



ARTES 4.0 Generic Programme Line Business Applications - Space Solutions
ACTIVITY DESCRIPTION

“Space for Intermodal Transport”

THEMATIC CALL FOR PROPOSALS

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Table of Acronyms

AI	Artificial Intelligence
AoF	Authorisation of Funding
APQ	Activity Pitch Questionnaire
ARTES	ESA Advanced Research in Telecommunications Systems Programme
BASS	ESA Business Applications and Space Solutions
DRT	Demand Responsive Transport
ESA	European Space Agency
FP	Full Proposal
GNSS	Global Navigation Satellite Systems
MaaS	Mobility as a Service
OP	Outline Proposal
OSIP	Open Space Innovation Platform
PSI	Project Security Instruction
SatCom	Satellite Communications
SatEO	Satellite Earth Observation
TEN-T	Trans-European Transport Network



1. OVERVIEW

This document provides an overview of the “Space for Intermodal Transport” thematic call for proposals under the ARTES BASS, 5G and 4S programme lines. It invites companies to submit business ideas that develop space-based services aimed at enhancing either intermodal passenger or intermodal freight transport.

2. BACKGROUND AND RATIONALE

Urban areas struggle with congestion, parking, and pollution. To meet growing mobility demands, cities are promoting sustainable mixed mobility solutions. Intermodal Passenger Transport and Mobility-as-a-Service (MaaS) platforms could improve transport efficiency by integrating multiple modes into a user-centred system. City authorities are shifting focus from cars to public transport and soft mobility options like cycling. When implemented well, **Intermodal Passenger Transport** can help optimise public transit infrastructure and offer greener, faster, and more economical mobility services.

In certain cities, Mobility as a Service (MaaS) platforms have been implemented to assist travellers by providing real-time information on shared and soft mobility options throughout their journey. These platforms also feature integrated billing systems aimed at reducing the reliance on single-occupancy vehicles. For example, the Vienna MaaS solution “WienMobil” offers passengers ride-sharing capabilities¹.

Intermodal Freight Transport provides an efficient method for the movement of goods. By using various modes of transportation such as sea, air, rail, and road, Intermodal Freight Transport can offer faster and more cost-effective solutions over long distances compared to standalone transport methods. This mode of transport employs a single loading unit, like containerised freight, which helps reduce handling costs.

Intermodal Freight transport is already intrinsic to the global economy, and far more widespread than its passenger counterpart. However, between 1990 and 2019 the demand for freight transport has outpaced the capabilities of Intermodal Freight Transport². This has meant emissions from the transport sector increased by 24% in Europe as a result of increased road use³. Intermodality for freight in Europe is currently not sufficient⁴, but the revised Trans-European Transport Network (TEN-T) policy instrument aims to cultivate a high-quality network of shipping corridors and nodes⁵, with a completion date of 2030. This policy will empower European cities and regions to implement infrastructure projects. As such, these players will be looking for solutions to enable their transport solutions in line with TEN-T.

Intermodal Transport offers significant opportunities across both Passenger and Freight ecosystems. However, numerous challenges that require careful planning, coordination, and collaboration among relevant actors. It is still highly challenging to avoid delays caused by

¹ [WienMobil – the app for all routes in Vienna - vienna.info](https://www.wienmobil.info)

² [Reducing greenhouse gas emissions from heavy-duty vehicles in Europe — European Environment Agency](https://www.eea.europa.eu/en/press-releases/2020/04/reducing-greenhouse-gas-emissions-from-heavy-duty-vehicles-in-europe)

³ [Greenhouse gas emissions from transport in Europe | European Environment Agency's home page](https://www.eea.europa.eu/en/press-releases/2020/04/greenhouse-gas-emissions-from-transport-in-europe)

⁴ [Special report 08/2023: Intermodal freight transport](https://www.eea.europa.eu/en/press-releases/2020/04/special-report-08-2023-intermodal-freight-transport)

⁵ [Trans-European Transport Network \(TEN-T\) - European Commission](https://ec.europa.eu/transport/modes/road/ten-t/)



changes between transport modes, which necessitates having live, interoperable data between modes. At the same time, it is critical to have information regarding the emissions for various transportation modes to ensure a sustainable network. On top of this, each mode is likely to be accompanied by its own set of regulations, equipment, and operational procedures, which can create inefficiencies and delays when moving people or freight from one mode to another.

