

## European Space Agency Space for Green Construction

## Supported by





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### Before we start...

- Please keep your microphones muted at all times and switch off the webcam function
- You can use the conversation function anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar

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### Agenda

- 1. European Space Agency (ESA)
- 2. ESA Business Applications
- 3. Space for Green Construction
  - 1. Overarching Theme and Objectives
- 4. Guest Speakers
  - 1. Dirk Paelinck, European PropTech Association
  - 2. Anil Sawhney, Royal Institution of Chartered Surveyors (RICS).
- 5. Space for Green Construction
  - 1. Topics of Relevance
  - 2. Value of Space
  - 3. Project Examples (ESA BASS)
- 6. How to Apply



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## 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 + 9 Associate & Cooperating States
- 8 sites across Europe and a spaceport in French Guiana
- Promote European scientific and industrial interests in space



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# Science and Exploration







**Enabling and** 

Support











Applications







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## Space Improves Life on Earth

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### ESA SPACE SOLUTIONS

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.

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### ESA SPACE SOLUTIONS OFFERS





Zero-equity funding (from €50k to €2M+ per activity)

A personalised ESA consultant

Technical support and commercial guidance

Tailored project management support

Access to our international network of ESA and partners

Access to our network of investors

Credibility of the ESA brand









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### → ESA BUSINESS APPLICATIONS

### Zero-equity co-funding up to €2M

- Demo projects: Mature value proposition & business plan and demo your service with customers.
  - Up to 50% co-funding\*
- Feasibility studies: Explore ideas, create a business plan & connect with potential users.
  - Up to 50% co-funding\*
  - Up to 100% funding under Competitive Tender
- Kick-Starts: Thematic activities.

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• Up to 75% co-funding

\* Up to 80% for SMEs (pending specific initiative and approval of National Delegation)



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### → Feasibility Study: Background

12 months duration -Overall cost upto €250K

### upto €200K ESA funding (80% ESA co-funding)

Feasibility Studies are ESA's funding scheme enabling companies to explore new service and application concepts making use of space capabilities.

- Evaluate economic and technical viability of an operational service.
- Create Proof of Concept for preliminary validation.
- Limited initial investment by companies, particularly attractive for SMEs and start-ups, granting them an easy entry into ESA Business Applications.
- Competitive tendering procedure.

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• If successful, possible follow-up support via Demonstration Projects





## Space for Green Construction Theme and Objectives

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## **Overarching Theme and Objectives**

### Space for Green Construction

Space for Green Construction will support the study and development of space-enabled commercial services aiming to improve environmental sustainability across the construction lifecycle of "built" or "hard" infrastructure.

Such infrastructure refers to the physical infrastructure of buildings, monuments, roads, bridges, tunnels, mines and quarries, dams and reservoirs, railways, ports, offshore structures and beyond.



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## **Overarching Theme and Objectives**

Why Sustainability in Construction?

- Climate Change
- Growing World Population
- Top-down pressure from regulators
- Improved commercial prospects



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### → Guest speaker

### **Dirk Paelinck**

Serial entrepreneur in the real estate domain, and Chairman and Founder of the European PropTech Association.





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## THE EUROPEAN PROPTECH ASSOCIATION

Dirk Paelinck Chairman & Founder

www.proptechhouse.eu

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#### SUPPORTING RESEARCH

#### GLOBAL TRENDS IMPACTING REAL ESTATE

#### Impact-likelihood matrix of global trends

Global Trends – Their importance for and impact on the E&C Industry



# MACRO ECONOMIC

- Climate change and regulation put stringent criteria on real estate (36% of emissions from RE)
- Rise in urban development and smaller family units change the real estate landscape (from 74% to 83,7% in 2050)
- Aging of the population pushes for other needs and adapted infrastructures (By 2045, +65y equals 25% of population - now 16%)
- More complex projects with increasing complexity in regulation and tax introduce a wider range of risk and return

#### Dirk Paelinck, Chairman European PropTech Association

#### SUPPORTING RESEARCH

#### TECHNOLOGIES IMPACTING REAL ESTATE

#### Impact-likelihood matrix of new technologies

#### Future Impact and Likelihood of New Technologies



"Real estate players really need to understand how technology is affecting their sector." - PwC Real Estate

