

USB Grant Case Studies

Overview of Grant Projects



Table of Contents

01	Overview of Unlocking Space for Business Programme
----	--

Transport & Logistics

02	Shipping Strategy Limited – Risk scoring for maritime insurance
----	---

03	Sports City Management Company – Enhancing fan travel to Etihad Stadium
----	---

Financial Services

04	Admiral – Subsidence hazard risk score
----	--

05	Equitix Limited – Renewable energy resilience
----	---

06	Foresight Group – Nature and climate management and disclosure
----	--

07	Frontier Insurance – Residential property roof assessment using satellite imagery
----	---

08	Level E Research – Utilising earth observation data to derive an AI Risk Index
----	--

09	Octopus Investments – Natural capital due diligence
----	---

10	Safe Earth Solutions – Nature investment monitoring
----	---

11	WieldMore Investment Management – Environmental risk evaluation
----	---

Overview of Unlocking Space for Business Programme



‘Unlocking Space for Business’ is a UK Space Agency pilot programme launched in October 2023 to support businesses to:

- **Better understand and prioritise** how innovations in satellite data and services, combined with complementary data sources, can drive businesses benefits
- **Connect** with leading data suppliers, aggregators, technology integrators and insight providers
- **Apply** for Government funding to support the delivery of benefits from satellite data and services, through pilot projects, data procurement or partnerships

 The focus sectors have been **Financial Services** and **Transport & Logistics**

What has been on offer for businesses through this programme?

