by the tenderer and/or other partners.

✓ **IPRs** (Intellectual Property Rights) will **remain with the company**.

ESA Generic and Strategic Programme Lines

….several funding opportunities in ESA ARTES 4.0 also for applications/services…

Generic Programme Line **BASS** – to support the development of pre-operational services - possibly in partnership - for a wide range of users through the combination of different systems.

Strategic Programme Line **4S** (Space Systems for Safety and Security) - to support and promote the development of innovative safety and security downstream services enabled by space technologies (SatCom but also other space assets) addressing institutional needs in the railway sector.

Strategic Programme Line **5G/6G** - to support space, terrestrial and railway vertical players to foster the design, development, implementation, validation, demonstration of Integrated 5G terrestrial and satellite solutions, technologies including downstream applications to the benefits of railway vertical sector.

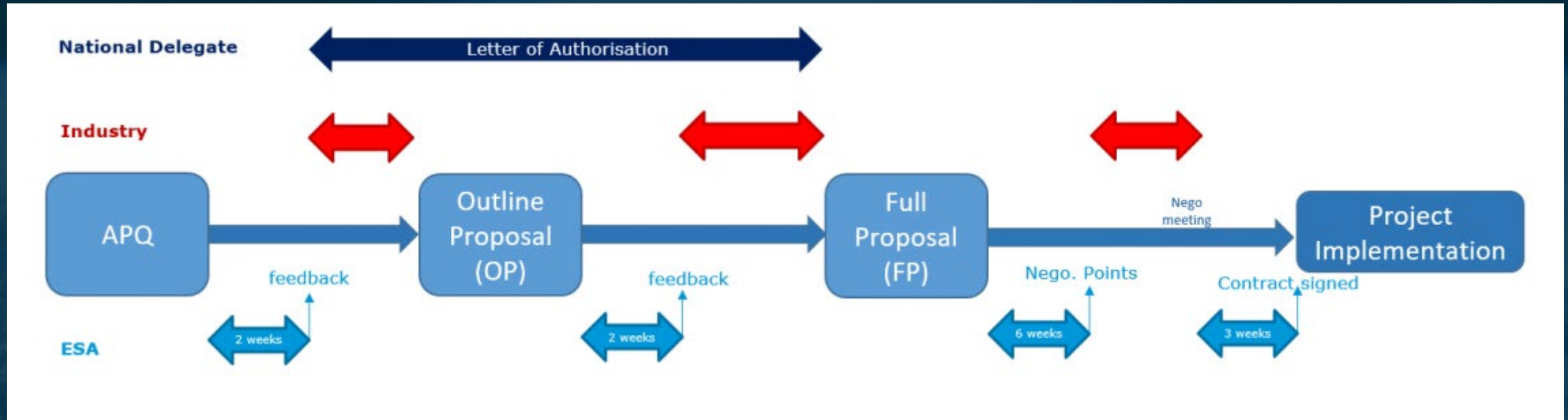….list of participating countries described in ESA Star AO 11026…

Procurement process

- ✓ Incremental procurement approach: APQ is the starting point – max 8 pages document with a standard template to present WHAT, WHY, HOW

- ✓ standard templates for proposals and deliverables during activity implementation

- ✓ Ambassador Platform available to guide companies in the process (https://business.esa.int/ambassador-platforms)

ESA-Star and S4R website

✓ Space4Rail Downstream Applications in ARTES 4.0 Open Call for Proposal is permanently open and available on ESA-Star as AO-1-11026

https://esastar-publication-ext.sso.esa.int/ESATenderActions/details/24185

✓ **Space4rail website & Open Call**:

    ✓ news for this specific call for proposal,

    ✓ customised templates for the Activity Pitch Questionnaire, Outline Proposal and Full Proposal as soon as the call is issued

https://space4rail.esa.int/opportunities/ba-s4r/documents

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Thank you

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