

Space for Construction Monitoring

European Space Agency x Ferrovial

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[ESA Business Applications](#)

Speakers



Christopher Frost-Tesfaye
Space Applications
European Space Agency



Juan Beneytez Salvadores
Corporate Innovation Manager
Ferrovial

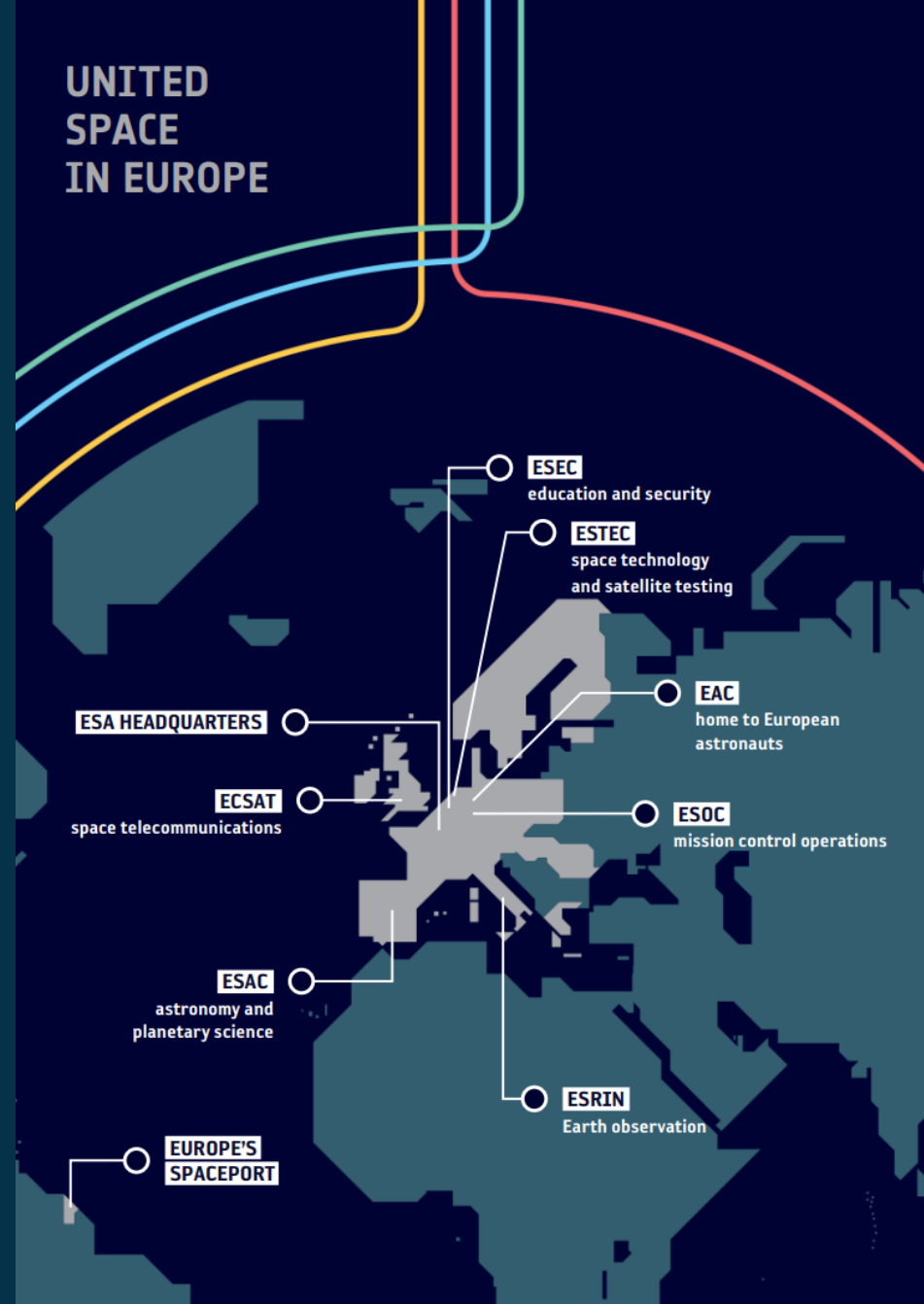
Agenda

1. Introduction
2. European Space Agency
3. Business Applications Space Solutions (BASS) Programme
4. Space for Construction Monitoring
5. Guest Speaker - **Juan Beneytez Salvadores, Ferrovial**
 1. Ferrovial Earth Observation Construction Monitoring Challenge
6. How to Apply
7. Q&A

European Space Agency



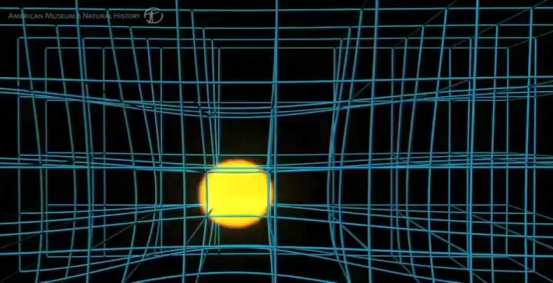
- Europe's gateway to space
- Peaceful exploration and use of space for the benefit of everyone
- Established in 1975 - over 50 years of experience
- 22 Member States + Additional Associate & Cooperating States
- 8 sites across Europe and a spaceport in French Guiana
- Promote European scientific and industrial interests in space