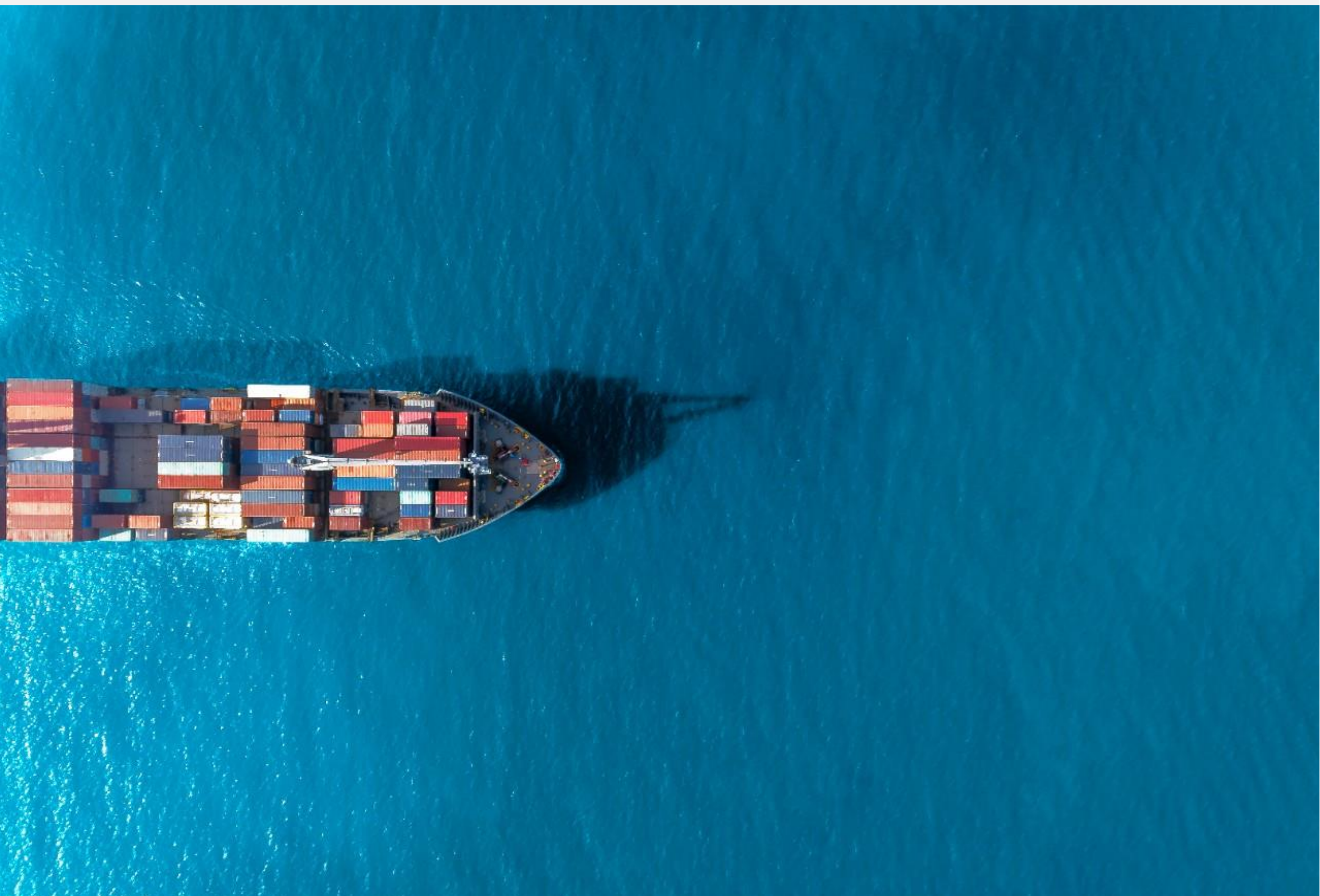
Information Hub	Insight and Networking Events	Exploration Workshops	Learning and Development	Funding Call
Access to insights on how businesses can unlock value from satellites, with examples of activity from across the world	Interactive events that bring together customer and supplier ecosystems to connect and explore business opportunities	Expert perspectives to help your business identify, prioritise, and prepare to further benefit from satellite data and services	Online and in-person learning to enhance business capabilities in buying, integrating, and exploiting satellite data and services	Apply for Government funding to launch innovative pilots, acquire new data, and start delivering benefits for your organisation
<ul style="list-style-type: none"> • Insights and global success stories on how businesses are benefiting from satellite data and services • Information about the programme and opportunities to get involved • Insights provided through Events, Workshops, Learning & Development and Funding Call 	<ul style="list-style-type: none"> • Expert panels and live demonstrations from leading satellite data and service providers • Enhanced connections and collaboration opportunities with suppliers and integrators • Cutting-edge discussions and help shape UK direction on new use cases 	<ul style="list-style-type: none"> • Tailored expert guidance on potential areas where satellite data and services could drive significant impact • Discussions on how sat data can help address key business challenges for your organisation • Identification of Business case and delivery plan with cross-functional stakeholders 	<ul style="list-style-type: none"> • Access to a range of experts on how to buy and maximise the value of data and services • Online learning materials on the topics of choice • Better understanding of the success factors required for organisation’s journey 	<ul style="list-style-type: none"> • Funding to support partnerships and projects using satellite data and services • Support to launch pilots and turn opportunities into reality for your business • Brand strengthening opportunities as a leading innovator

Who are the organisations that engaged with the USB programme?

<p>350 unique organisations engaged through USB programme initiatives</p>	<p>160 Of the participating organisations were from ‘non-space’ sectors</p>	<p>35 were publicly listed companies</p>	<p>27 end-users participated in exploration workshops</p>
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Transport and Logistics



Transport & Logistics **Risk scoring for maritime insurance**
Assessing short-term risk factors of maritime incidents using earth observation insights led by Shipping Strategy Ltd