By addressing the challenges of coordinating different modes of transportation, ensuring standardization and interoperability, managing tracking, and fostering reliable infrastructure, Intermodal Transportation of both Passengers and Freight can be improved in efficiency, cost effectiveness, and sustainability.

3. OBJECTIVES OF THE CALL

The objective of this call for proposals is to stimulate the emergence of innovative space applications and services with high market potential, addressing the challenges related to Intermodal Transport of Passengers and Freight. These services will ideally support cities and regions pursuing Intermodal Transport solutions, or players in the industry such as mobility providers and couriers. This is not an exhaustive list of users. The initial areas of interest include, but not limited to, the following:

Environmental Sustainability

Intermodal transport provides an effective solution for reducing the environmental impact of transportation. By decreasing the environmental footprint associated with moving passengers and goods, and by seamlessly integrating multiple modes of transport in a coordinated manner, it enhances efficiency and amplifies environmental benefits:

- Intermodal transport systems inherently reduce road congestion, which is a major contributor to environmental degradation. Reducing the number of cars and trucks on the road means less traffic congestion leading to lower emissions and improved air quality in urban areas.
- Choosing the most efficient mode of transport for each leg of the journey allows to minimize emissions. For example, transporting goods by train for long distances reduces the need for multiple truck trips, leading to a smaller overall carbon footprint. The integration of rail and ship transport into port operations offers a greener approach, not only reducing the truck traffic congestion around ports but also lowering emissions in the surrounding urban areas.

Efficiency and Flexibility

Intermodal transport flexibility is essential for ensuring efficient and seamless journeys for passengers and goods. By integrating advanced digital solutions, it is possible to reduce delays, optimise resource utilisation and contribute to smoother and more cost-effective operations.

The UK Urban Transport Group quotes: “Greater digital connectivity and the growth of ‘on-demand’ transport have led to greater expectations for public transport, that its networks should adapt to customers and their convenience, rather than customers adapting their behaviour to rigid timetables and routes. In the next 10 years it is likely that people will expect more flexibility in their transport options and more seamless integration”⁶.

Some examples of use cases are as follows:

- Implementing advanced tracking systems, making use of GNSS and IoT devices, can provide near real-time updates on the location of passengers and goods and propose alternative combination of modes of transport. This is made possible through a continuous monitoring of the journey advancement, with any potential solution following the relevant GDPR and privacy regulations.
- Demand-responsive transport (DRT) is a form of shared public transport where vehicles alter their routes based on users’ needs without a fixed route or timetable. This allows services to respond flexibly to the requirements of users and to enable better connections between different modes of transport. DRT trials are underway in several urban areas across the UK⁶ demonstrating key benefits. DRT has indeed the potential to enable a public transport service to be provided in a sustainable way in small and medium-sized towns at times of lower demand or to help in serving large workplaces with anti-social hours, such as hospitals.
- Another challenge faced in the intermodal transport is the availability of an adequate infrastructure to support seamless movement of passengers and goods across different modes of transportation. For example, inadequate rail connections to ports or lack of intermodal terminals can hinder the efficiency of intermodal transportation. Applications making use of Digital Twins could be developed to assess the feasibility in developing new or upgrading existing infrastructure, such as building new rail lines and intermodal terminals, to facilitate efficient and smoother intermodal operations.

Safety

Safety of passengers and vehicles requires reliable communication also in remote areas where the terrestrial coverage is scarce or even not existing. Moreover, maintaining the goods in the same unit without offloading them throughout the journey minimizes the risks of theft or damage.

- Transporting goods without handling them when changing transport modes not only reduces damage and loss but can also reduce the timing and the costs. For example, intermodal transport, making use of rail as one of the modes of transport, can be significantly safer with respect to the transport on the road. Railroads have less accidents and are able to transport hazardous materials more easily than trucks.

⁶ [House of Lords - Public Transport in Towns and Cities](#)

Continuous and reliable connectivity enabling continuous monitoring of goods is paramount to address these challenges.

- In remote or low-connectivity areas, prompt communication of critical situations is paramount for ensuring the safety of passengers. Innovative solutions to address these challenges are needed to establish reliable communication in remote or low-connectivity regions, ensuring prompt response for rescheduling needs.
- Moving in adverse weather conditions may require the route and the mode of transport to be updated. The ability to give an advanced weather warning is extremely important for safety and security.