ESA Pillars



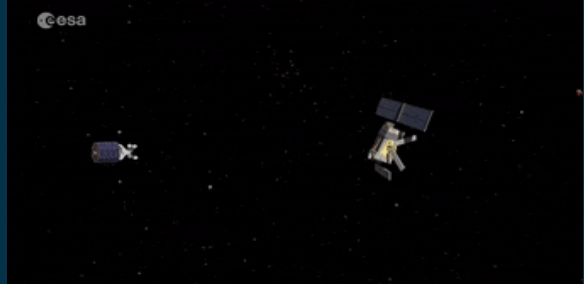
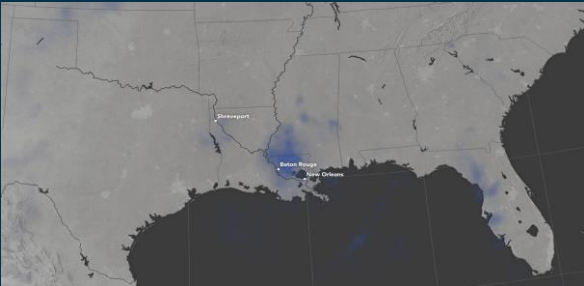
Science and Exploration



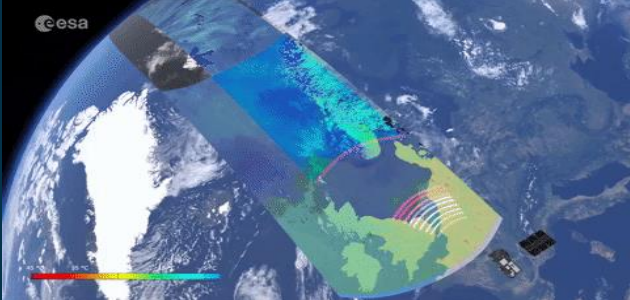
Enabling and Support



Safety and Security



Applications



The largest space innovation network in the world

- The go-to place for great business involving space to improve everyday life.
- Supporting European start-ups and SMEs to develop businesses using space technology and data.
- Offering funding, business and technical support to help to generate successful business and create jobs.





Space Improves Life on Earth



Space Technology... X **... non-Space Technology...** = **... more applications, more value ...**

Earth Observation

Satellite Positioning

Satellite Communication

Spaceflight Technologies

Space Weather

Big Data Analytics
VR/AR/XR
Artificial Intelligence
Distributed Ledger Technology
Robotics
Internet of Things
Digital Twins
Drones
Cloud Technologies

5G (<https://artes.esa.int/esa-5g6g-hub>)

Maritime

Environment

Financial

Education

Energy

Agriculture

Healthcare

Transport

Media

Aviation

What can you do with Space Technology?

Satellite Positioning



Global Positioning
Navigation
Velocity
Precision Timing
Activity Tracking
Route Optimisation
Surveying
Machine Control

Satellite Communication



Reliable and Secure
Communication
Remote Connectivity
Backup to Terrestrial
Infrastructure
Broadcast to
Widespread Users

Earth Observation



Land, Sea, Air Monitoring
Infrastructure Monitoring
Resource Mapping
Environment Sensing
Change Detection
Weather and Pollution
Forecasting

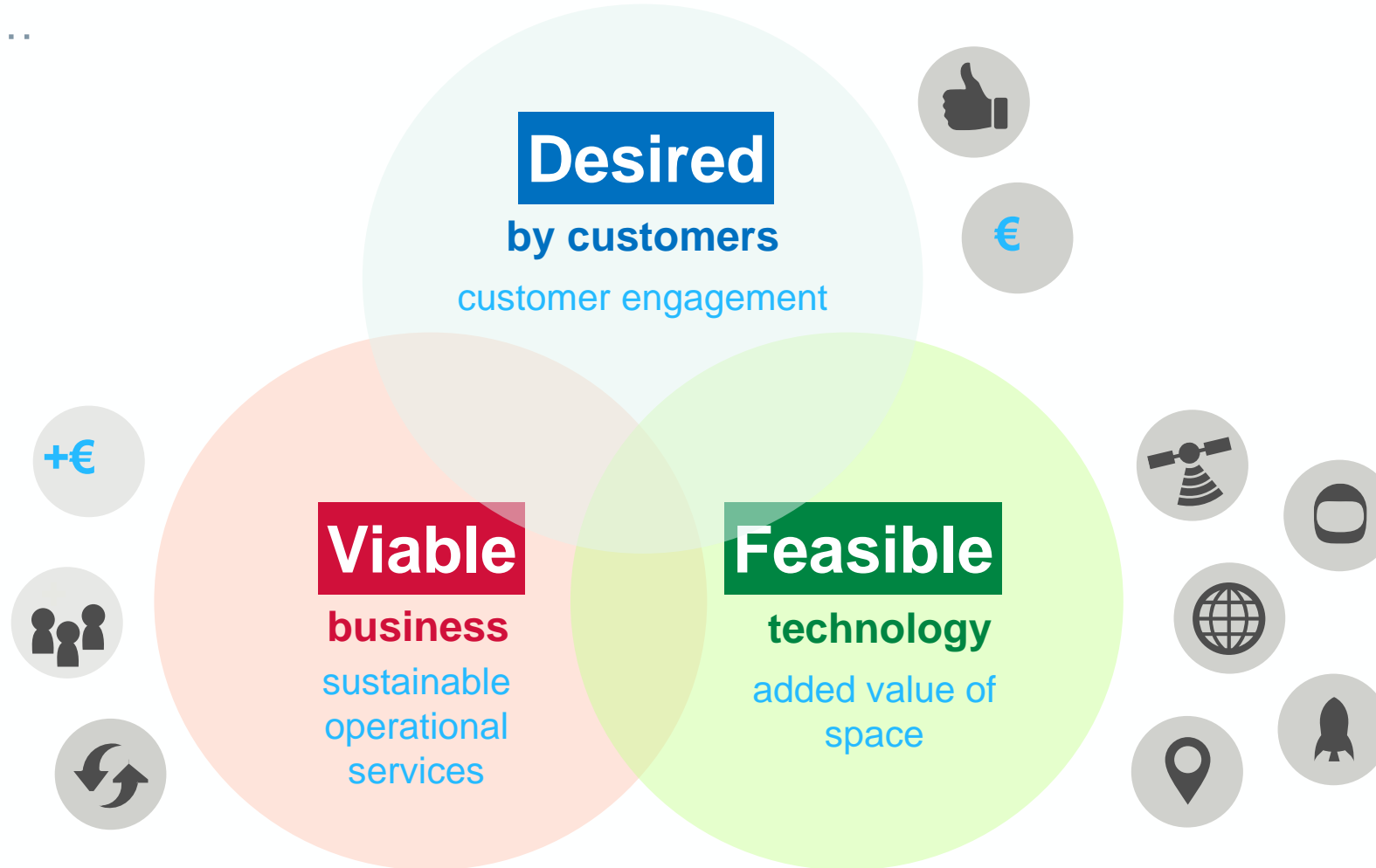
Human Spaceflight Technologies (Spin-Outs)