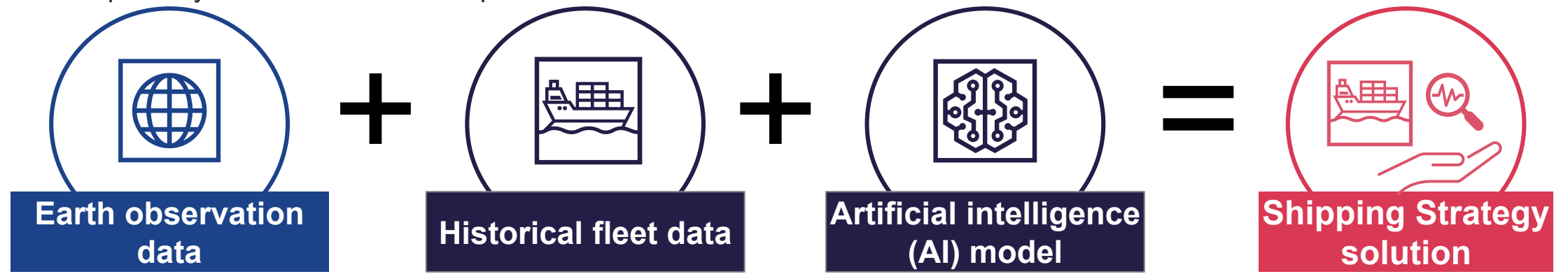


Situation **Consortium members**

- Hull and machinery insurance is mandatory for all ships globally, with premiums determined by past claims and limited technical data. This approach lacks precision, potentially costing ship owners more than necessary.
- **Shipping Strategy Ltd** (SSL) partnered with **AAC Clyde Space** to integrate satellite data with historical ship movement to refine risk assessments.
- The data is fed into an artificial intelligence (AI) model developed by **Morphing.ai** that will model conditions during past claims events to assess the risks for any vessel on any given day. By publishing this information in a time-series format, the solution increases transparency to the risk evaluation process.



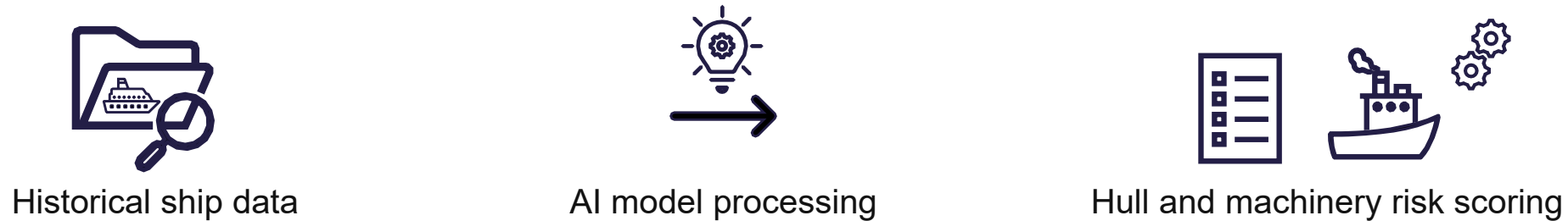
Morphing.ai



Actions taken by Grant Project

- 1 Identifying partners**
 The project required expertise in both satellite data and AI model development, making it essential for Shipping Strategy to find the right partners for effective collaboration. AAC Clyde Space offered to provide satellite data, and SSL connected with Morphing.ai, their AI partner, through a mutual contact.
- 2 Market research**
 Although initial outreach to insurers through surveys and interviews yielded limited results, Shipping Strategy started to engage with senior management directly, which garnered more participation in market research.
- 3 Field testing**
 Shipping Strategy identified a small group of users to field-test the solution, focusing on validating its effectiveness and confirming it meets practical applicability. This will allow Shipping Strategy to assess the solution's performance in real-world scenarios and further refine the model.

Solution developed by Grant Project



This hull and machinery risk scoring was innovative in several ways:

Integration of satellite and terrestrial data

The solution uniquely combines satellite data, including real-time ship locations and historical movements, with terrestrial data such as global weather and sea-state conditions. This integration allows for dynamic, day-to-day risk evaluations, offering insurers and ship owners precise, actionable insights that were previously unavailable.