4. SPACE ASSETS AND DIGITAL TECHNOLOGIES

Satellite technologies and data, integrated with other digital technologies, have a significant role to play for prospective services addressing Intermodal Transport systems:

- **Satellite Positioning and Timing**
Global Navigation Satellite Systems (GNSS) enable innovative tracking and tracing of vehicles and goods through precise positioning, navigation, and timing. GNSS can provide positioning information ranging from coarse to high accuracy, depending on the use case. GNSS facilitates real-time location data and flow monitoring, enabling effective route optimisation and tracking for passengers, vehicles, and goods. GNSS would be highly useful in applications related to Demand Responsive Transport (DRT) or even Fleet Management services for mobility providers and couriers during last-mile delivery.
- **Autonomous Vehicles**
GNSS also enables the use of autonomous vehicles such as unmanned aerial vehicles, enabling awareness in and around freight nodes. This also includes the use of robots to move heavy freight autonomously in and out of nodes.
- **Satellite Communications (SatCom) and terrestrial networks**
Satellite connectivity is vital for signalling critical situations in remote or low-connectivity areas. Integrating satellite and terrestrial networks can ensure reliable connectivity in these regions, supporting seamless data transfer and enhancing communication.
- **Satellite Earth Observation (SatEO)**
SatEO data, combined with advancements in AI and machine learning, can offer insights into activities along supply chains. SatEO can be used to identify infrastructure needs and monitor the environmental impacts of traffic, such as emissions, while providing meteorological information relevant for route optimisation and planning.

5. SCOPE OF THE CALL

The proposals submitted under this Call for Proposal (CfP) shall target innovative and user-driven services which rely on advanced digital and space-based technologies. The proposals shall leverage target opportunities in the transport sector related to the environmental sustainability, efficiency and flexibility, and safety of Intermodal Transport.

The Bidder has two options for addressing use-cases in their proposal: either address the optional use-cases included in the Annexes ([available on the website](#)), or address other use-cases and requirements related to the Call by involving other customers or users directly. If choosing the latter, the Bidder must provide letters of interest from these potential customers as evidence of their support, which should be attached to the Outline Proposal (the second step in the application process). Both options will be considered equally in the evaluation process

The service provider shall be identified and be part of the bidding team to ensure the commercial operational roll-out of the proposed service following completion of a demonstration project.

This Call for Proposal covers two types of activities:

1. **Feasibility Studies** which provide the preparatory framework to identify, analyse and define new potentially sustainable services.

The applications and/or services covered by the proposed Feasibility Studies must:

- **Be customer - and user-driven:** proposals should demonstrate a clear understanding of user needs and present a strong potential for sustainability.
- **Leverage integrated space assets:** propose a service demonstrating the benefits of the utilisation of integrated space assets.
- **Include a plan to test business hypotheses:** a plan should be included that details how the user desirability, technical feasibility, and commercial viability of the service will be tested.
- **Target marketed readiness:** Aim to evolve the targeted applications and services to marketability and operational roll-out, potentially through a Demonstration Project after successful completion of the Feasibility Study

2. **Demonstration Projects** dedicated to the implementation and demonstration of pre-operational services.

The applications and/or services covered by the proposed Demonstration Projects must:

- **Be customer- and user-driven:** Active user involvement is essential throughout the project, including their participation in defining requirements,



validating results, and contributing to the pilot activities.

- **Showcase the value of space assets:** Proposals must clearly demonstrate how the utilisation of space technologies provides a distinct advantage, with a strong potential for long-term sustainability.
- **Deliver measurable socio-economic benefits:** The project should quantify its impact, highlighting improvements in efficiency, sustainability, or other key outcomes that align with user and societal needs.
- **Ensure user participation:** Representatives from the target user communities must actively engage in the project, including participation in the pilot phases to ensure alignment with their requirements and expectations.

The goal of Demonstration Projects is to validate pre-operational services in a real-world environment, paving the way for scaling and operational deployment.

To apply to a demonstration project, the Bidder is required to have addressed the key technical and business risks associated with the proposed project, and to have established a solid business plan including clear support from prospective customers.

6. PROCUREMENT APPROACH

The proposals submitted in reply to the call shall be implemented in the context of ARTES 4.0 Generic Programme Line “Business Applications – Space Solutions”, “Space Systems for Safety and Security” (4S) and “Space for 5G/6G and Sustainable Connectivity” Strategic Programme Lines in coordination with National Delegations.