2020: Building the Future

### TECHNOLOGY REVOLUTION

- Al Integrated BIM continuously improving through generative design
- IOT, Big data & AI drive investment decision making
- Customer experience drives sales and marketing
- Blockchain creates efficiencies in transactions and makes capital readily available
- SaaS and Robotics allow small real estate players to compete with large players
- Electric mobility and the sharing economy will change the way people live and work

#### Dirk Paelinck, Chairman European PropTech Association

#### SUPPORTING RESEARCH

#### RISING DEMAND IN REAL ESTATE AND CONSTRUCTION

Real estate  $\mathrm{CO}^2$  emissions are up 25% since 2000 and there is no sign yet of a slowdown

### Exponential growth in new construction: the world will add 18 billion SQM by 2060 which is 2x the existing stock

This equates building the equivalent of a new New York City every month for the next 40 years.

### COSTS

 96 cities have committed to net zero carbon new construction by 2030 and all existing buildings by 2050

In Europe, the Renovation Wave regulations impose a
 <u>60% reduction of emissions by 2030</u>
 <u>with an estimated cost of \$3 trillion</u>

The cost of realising new sustainable buildings requires \$400 billion of investments per year until 2030

23% of buildings in France = obsolete // EU Green Deal

A unique momentum

## ESG

## TAXONOMY

## Eu Climate Law

## THE DRIVERS

1. Regulation & taxonomy

2. Efficiency & user experience

a. Personal (founders, investors)

Dirk Paelinck, Chairman European PropTech Association

## THE EXCEPTIONAL EUROPEAN NEED FOR PROPTECH SOLUTIONS

### Top 5 Tech based on 2 MAJOR DRIVERS OF INNOVATION

Technology Top 5	Blockchain	5G	AI	loT	VR/AR
User Experience	<ul> <li>Transparency</li> <li>Accessibility</li> <li>Financial stability</li> <li>Complexity of projects</li> <li>Veracity!</li> </ul>	<ul> <li>Connectivity</li> <li>Convenience</li> <li>Speed</li> <li>Motion/wifi detecting through sensors</li> <li>Podcasts, video, marketing automation</li> </ul>	<ul> <li>Full touchless experience: voice</li> <li>Hyper Personalization</li> <li>Immediately &amp; continuously available</li> <li>Better/faster understanding images, language, videos</li> <li>Democratization of</li> <li>Data</li> <li>Technology</li> <li>Intelligence</li> </ul>	<ul> <li>Smart search platforms</li> <li>SAAS</li> <li>Aggregators</li> <li>Enhance social interaction &amp; comm</li> <li>General increase in quality of living <ul> <li>GDP/capita doubled in last 25 years in EU)</li> <li>Globalization</li> </ul> </li> </ul>	<ul> <li>Hyper Personalization</li> <li>Decision making</li> <li>War for talent</li> <li>Meetings, collaboration</li> <li>3D modelling</li> </ul>
Efficiency	<ul> <li>Transactions</li> <li>Valuation</li> <li>Taxation</li> <li>Land registry</li> <li>Capital markets</li> <li>Data security</li> <li>Build cost</li> <li>velocity</li> </ul>	<ul> <li>Measure live</li> <li>Performance based</li> <li>Mobility</li> <li>Data in the cloud</li> <li>Smart cities</li> <li>Workspace monitoring</li> <li>velocity</li> </ul>	<ul> <li>Prediction</li> <li>Velocity</li> <li>Automation of process</li> <li>Sustainability</li> <li>Climate change</li> <li>Facial Recognition</li> <li>Robotics (faster build)</li> <li>Smart World (drones)</li> </ul>	<ul> <li>Collaboration</li> <li>Integration</li> <li>Urbanization / Concentration</li> <li>Real estate of the future will be CONNECTED</li> </ul>	<ul> <li>Virtualization</li> <li>Sales process</li> <li>Development process</li> <li>Company process</li> <li>Conceptualising (BIM)</li> </ul>

## A UNIQUE MOMENTUM

## FOR PROPTECH IN EUROPE



# WHAT IS PROPTECH?

### PropTech includes all innovations (technologies or business models) in the real estate value chain (construction and property industries)



It includes all the asset classes (residential, retail, office, logistics, hospitality, healthcare...)

Dirk Paelinck, Chairman European PropTech Association

#### PROPTECH SUBCATEGORIES

### **5 SEGMENTS COVERING THE VALUE CHAIN OF RE**

This category covers the beginning of any real estate project, the selection of the site, the investment and financing phase.

FINANCE &

INVEST

This category covers the design of the buildings, the execution of the construction works, up to the handover of the buildings.