Augmented Reality
Health Sensors
Procedures
Big Data Processing
Artificial Intelligence

What are we looking for?

Services that are...



What ESA Space Solutions Offers...

Our aim is to work together to make your idea commercially viable, with:



Zero-Equity Funding
(€50K-€2M+)



Tailored Project Management Support



Access to our Network and Partners

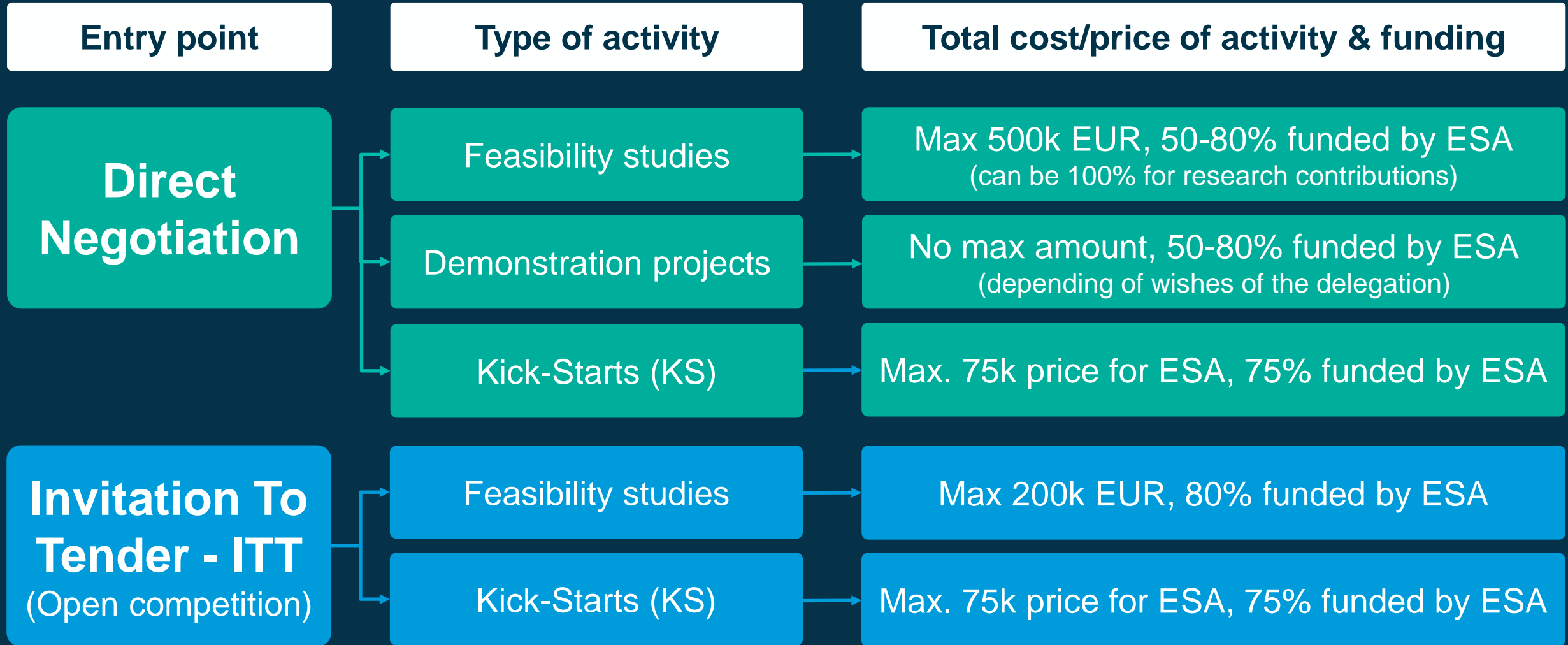


Use of ESA Brand for Credibility

Demo Projects: Mature value proposition & business plan and demo your service with customers

Feasibility Studies: Explore ideas, create a business plan & connect with potential users





After market-entry ESA can provide support through access to an investor network and media promo

What's in it for us?