AI-powered back-modelling for enhanced accuracy

The solution leverages AI to back-model conditions during past claims events, enabling it to learn from historical data and provide predictive risk assessments. This innovative use of AI enhances the accuracy and reliability of risk scoring, surpassing traditional methods that rely solely on past claims data.

Transport & Logistics

Risk scoring for maritime insurance

Assessing short-term risk factors of maritime incidents using earth observation insights led by Shipping Strategy Ltd



Impact from Grant Project



Increased operational efficiency

Shipping Strategy's solution optimises insurance pricing by providing precise, data-driven risk evaluations, streamlining the renewal process for insurers and ship owners, and reducing the time and resources required for policy adjustments.



Increased safety for ship owners

By offering transparent risk assessments, the solution encourages ship owners with higher risk scores to implement safety improvements, reducing the likelihood of collisions, groundings, and associated incidents.



Risk reduction and enhanced resilience

The solution has the potential to enhance fleet resilience by enabling insurers and ship owners to identify and mitigate risks proactively, ensuring more reliable operations and minimising the financial and environmental impact of potential accidents.

Lessons learnt from Grant Project

Data quality

A key takeaway from the project was the critical role of data validation and verification. The project reinforced the importance of accurate and reliable data in developing a robust AI model to deliver meaningful risk assessments as the product.

Stakeholder engagement

Shipping Strategy saw that initial outreach methods, such as surveys and cold calls, were less effective in engaging insurers. A shift to direct engagement to C-suite proved more successful, highlighting the importance of targeting decision-makers to build support for innovative solutions.

Next steps and commercialisation plan

Develop strategic partnerships

Shipping Strategy is focusing on engaging a wider group of relevant stakeholders, particularly at the C-suite level, to demonstrate the solution's value. This targeted approach aims to build support and drive adoption within the insurance sector and related industries.

Continue testing with selected users

As part of their commercialisation plan, Shipping Strategy has identified a small group of users to field-test the solution. By using real-world data within the system, they aim to validate its effectiveness, refine the model, and showcase its practical applicability to potential customers.

Engagement with USB Programme

Networking Events

Supplier Insight Events

Shipping Strategy attended the 2024 Supplier Insights Event held at Leicester Space Centre.

"It was useful to hear success stories and other participants' challenges."

Transport & Logistics	Enhancing fan travel to Etihad Campus <i>EventGo 5.0 AI-enabled earth observation for travel demand management led by Sports City Management Company</i>	Sports City Management Company
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Situation Consortium members

- EventGo 5.0 (EG5.0) aims to reduce congestion and carbon emissions associated with travel to large-scale events.
- This problem is significant to the transport sector as event-related travel often leads to operational inefficiencies, environmental impacts, and negative visitor experiences due to overcrowded routes and insufficient transport services.
- The push for sustainable travel emphasizes the importance for EG5.0, aligning with the sector's need for innovative tools to promote low-carbon, efficient transport systems.
- The motivation to use satellite data, stems from the capability to provide comprehensive, real-time insights into spatial and environmental factors influencing travel demand.