DESIGN &

BUILD

This category covers the commercialization of the building.

MARKET &

TRANSACT

This category covers the management of the buildings, as operator, property manager, facility manager, asset manager.

MANAGE &

OPERATE

This category covers any new technology, or service (access controls, air quality monitoring, community management solutions) impacting the end-user experience.

LIVE &

WORK





**SPACEFLOW** 

### A UNIQUE MOMENTUM

### **3123 PROPTECH STARTUPS & SCALEUPS IN EUROPE**

#### Distribution of the startups per category in EU



MATURITY BY SUB CATEGORY 2021



#### WHY PROPTECH - WHY NOW?

### PROPTECH IS STILL EARLY

### Proptech is now where Fintech was 8 years ago Company formation growing at CAGR 44,8%



European PropTech Association – PropTech House

## A UNIQUE MOMENTUM

	REGULATION & FINANCE	ІМРАСТ	
EU GREEN DEAL	<ul> <li>imposes strict climate measures on real estate</li> <li>goals can only be achieved through adoption of technology</li> <li>double renovation rate (0.4%-1.2% to +2%)</li> <li>will accelerate the already exponential growth of Proptech</li> </ul>	EU Green Deal will	
<b>NEXT GENERATION EU</b> considers the twin green and digital transitions being at the top of the agenda	<ul> <li>the 2 top priorities for EU Commission: digital and green</li> <li>PropTech sits at the crossroads</li> <li>€1.85trillion to boost the economy in the Eurozone (=12% of EU GDP)</li> <li>25% of the EU budget will be spent on climate investments and additional funding for Horizon Europe</li> </ul>	make EU PropTech market explode	

# What are you struggling with in your international expansion?



Current regulations = challenge for PropTechs but EU Green deal regulation will be a catalyst for PropTechs



European **PROPTECH** Association

Proptech house



- ) Startup Europe Awards 2020
- O Timeline
- ) Mission
- O Categories
- ) Partners
- Why Apply
- News

# The European PropTech Association – PropTech House

Our mission is to support a sustainable European PropTech market and to create a positive impact on the European living environment and beyond. Our objectives: to scale up cross-border collaborations, to standardise the European PropTech markets, to create a legal framework adapted to PropTech, to foster innovation in Real Estate and to facilitate access to funding.

#### PROPTECH STARTUP & SCALE-UP EUROPE AWARDS 2020

DOWNLOAD OUR EBOOK

DOWNLOAD OUR EBOOK



Council

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PROPTECH

SouthEastEurope

Italian PropTech Network

gpti

Proptech Foundation

Dirk Paelinck – Chairman European PropTech Association

### EUROPEAN PROPTECH ASSOCIATION

- Non Profit alliance of national/area PropTech associations
- Mission: Support a sustainable European PropTech market which creates a positive impact for all country/area PropTech hubs
- First Goals:
  - Standardise the fragmented EU PropTech market
  - Create a legal framework adapted to PropTech in Europe
  - Working with DGs of EC + EIF to grow the industry
  - Promote contacts at EU level
  - Scale up cross border collaboration
  - Facilitate access to EU funding/subsidies





**CONCLUSION:** 

## **PROPTECH ADDS VALUE TO**

real estate

- environment
- society

## The bigger picture



Dirk Paelinck, Chairman European PropTech Association – PropTech House
### Climate tech investment per HQ region



Europe is now the fastest growing region for climate tech, with investment growing seven times since 2016.

Source: Dealroom.co

Dirk Paelinck, Chairman European PropTech Association

euronews.

# European climate tech startups raised a record \$11B in 2021: a 2.2x increase on 2020.

Investment into European climate tech startups

\$0-1M (pre-seed) \$1-4M (seed) \$4-15M (Series A) \$15-40M (Series B) \$40-100M (Series C) \$100-250M \$250M+



## PATH TO NET ZERO

## IMPACT INVESTMENT FUNDS

# SimpliCity

INVESTING IN THE SHAPERS OF TOMORROW'S SUSTAINABLE CITIES

## 100 MIO EUR IMPACT FUND CLIMATE TECH

Dirk Paelinck Partner

## WHAT IS IMPACT INVESTING?

"Impact investments are investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return"