SOCIO-ECONOMIC IMPACT

Deliver social value and economic sustainability



USE OF SPACE TECHNOLOGY

Expand the utilization of space in new markets and user communities



INDUSTRY COMPETITIVENESS

Strengthen European Industry competitiveness on the global space and non-space markets



Cooperations with Non-Space Stakeholders*

* These are entities who do not receive funding from ESA through the cooperation but have mutual objectives in running initiatives with ESA

Aviation

Smart Cities

Energy

ICT

Health

Food and Agriculture

Infrastructure

Circular economy

Cybersecurity



Space for Construction Monitoring



Construction Projects...

- Complex and Dynamic
- Multistakeholder Involvement
- Long Timeframes
- Resource-Intensive
- Geographically Dispersed
- High-Risk and Uncertainty
- Combine Traditional & Modern Practices
- Regulatory and Compliance Challenges
- Many Interdependencies
- Data-Intensive
- Sustainability Spotlight

And Associated Challenges...

- Coordination Difficulties and Delays
- Misaligned Expectations/Priorities and Conflicts
- Increased Risk Exposure (Inflation, Labour Shortages...)
- Inefficiencies, Wastage and Shortages...
- Limited Access and Visibility
- Safety Incidents, Financial Overruns...
- Misalignment Between Digital and Physical Worlds
- Fines, Legal Issues, Shutdowns...
- Propagating Delays
- Data Veracity is Critical to Decision-Making
- Balancing Sustainability Goals with Economic Considerations

Common Thread – Data and Actionable Insights

Opportunities...

- Leverage advances in, and synergies between, **state-of-the-art technologies** including satellite data, AI, sensor technology, and beyond.
- **Billion \$ market** and growing, driven by demand for sophisticated monitoring solutions that enhance efficiency and productivity on construction sites
- Targeted Areas:
 - Ferrovial **Earth Observation Challenge**
 - **Other Opportunities** Identified by the Bidder...
 - Progress Tracking
 - Safety and Compliance
 - Environmental Impact Monitoring
 - Supply Chain and Logistics
- **Feasibility studies** to evaluate technical, economic, operational, legal and regulatory constraints and possibilities. **Demonstration projects** to pilot solutions in pre-operational environments with users.





Satellite Earth Observation

- Tracking of highway works, vegetation information, land equipment and vehicles.
- Change detection and like-for-like comparisons over time.
- Heat signatures, topographical measurements, air quality analysis.



Satellite Positioning

- Geolocation and timestamping of data collected on-site
- Structural integrity monitoring of assets.
- Navigation of drones.



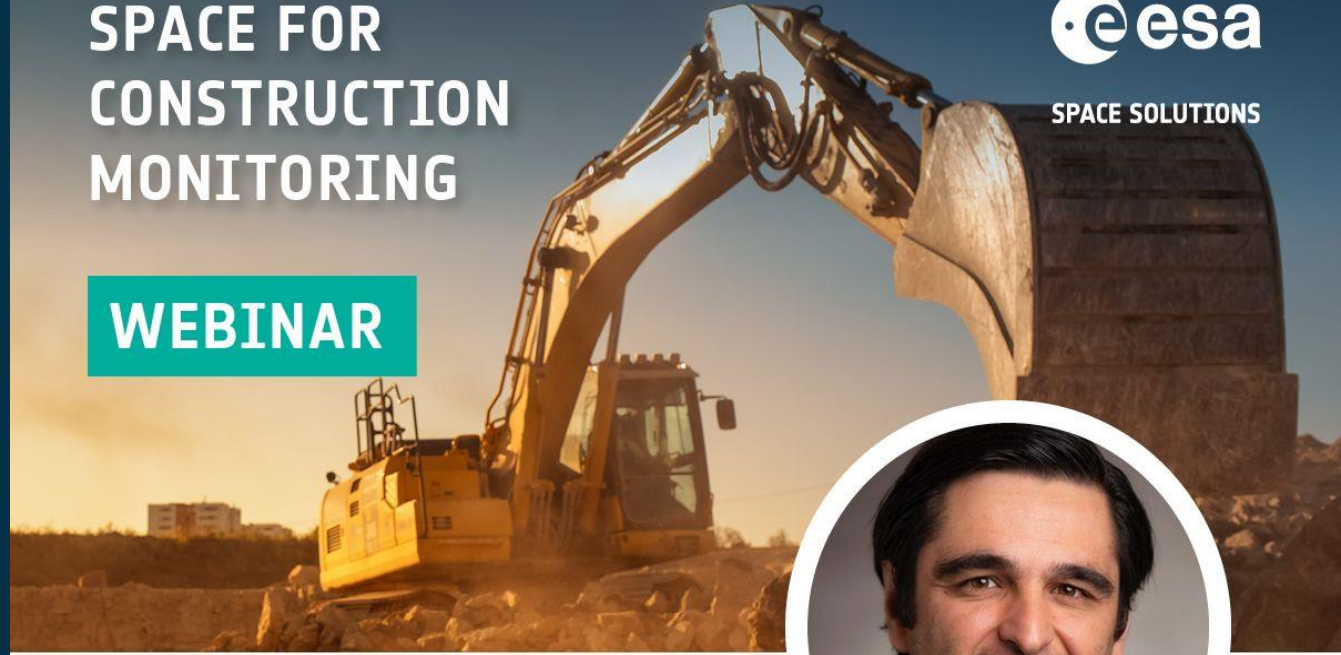
Satellite Communications

- Rural, remote and offshore connectivity.