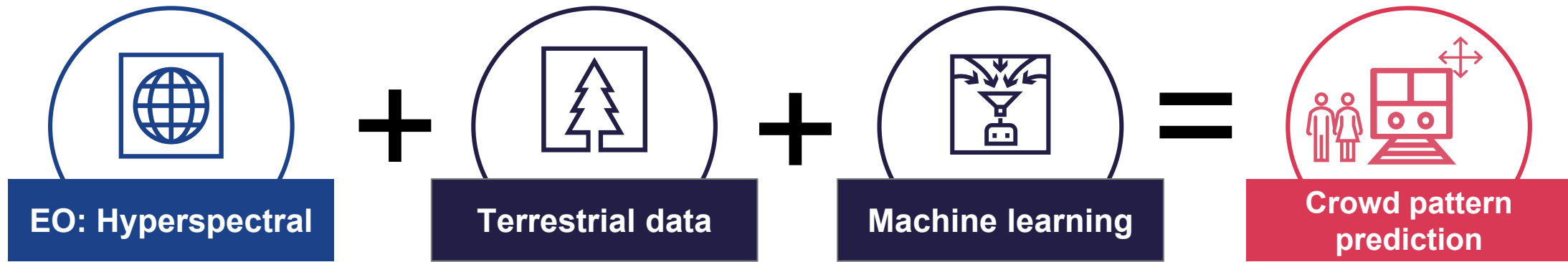


You. Smart. Thing.



Transport for Greater Manchester

ETIHAD
CAMPUS

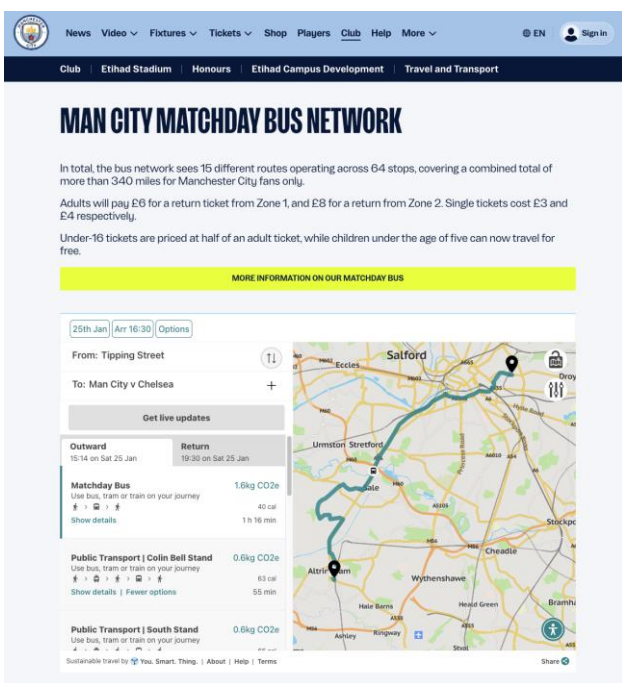


Actions taken by Grant Project

<p>1 Establishing partnerships</p> <p>In 2023, You. Smart. Thing. was selected to collaborate with Transport for Greater Manchester (TfGM) to supply cutting-edge multi-modal journey planning technology. Recognising the opportunity to address matchday travel challenges, TfGM facilitated a partnership with Sports City Management Company (SCMC).</p>	<p>2 Developing and prototyping</p> <p>In developing and prototyping the EG5.0 solution, efforts have been made to integrate personalised journey planning tools to cater to the specific needs of event attendees. Manchester City fans were involved in usability tests, through structured tasks and interviews that provided actionable feedback to inform key design improvements.</p>	<p>3 Live demonstration programme</p> <p>The EG5.0 solution has undergone a 5-month live demonstration programme led by SCMC and TfGM. Leveraging advanced travel demand management technology, the programme aims to optimise transport for diverse events at the Etihad Campus, including football matches and concerts.</p>
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Solution developed by Grant Project

The EventGo 5.0 solution was innovative in several ways:



Integration of satellite data with machine learning




EG5.0 uniquely combines satellite imagery with terrestrial data, such as event schedules and fan travel demand, using machine learning to create a predictive model for travel management. This approach enables precise predictions of travel patterns, optimisation of routes, scenario modelling, and helps manage congestion.

Personalised journey planning tools for attendees

The solution plans to incorporate personalised journey planning tools tailored to the specific needs of event attendees. By integrating these tools into fan communication platforms, such as emails and club websites, EG5.0 enhances user experience, encourages the use of public transport, and promotes sustainable travel behaviours.