Source : Global Impact Investing Network



### → Guest speaker

### Anil Sawhney PhD PMP FRICS FHEA

- Global Lead for the Construction and Infrastructure Sector at the Royal Institution of Chartered Surveyors (RICS).
- Construction and infrastructure sector expert, educator, researcher, and ConstructionTech enthusiast.
- Adjunct Faculty at Columbia University and University of Southern California
- Visiting Professor at Liverpool John Moores University





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Space for Green Construction



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## Data and technology for the built environment lifecycle

Anil Sawhney, Ph.D. PMP FRICS FHEA Global Construction Sector Lead

September 21, 2022



Vision Role of Data and Technology

Current State

Path Forward





Vision



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**#BuildingforEveryone** accelerate the Sustainable Development Goals and sustainable built environments for everyone, everywhere

**#Building for the planet** urgently addressing climate, health and food crisis

**#Building for communities** 

urgent action to address social outcomes such as affordability and equity

**#Building for economies** 

accelerating a more circular and regenerative economy

Can our sector achieve this vision without data and technology?



Role of Data and Technology



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## Crucial role of data and technology



## Edge data during construction

Source Latium Technologies https://latiumtech.com/job-site-insights/





Current State



## How much data are we talking about (~2019)?



Large infrastructure projects requiring an average of **130 million emails, 55 million documents, and 12 million workflows** 



**95.5 percent** of all data captured goes **unused** 



13 percent of construction teams' working hours are spent looking for project data and information



30 percent of engineering and construction companies are using applications that don't integrate with one another Consistent use of processes and practices driven by digitalisation versus improvements resulting from digitalisation



🔵 Use (most projects and all projects) 🛛 🔵 Use (none of our project) 🔹 Improvements (strongly agree and agree)

Your organisation in terms of sharing data and information with other project team members about materials, products and systems via digital models on your current projects:





Path Forward



## Construction 4.0 Framework



## Digital thread

"Digital Thread can be viewed as containing all the information necessary to generate and provide updates to a Digital Twin."



Source: Victor Singh and Karen E. Willcox. "Engineering Design with Digital Thread," AIAA 2018-0569. 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. January 2018.

## Things We Need to Address

Data & technology central to digitalization of our sector

Common principles and standards are crucial

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Value data and demand data-enriched processes, practices, and assets

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Convert data into information, knowledge, and understanding



Focus on performance and outcomes (reduce emissions, reduce waste, etc.)



Sort out contractual, technological, and cultural issues



# Thank you.

Email <u>asawhney@rics.org</u>





## Space for Green Construction Topics of Relevance

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## Topics of Relevance

Commercially sustainable services to help reduce emissions and waste across the construction lifecycle:

- Design, Produce, Construct
- Operational Use
- End-of-Life
- Beyond-the-Lifecycle



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## Design, Produce, Construct

This topic invites solutions supporting sustainable practices and ensuant outcomes in the design, production and construction stages of the construction lifecycle.

#### Design

- site assessments, simulations and selection (from a geological, topographical, hydrogeological, meteorological, geophysical, economic and practical standpoint)
- integrating infrastructure sustainability into early design (waste management, carbon offsetting...)
- material and component selection based on future sustainability potential (recycling/reusability).
- Construction methodologies and technologies to be used and sourced

#### Produce

Related to construction material producers – cement, steel, asphalt, aluminium, glass...)...

- support the integration of renewable energy sources and alternative fuels.
- condition monitoring of site equipment and streamlining of operations.
- measurement and tracking of transportation of materials
- support the deployment of carbon capture technologies and other carbon offsetting mechanisms.
- cleaner raw material extraction solutions.
- support market oversight / balancing material supply and demand.

### Construct

- digital twins of construction sites and lifecycles.
- integration of robotics into construction processes.
- support to modular construction.
- emissions and waste • management and monitoring.
- construction activity monitoring, optimisation, oversight...

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space solutions



### **Operational Use**

Use, maintenance, repair, refurbishment and replacement of assets pertaining to the infrastructure with the goal of sustainability, upkeep and revitalisation of the infrastructure in question.

- Real-time insights into structural integrity and health.
- Dynamic models and visualisations of infrastructure to aid maintenance and re-work efforts.
- Monitoring and reduction of emissions and environmental impact of infrastructure.
- Systems to recycle or reduce operational waste production
- Waste and emissions offsetting mechanisms and technologies...