Juan Beneytez Salvadores
Ferrovial Earth Observation
Construction Monitoring Challenge

**SPACE FOR
CONSTRUCTION
MONITORING**

WEBINAR



GUEST SPEAKER

**JUAN BENEYTEZ
SALVADORES**

Corporate Innovation Manager, Ferrovial

12/12/2024 – 11.00 CET





Space for Construction Monitoring

Juan Beneytez - Innovation & Automation Manager

Dec 2024

Introduction



Juan Beneytez

Innovation & Automation Manager

BIO


- Experience spanning airports, construction, and highways. His career includes leading business development at Heathrow Airport, driving innovation in automation in construction projects at Ferrovial, and implementing advanced technologies in highway infrastructure
- Expertise in digital transformation and strategic partnerships, Juan focuses on integrating IoT, robotics, and AI to shape the future of sustainable infrastructure

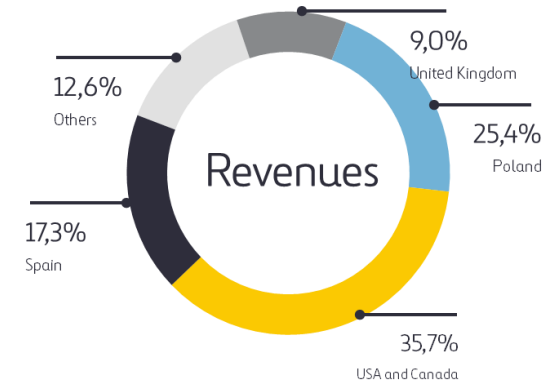
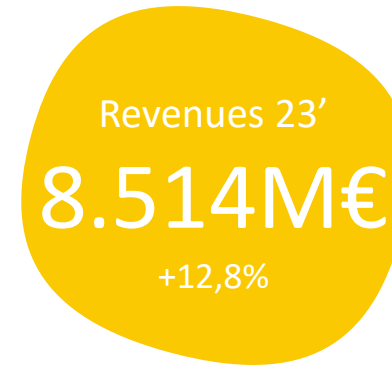
About Ferrovial

Main Figures

- One of the main contractor groups in Spain
- With more than 70 years of experience in the infrastructure sector
- Currently operating with 4 main divisions:



- Presence in 4 continents through 7 main markets (US, Canada, Spain, Poland, Chile, UK and India)
- Since May 24', Ferrovial is trading on  Nasdaq



The Journey So Far

5G / Robotics

- 1st Private 5G connected site
- 1st Teleoperated robot over 5G

Machine Teleoperations

- 1st teleoperated excavator with CAT Command

Semi-automatics

- Excavator & Dozer Guidance Systems
- Stake Out Robot
- Smart Lifting

Auto Steer & Full Autonomy

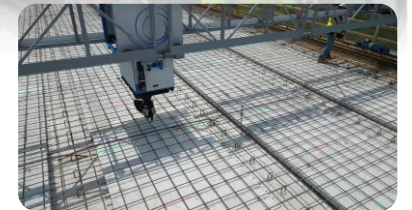
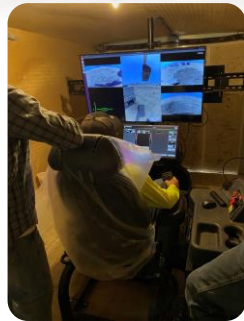
- 1st Auto Steer on a Roller
- 1st Autonomous Machine at site
- Rebar Tying Robot

2021

2022

2023

2024



Construction Challenges

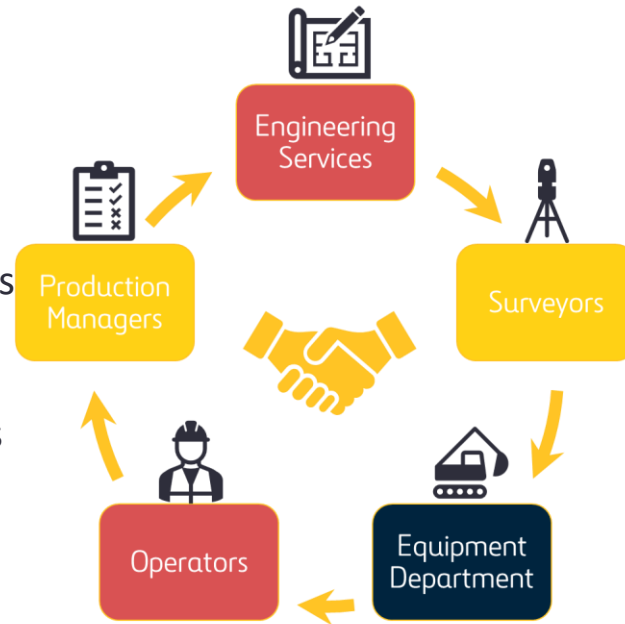
Current progress monitoring methods don't satisfy every need in construction sites....

Challenges

1. **Limited drone flights** - every quarter (4/year)
2. **Frequent site visits** – PMs / Survey team trips
3. **Visibility gaps** – stakeholders (suppliers, managers, directors...)
4. **High costs** – (drone operators, fuel, time...)