Transport & Logistics	Enhancing fan travel to Etihad Campus <i>EventGo 5.0 AI-enabled earth observation for travel demand management led by Sports City Management Company</i>	Sports City Management Company
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Impact from Grant Project

 <p>Increased travel management efficiency</p> <p>EG5.0 optimises travel management during large-scale events by predicting travel patterns and addressing congestion points in advance. This improves the efficiency of public transport services, parking utilisation, and overall event logistics.</p>	 <p>Promotion of safe travel behaviours</p> <p>By proactively managing travel demand and mitigating congestion, the solution contributes to risk reduction, particularly in scenarios involving high visitor volumes and dynamic travel conditions. The solution will support event operators and attendees by improving crowd flow management, thus ensuring safety during large-scale events.</p>	 <p>Enhanced visitor experience</p> <p>By integrating personalised journey planning tools and providing real-time travel insights, EG5.0 improves the overall experience for event attendees, ensuring smoother, more convenient journeys to and from venues.</p>
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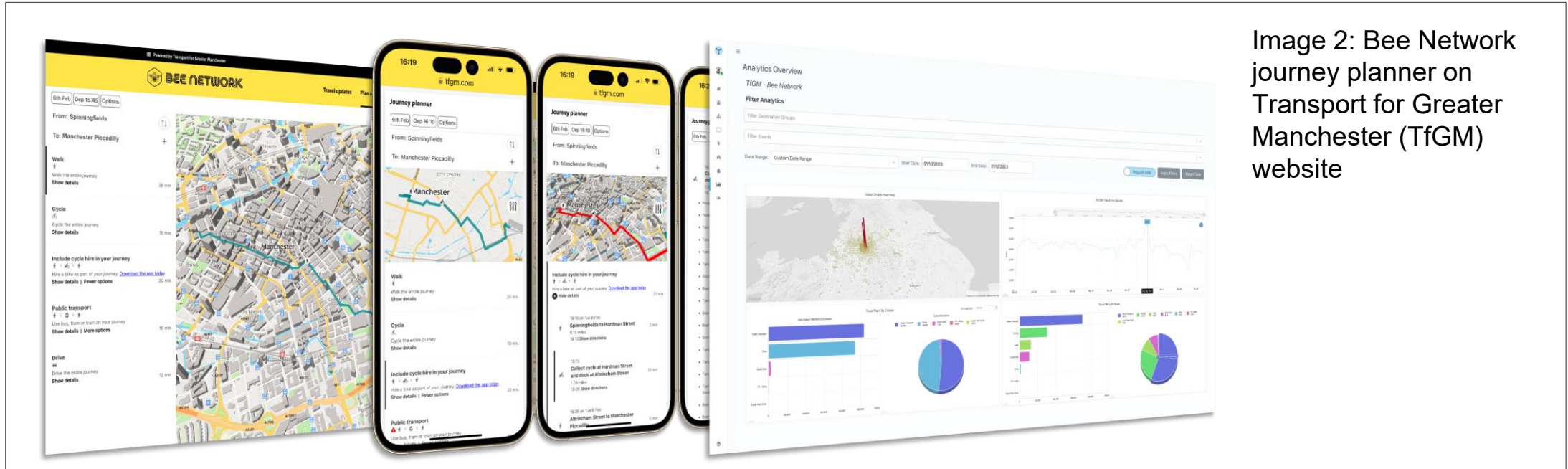


Image 2: Bee Network journey planner on Transport for Greater Manchester (TfGM) website

Lessons learned from Grant Project

<p>Access to satellite data has been limited</p>	<p>This presented a challenge in aligning available data with the key dates and times of Manchester City home fixtures, which impacted the ability to accurately capture and analyse expected traffic flow for ingress and egress on match days. The utility of satellite data depends heavily on its availability and temporal alignment with specific events.</p>
<p>Satellite imagery resolution on specific dates/times</p>	<p>Obtaining high-resolution imagery that matches the exact schedule of match days has proven difficult, partly due to the infrequent revisit rates of certain satellites and the cloud cover that can obstruct visibility. This necessitated the inclusion of alternative data sources, such as terrestrial data and historical travel patterns, to supplement gaps in satellite-derived insights.</p>