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![](_page_61_Picture_9.jpeg)

### End-of-Life

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The end of the useful life of the infrastructure when followed by re-purposing, refurbishment, deconstruction or demolition and disposal of the constituent assets. Services supporting sustainability improvements in this stage should be pursued:

- Less emission-intensive and wasteful demolition processes.
- Effective deconstruction processes.
- Facilitate an ecosystem in which the infrastructure designs are better informed for future deconstruction.
- Improve waste quantification, removal, transportation and general management during deconstruction/demolition activities.
- Propose alternative approaches to end-of-life decommissioning of infrastructures.

![](_page_62_Picture_7.jpeg)

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## **Beyond-the-Lifecycle**

Beyond-the-lifecycle comprises greenhouse gas emissions savings and waste prevention stemming from circular economy activities including reuse, recycling and recovery of infrastructure assets.

- Novel business models supporting circular construction marketplaces and material and component reuse.
- Identification and mapping of infrastructure, materials and components.
- Support establishment of materials passports.
- Construction supply chain tracking, optimisation and integration.

![](_page_63_Picture_6.jpeg)

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## Value of Space

#### SatNav

- Tracking of machinery, vehicles, people, equipment...
- Geo- and time-stamping of data from drones, IoT sensors...
- Site surveys / measurements
- Machine control (graders, dozers, excavators...) and navigation of robotics

#### SatEO

- Mapping information, boundary/feature delineation and change detection
- Air quality measurements
- Flood and land subsidence risk
- Soil quality and land characterization
- Heat signatures and fire detection
- Weather forecasting
- Digital elevation/surface models and topography measurements

#### SatCom

- Connectivity for remote construction sites (e.g. offshore, rural/remote areas...)
- Back-up connectivity to terrestrial communications

#### Spaceflight Technologies

 Technologies designed for use in space – advanced materials, additive manufacturing, robotics, clean energy technology, waste management, recycling and reuse technologies...

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![](_page_64_Picture_20.jpeg)

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![](_page_65_Picture_0.jpeg)

## ESA Business Applications Example Activities

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![](_page_65_Figure_2.jpeg)

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![](_page_65_Picture_4.jpeg)

## Virtual Post-It (Kick-Start Study)

![](_page_66_Picture_1.jpeg)

The Virtual Post-It solution will allow construction foremen and technical building inspectors to create GNSS-anchored, interpersonal digital error messages or "virtual post-its" during the review of construction work. Such GNSS-anchored digital error messages are linked to the location of rework in 3D space until the requested rework has been completed.

**Targeted Users:** Construction foremen, technical building inspectors...

Industrial Consortium (HU): Prime: Pro Environ

- Save time
- Reduce communication errors
- Record of all works carried out/reworks required

Satellite Positioning: Geolocalisation of the virtual post-its

![](_page_66_Picture_9.jpeg)

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## Mylo (Demo Project)

**mylo** provides a cloud hosted SaaS (Software as a Service) application for construction companies to manage the project delivery process. The solution consists of a web application for project administration, planning, and reporting, that can be accessed by all associated participants. It also consists of a mobile application to be used by sitebased teams to evidence completed work, record delay data, create and claim variations, problem solve in real time, and monitor QA (Quality Assessment) gatekeeping.

Targeted Users: Construction companies

![](_page_67_Picture_3.jpeg)

- Real-time visibility of construction activity
- Improved planning and project delivery
- Reduced delays, saved time and costs
- Transparency of issues and progress

Industrial Consortium (IE): Prime: LLO Ltd Subco: IGALE LTD, LOKOMOTIV Group SatCom: reliable connectivity for construction sites (areas lacking terrestrial options or facing signal disruption)

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### EO4Belmap (Demo Project)

gim < sirris

**Belmap**, a 3D digital twin of the built environment. A database of all buildings and addresses within Belgium and its neighbouring countries with a multitude of linked data variables. It provides the most accurate, complete and up-to-date location-related insights on buildings and addresses for the Benelux. GIM is extending Belmap using EO derived information exploiting advanced artificial intelligence techniques and creating the following 4 Belmap product extensions: Greenfields, Building Age, Gardens, Roofs. The solution targets several sectors: insurance and finance, renewable energy, utility and telecoms, real estate & construction, geo-marketing & data brokers.

#### Industrial Consortium (BE):

Prime: GIM

Sub-contractor: Sirris

- Save time spent collecting relevant data
- Derive new insights on building and address features
- Single source for up-to-date location information

Satellite Earth Observation: Identification and mapping of locationbased building data

![](_page_68_Picture_10.jpeg)

→ THE EUROPEAN SPACE AGENCY

## GeoSHM (Demo Project)

**GeoSHM - GNSS and Earth Observation for Structural Health of Monitoring of Bridges -** is a structural integrity monitoring solution targeting bridges primarily in the UK, US and China to ensure their safety. The system measures and quantifies all the excitations applied to a structure to estimate its behaviour based on its response and comparisons with theoretical designed thresholds of the structure function. The solution sold during the project, created >15 new jobs and is in operation on bridges in the UK and China.