Forward looking

- Reimagining of Roles
- New Construction Processes
- Trust/Training of Current Operators
- Maturity of Technology
- Regulations & Client Specifications



Why Space for Construction Monitoring?

Introduction

Challenge

- Traditional methods like drone imaging or manual site inspections can be limited by cost, weather, and scalability

Opportunity

- Space technologies, such as satellite imagery and geospatial analytics, could provide continuous, scalable, and efficient monitoring solutions

Impact

- Enable better project control, risk mitigation, and resource optimization



Use Cases

Space for Construction Monitoring

1

Earthworks Monitoring

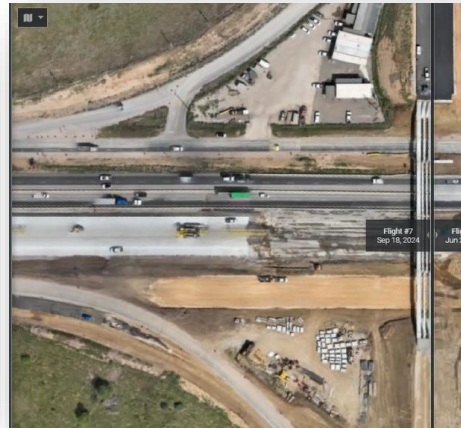
Quantify earthmoving volumes and verify progress in real-time



2

Structural Health

Monitor bridges and roads for deformation or stress through SAR



3

Environmental Monitoring

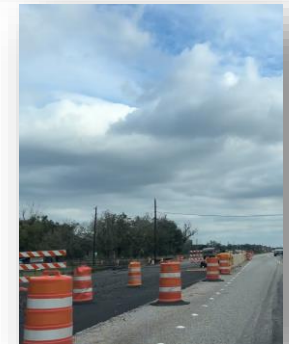
Ensure compliance with land use regulations by tracking vegetation and water resources

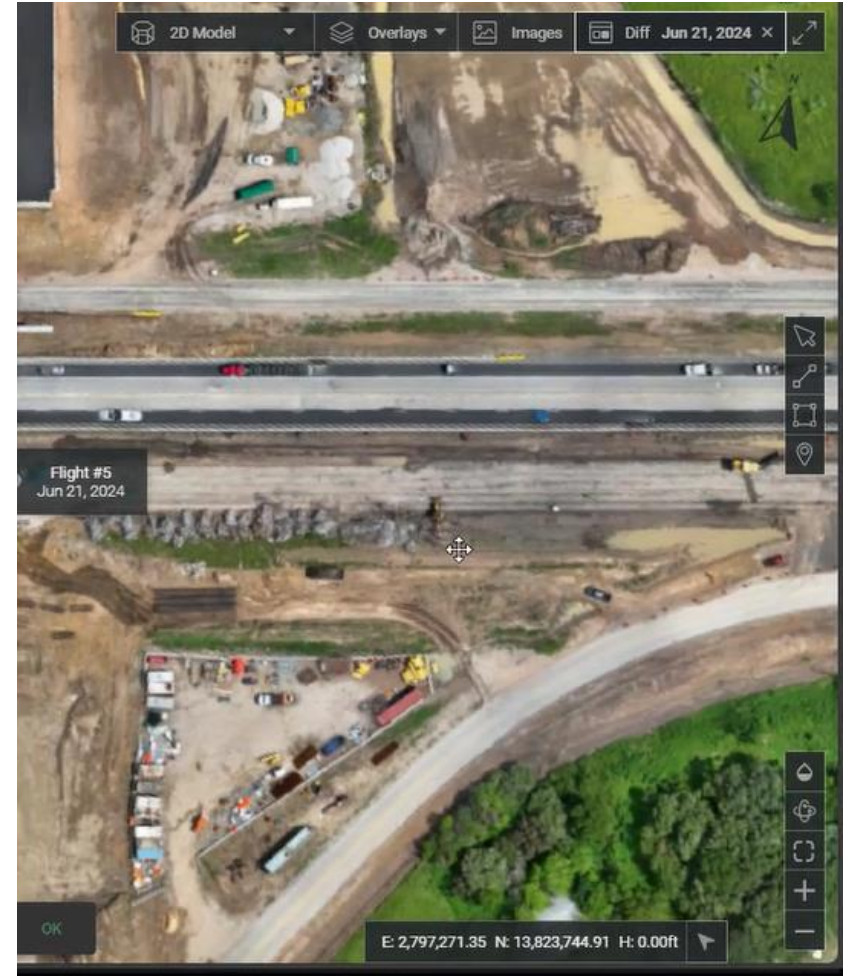
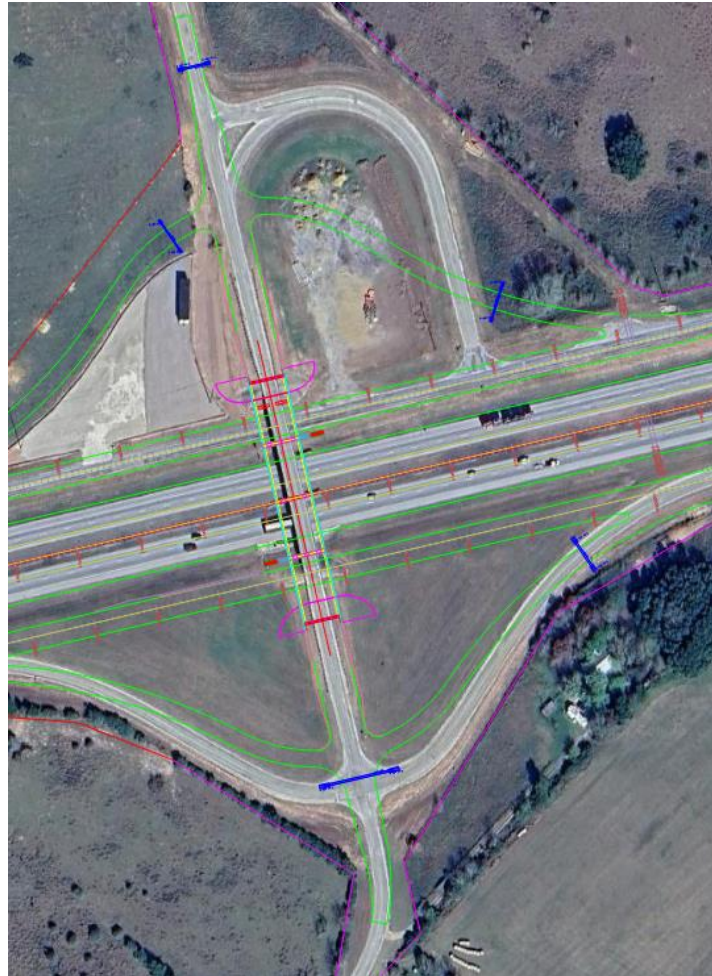