The Bidder shall submit first an Activity Pitch Questionnaire, and following evaluation, may be invited to submit the Outline and Full Proposal. The Activity Pitch Questionnaire (APQ) template provided by ESA shall be used. This is considered as entry point for companies to submit their idea, providing a simplified and single point of access to the ESA ARTES framework.

The price of activities carried out in a given State are charged against the contribution of that State in the programme. A letter of Authorisation of Funding (AoF) from the relevant National Delegation is therefore required as part of the Full Proposal. The Bidder is however advised to inform the relevant National Delegation(s) when submitting the Pitch. The contact information of the National Delegates can be found here:

<https://artes.esa.int/national-delegations>.

The Agency will admit for evaluation only (Outline and Full) proposals from a bidding team composed of a company and/or organisations (be it Prime or Subcontractor) residing in any of those states that subscribe to the Programme under which you wish you submit your proposal:

- l) **for the ARTES 4.0 BASS Generic Programme Line:** Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania,



Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Sweden, Switzerland and the United Kingdom.

- II) **for the ARTES 4.0 Space for 5G/6G and Sustainable Connectivity Strategic Programme Line:** Austria, Belgium, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom and Canada.
- III) **for the ARTES 4.0 Space Systems for Safety and Security (4S) Strategic Programme Line:** Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Norway, Portugal, Romania, Spain, Switzerland, the United Kingdom and Canada.

7. PROCESS AND SCHEDULE

It is planned for the call for proposals to open on 10th March 2025 until the 12th September 2025.

7.1 Timeline and procedure

The Bidder shall submit first an **Activity Pitch Questionnaire**, and following evaluation, may be invited to submit the **Outline Proposal** and subsequent **Full Proposal**. The Activity Pitch Questionnaire (APQ) template provided by ESA shall be used, which is considered as entry point for companies to submit their idea. The details of the APQ can be found here: [Open Space Innovation Platform - OSIP - Channel: APQ for ARTES Downstream Business Applications](#)

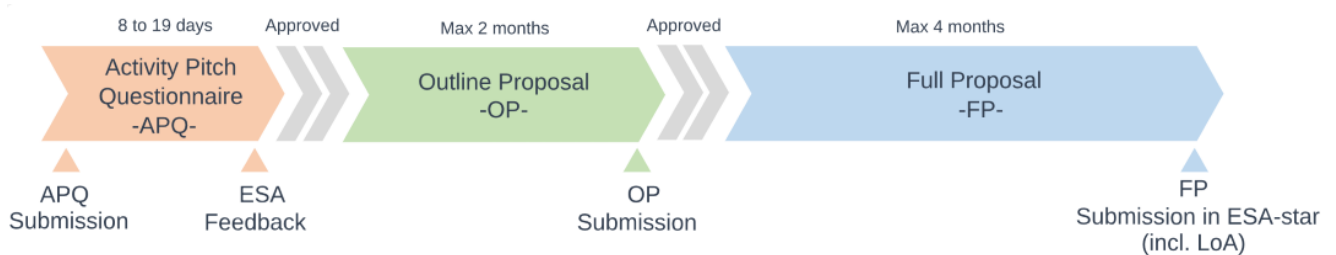


Figure 11: Application steps

This Call is planned to be implemented according to the following stepwise approach.

Step 1: APQ Submission

In Step 1, the interested Bidders are requested to submit their proposal(s) based on a short Activity Pitch Questionnaire (APQ) template made available by ESA that can be downloaded from the Thematic Call website. The pitch should provide the initial idea of what the Bidder would like to propose, elaborated on the basis of the thematic areas and either the use cases proposed by ESA’s partners or others selected by the Bidder. If the Bidder has the relevant information available to them, they may consider completing the supplementary questions



(AP5) in the APQ template as part of the APQ+, which may allow to skip Step 3 below, at ESA's discretion.

Should the bidder wish to cooperate with any of the listed partners in the annexes, they shall give to the Agency the authorisation to distribute the activity pitch questionnaire to these stakeholders by explicitly stating it in the Activity Pitch Questionnaire. Subject to such authorisation, the Agency will follow up distributing the APQ to the bidder's authorised stakeholder(s) and liaise with them to facilitate interactions with the Bidder.