**Targeted Users:** Bridgemasters, Infrastructure managers, public authorities, engineering and maintenance contractors, academics and researchers

- Improve safety of bridges
- Reduce maintenance costs
- Service operational in U.K. and China

Industrial Consortium (UK): Prime: Ubipos Subco: University of Nottingham, Leica Geosystems

![](_page_69_Figure_7.jpeg)

SatEO: InSAR data to measure subsidence of the structure and displacements

![](_page_69_Figure_9.jpeg)

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Activity	Content	Link
Space for Buildings (Feasibility Study)	Real-time insights into the pollution levels in and around buildings.	Space For Buildings   ESA Business Applications
ConsTrack - Taking Stock of the Construction Industry (Demo Project)	Oversight of and insights into construction activities at the macro-scale.	ESA Business Applications ConsTrack   ESA Business Applications
Buildspot (Demo Project)	Operational tool based on satellite imagery to detect, monitor construction sites and quantify urban areas.	Buildspot   ESA Business Applications
Optimal Cities (Kick-Start Activity)	GIS-based tool to support users in visualizing the "health" of cities (in terms of various parameters including green space, air quality, availability of amenities). (GIS – Geographical Information System)	OPTIMAL CITIES   ESA Business Applications
Orbital Assets (Kick-Start Activity)	Insights on building components and material type, including through analysis of colour, texture, typology, age, location, etc. and assessments of building health and condition to support a circular construction economy.	Orbital Assets   ESA Business Applications
Climate-Proofing of Buildings (Feasibility Study)	Combination of geographical and meteorological information with advanced machine learning algorithms to provide users with site-specific climate data.	Climate-proofing of buildings   ESA Business Applications

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Activity	Content	Link
Mylo (Demo Project)	mylo provides a cloud hosted SaaS (Software as a Service) application for construction companies to manage the project delivery process.	mylo   ESA Business Applications
inSAR4insurance (Kick-Start Activity)	Application providing insights into ground stability of the client's area of interest, assessing not only the risk of the territory to move or fail, but the long-term trend of such movements and related statistical information.	inSAR4insurance   ESA Business Applications
Building Stock Monitor Service (Kick-Start Activity)	Building Stock Monitor Service is a service to aid municipalities with monitoring the entire building stock within their geographical borders.	Building Stock Monitor Service
Virtual Post-It	The Virtual Post-It solution will allow construction foremen and technical building inspectors to create GNSS-anchored, interpersonal digital error messages or "virtual post-its" during the review of construction work. Such GNSS-anchored digital error messages are thus linked to the location of rework in 3D space until the requested rework has been completed. (GNSS – Global Navigation Satellite System)	Virtual Post-It   ESA Business Applications

![](_page_71_Figure_1.jpeg)

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####


## How to Apply (1/2)





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## How to Apply (2/2)



The Letter of Invitation to Call for Proposals is issued on ESA-Star Publication ( Doing Business with ESA ) under 'AO 11518' and includes:



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### Authorisation from National Delegations

- The authorization from National Delegation for the specific Thematic Call against which you submit your Proposal is an admissibility criterion. Proposals not authorized at the closing date of the Thematic Call will not be admitted for evaluation
- For each individual Thematic Call, dedicated clarifications will be posted in ESA-Star Publication to provide information on the list of Member States that have already provided their pre-authorization to the Thematic Call
- In case your company/organisation resides in a country which has not provided a preauthorization to the Thematic Call you are interested in, you need to contact your National Delegation. The contact information of the National Delegations can be found at https://business.esa.int/national-delegations

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## → Proposal template

Your Proposal shall include the following information:

- 1. TECHNICAL PART
- 2. MANAGEMENT, ADMINISTRATIVE AND IMPLEMENTATION PART
- 3. FINANCIAL PART

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4. CONTRACTUAL PART



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**European Space Agency** 



## Thank you!

# For more information:

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

Christopher.Frost-Tesfaye@esa.int

After 15<sup>th</sup> November 2022: Submit Questions through ESA-Star



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**European Space Agency**