4

Progress Documentation

Provide stakeholders with regular, unbiased progress reports using satellite data





ferrovial

1

Cement Truck



2

Mixer



3

Pathfooter



ferrovial

4

Blade



5

Roller



How to Apply...



How to Apply (1) – Documentation



Register

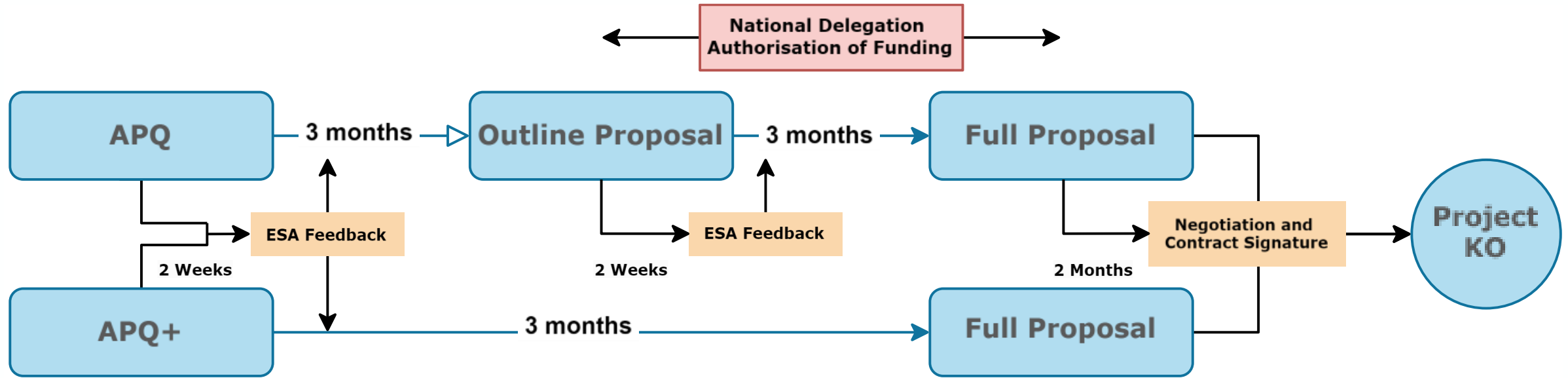
Register by completing online questionnaire on ESA-STAR Registration (minimum 'light registration') ([Doing Business with ESA](#))

Download

Download the tender information documentation (Invitation to Tender) via the webpage [Space for Construction Monitoring](#) at the opening date.

Submit

Download the Activity Pitch Questionnaire (APQ/APQ+) template and **submit your APQ** as instructed in the Activity Pitch Questionnaire guidelines (<https://business.esa.int/apq-submit>) through the online form **before 18th February 2025**, selecting this initiative in the drop-down of the APQ.



NB: Indicative Timelines are the Maximum Durations

- ✓ Incremental procurement approach: APQ is the starting point – max. 8-page document with a standard template to present WHAT, WHY, HOW
- ✓ The APQ+ may substitute the outline proposal as an alternative entry point for **mature propositions only**
- ✓ Standard templates for proposals and deliverables before and during activity implementation
- ✓ Ambassador Platform available to guide companies in the process (<https://business.esa.int/ambassador-platforms>)

APQ - 'Activity Pitch Questionnaire'



1. (WHO) Company Background Information
2. (WHAT) do you want to offer your customers and what is the added-value?
3. (WHY) Who are the target beneficiaries addressed by your offer, and what is the expected impact?
4. (HOW) How do you intend to implement?

(OPTIONAL) APQ+ Fast-Track Questions

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ACTIVITY PITCH QUESTIONNAIRE (APQ)

ESA-TIAA-PO-2017-1054 - V. 3.19

The Activity Pitch Questionnaire (APQ) allows you to present your business idea in a reduced, standardised pitch. It helps ESA to quickly take informed decisions on next steps, pointing you to the most appropriate activity stream in case the APQ is considered acceptable (e.g., additional preparatory work, training, teaming up with some other partners, go ahead targeting a Feasibility Study or a Demonstration Project).