The completed Activity Pitch Questionnaire (APQ) shall be uploaded using the online web submitter, ESA's open space innovation platform (OSIP) in the channel named "[APQ for ARTES Downstream Business Applications](#)".

Multiple Pitches with different ideas can be submitted.

It is strongly recommended that the interested Bidder liaises from the beginning with the relevant ESA Member States Delegates.

Step 2: APQ Evaluation

In Step 2, following an assessment of the pitch by ESA, ESA will provide feedback to the company, aiming to provide a reply within 10 working days following the deadline for submission of the pitch.

It is recognised that some interactions with the Bidder may be required, and ESA may therefore consult with the Bidder and may offer support in providing further clarifications, aimed at better shaping the Outline Proposal(s). Dialogue sessions may be organised individually with potential partners prior to Step 3.

ESA might also consult, when necessary, with the relevant National Delegation(s) for orientation and will provide key information (e.g. title, cost, price, subcontractor) to the relevant National Delegation(s).

Subject to a positive evaluation of the pitch and the Bidder having informed the National Delegation(s), the Bidder will be notified by ESA and invited to submit an Outline Proposal. Note that the APQ+ can act as a substitute for the Outline Proposal, thus if having adequately answered the additional questions included in the APQ+, the Bidder may be able to skip Step 3.

Step 3: Outline Proposal Submission

In Step 3, the Bidder will submit the Outline Proposal, based on a template provided by ESA, with letter(s) of interest from users/stakeholders. The Outline Proposal expands upon the pitch with a more extensive level of details. The Bidder will be allowed 2 months from ESA's approval of the APQ to the submission of their Outline Proposal. The outline proposal shall be submitted on the OSIP platform under the channel "[Outline Proposal for ARTES Downstream Business Applications – Feasibility Studies/Demonstration Projects](#)".



Step 4: Full Proposal Submission

In Step 4, subject to a positive assessment from ESA and in-principle support from the National Delegations, the Bidder will be invited to submit a Full Proposal on ESA-STAR in accordance with BASS programme line. The Bidder will be allowed 4 months from submission of their Outline Proposal to submit their Full Proposal on ESA-STAR.

A letter of Authorisation of Funding (AoF) from the relevant ESA National Delegation is required as part of the Full Proposal. The Bidder is however advised to inform the relevant National Delegation(s) when submitting the Pitch. The details of the National Delegates can be found here: <https://artes.esa.int/national-delegations>.

After the Bidder have submitted a Full Proposal with the Authorisation of Funding (AoF) from the relevant National Delegation(s) and following a positive assessment by ESA, the proposed activity will be approved for implementation.

7.2 Evaluation Criteria

The evaluation process is non-competitive, as each proposal will be assessed individually on its own merits, according to the evaluation criteria applicable for [CALL FOR PROPOSALS FOR DOWNSTREAM APPLICATIONS IN ARTES 4.0](#) (esa star ref.: 1-10494).

More information for the assessment of the APQ and outline proposal stages can be found on the OSIP page [“APQ for ARTES Downstream Business Applications”](#).

More information on the evaluation criteria for the final proposals can be found within the document “Appendix 1 to AO/1-10494/20/NL/CLP (Issue 2.2)” which can be found on ESA-STAR and the [activity webpage](#).

8. GENERAL CONDITIONS

The submissions and all correspondence relating to it shall be in English.

The tender shall not contain any Classified Information, whether in the APQ, Outline Proposal or in the Full Proposal. To avoid any confusion with Classified security markings, the unclassified protective marking used by the Tenderer in the proposal shall not contain the terms: "Restricted", "Confidential", or "Secret".

However, should the Tenderer consider necessary to include Classified Information in the tender, the Tenderer shall inform beforehand the ESA Security Officer.

The Tenderers are informed that Classified Information can be shared with ESA only in compliance with the Project Security Instruction (PSI) duly established by the Agency beforehand and subject to the approval by the ESA Member States.



The Agency will treat commercially sensitive or proprietary information confidentially and solely for the purpose of the assessment of the response.

Expenses incurred in the preparation and dispatch of the response to the announcement will not be reimbursed. This includes any expenses connected with a potential dialogue phase. The announcement does not bind the Agency in any way to place a contract. The Agency reserves the right to issue amendments to the announcement.