Gated and incremental approach: The submission process is based on the following three stages: the Activity Pitch Questionnaire (this form), the Outline Proposal, and the Full Proposal. In case the APQ is accepted by ESA, the answers to the questions of this APQ will be directly integrated in the Outline Proposal and extended as needed. In a similar way, the elements of the Outline Proposal, if accepted by ESA, can be directly integrated in the Full Proposal.

Prepare your pitch:

- Make sure you use the **LATEST VERSION** of the [APQ template](#).
- Explanations of terminology used here can be found in the document '[Terminology used in ESA Business Applications](#)'.
- Some explanations on how to prepare the APQ are available in the presentation '[ESA Business Applications - Guidelines for APQ Preparation](#)'.
- Choose the appropriate Open or Thematic Call. For further details, visit '[ESA Opportunities for Open Calls](#)'.

Call: Activity:

"Please be aware, it's important to ensure you have selected the right options."

Submit your pitch:

- Contact your National Delegation¹ as specific rules may apply depending on your country.
- Please note that for a given idea, **ONLY ONE** APQ submission is possible (no subsequent submission of revised APQ Form(s) is allowed).
- The APQ has a validity of **ONE YEAR**: in case of no draft of Outline Proposal is submitted within one year from the date of the APQ submission, the APQ will be considered by ESA as withdrawn.
- Your APQ shall be submitted using the **online web form submitter** accessible at '[APQ Submit](#)' Please note that only PDF formats are accepted.

Activity Pitch Process:

Upon submission of your Activity Pitch Questionnaire:

- ESA may provide this Activity Pitch Questionnaire to and discuss it with the National Delegations of the countries of your consortium.
- ESA will assess your pitch.
- ESA will provide written feedback typically within 10 working days from the date of the APQ submission.

¹ Contact details of the National Delegations can be found under: <https://business.esa.int/national-delegations>
For Greek entities, please note that Greece does not support non-competitive bids, therefore Greek proposals are not admissible under in this call.

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Important Note:

- For optimal viewing and accurate completion of the template, please download and install the latest version of [Acrobat Reader](#), which is available for free.
- Click on " ? " for more information.

Section AP.1 Background information

AP.1.1 Idea name:

Brand name: Full name:

Thematic market area

Primary 1: Subcategories 1:

Primary 2: Subcategories 2:

Keywords 1: Keywords 2: Keywords 3:

AP.1.2 Basic company information

Name: Website:

Address: Country: Phone:

Contact point name: Email:

AP.1.3 Company background

Year of creation: Revenues (Most recent figure in EUR) / Year:

Number of employees: Industry / sector:

Coming from ESA BIC(*): (*) If Yes, conclusion date of BIC contract: mm/yyyy

More details:

AP.1.4 Have you had any previous activities within Business Applications?

If Yes, indicate name of any previous activities and possible commercial outcomes

AP.1.5 Are you applying with sub-contractors?

If Yes, who are the other entities?

Name:	<input type="text"/>	Website:	<input type="text"/>	Industry:	<input type="text"/>	Country:	<input type="text"/>
Name:	--	Website:	--	Industry:	--	Country:	<input type="text"/>
Name:	--	Website:	--	Industry:	--	Country:	<input type="text"/>

Roles in Activity:



Ferrovial Challenge Information

- **Satellite Earth Observation Focus (optical, radar, combinations... selection open to the Bidder).**
- **Feasibility Studies**
 - **Selection of Satellite Earth Observation Dataset/s**
 - **Algorithm Validation**
 - **Delivery of Outputs (e.g. PoC)**
 - **Targets: Increased Coverage Capability, Resolution, Cost-Efficiency, Weather/Cloud Resilience**
- **6-Month Max. Duration**
- **High Starting TRL (Technology Readiness Level)**
- **Follow-Up Demo Project (after the Feasibility Study)**
 - **Bidders must be willing and able to progress to operational trials (via ESA Demo Project) thereafter, if successful.**
- **Datasets**
 - **Drone-derived site ground-truth data will be provided by Ferrovial, the Bidder should analyse and select optimal satellite earth observation dataset/s to be used for the viability assessment.**
- **APQ+ Submission (Complete Additional Questions in APQ)**
- **Details Provided in Annex/Use-Case Document: [Space for Construction Monitoring Use-Cases](#)**

- The **authorisation from National Delegation** will be required for submission of full proposals under direct negotiation (the third step in the application process) thus it is a good idea to initiate a dialogue with your National Delegation early on.
- Please note that funding participation is open to groups, organisations and businesses which reside in ESA member states that have subscribed to the programme.
- To date, these countries include Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece*, Hungary, Lithuania, Ireland, Italy, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain**, Sweden, Switzerland and the United Kingdom.
- The contact information of the National Delegations can be found at <https://business.esa.int/national-delegations>

*For **Greek** entities, please note that Greece does not support non-competitive bids, thus Greek proposals are not admissible under in this call.

For **Spanish entities, please note that Spain has no budget left for this initiative under the programme.

Thank you!

For more information:

ESA Space Solutions (<https://spacesolutions.esa.int/>)

<https://business.esa.int/funding/call-for-proposals-non-competitive/space-for-construction-monitoring>

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