Next steps and commercialisation plan

<p>Expanding deployment</p> <p>SCMC plans to expand the solution's use to other major trip generators in Manchester, including stadiums, hotels, and entertainment venues. By demonstrating its effectiveness in managing transport demand during peak periods, they aim to position the solution as a scalable tool for diverse high-traffic locations.</p>	<p>Generating additional revenue</p> <p>The commercialisation strategy also includes leveraging advertising and sponsorship opportunities within the platform. This approach aligns with broader commercial objectives, while creating sustainable revenue streams to support the solution's long-term implementation and growth.</p>
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Financial Services



Financial Services

Subsidence hazard risk score

Monitoring property subsidence risk at scale using satellite radar data led by Admiral



Situation

- **Admiral's** solution addresses subsidence, a natural hazard causing extensive damage and expensive repairs. Traditional monitoring methods are invasive and costly. Admiral's approach measures the vertical movement of properties from low earth orbit, identifying past subsidence and future risks without extra ground materials. This reduces claim costs and is less invasive for customers.
- This project is the first attempt to assess UK property subsidence at scale using satellite data. By observing historical property movements, Admiral can confirm that movement has stopped after repairs and identify future risks without human intervention.

Consortium members



Actions taken by Grant Project

1 Identifying an EO partner

Following USB exploration workshops Admiral identified **SatSense** to have the needed expertise in processing satellite data into a digestible state. They are a relatively small company with ties to a university, and Admiral felt this would be a good fit.

2 Leveraging subsidence expertise

Admiral worked with **Optera** who have expertise in the investigation and remediation of subsidence, including experience in using satellite monitoring to identify movement before the claim and in ongoing monitoring once repairs have taken place.

3 Prototype development

EO data is enhanced with overlays of known risk factors which can be applied at a property or local area level. The risk score is underpinned by the observed cyclical movement, the score is validated against Admiral's historic claims experience and the future predictive power validated against recent claims.

Solution developed by Grant Project

This subsidence hazard and InSAR risk score was innovative in several ways:



Historical movement analysis

By looking at the historical movement of a property both before and after a subsidence claim, it is possible to observe the movement that caused the damage and to confirm that the movement has stopped following repairs. The innovative part of this project is the investigation into whether this can be done for all properties in a large geographic area without human intervention.

Leveraging over 10 years' experience in subsidence

Admiral's 10 years of experience in handling subsidence claims, combined with their historic claims data and predictive power, uniquely positions them to develop and validate a subsidence risk score.

Image 1: Satellite imagery showing red dots denoting areas where the ground is sinking

Financial Services

Subsidence hazard risk score

Monitoring property subsidence risk at scale using satellite radar data led by Admiral



Impact from Grant Project



Operational efficiency

In the event of a subsidence claim, Admiral will have data on historic movement in the years leading up to the claim from the satellite record. This reduces the ground monitoring time and has the potential to reduce the severity of the claim by detecting it earlier.



Increased convenience for customers

Remote monitoring is less invasive for customers as no extra equipment needs to be installed at the property. Following repairs, Admiral can continue to monitor the site via satellite, confirming the repairs are effective.



Risk reductions and customer savings

Continuous satellite monitoring post-repairs confirms effectiveness, reducing claim settlement time. The ability to improve customer outcomes aligns with Admiral's aim for market-leading pricing accuracy, particularly in the South East of England where subsidence claims are more frequent.

Lessons learned from Grant Project

Data gaps

Admiral experienced delays due to gaps in satellite data coverage. Allowing time in the project plan to handle this and setting a clear project scope are crucial. This includes assessing the benefits of satellite data and having time to develop and validate a subsidence risk score.

Iterative improvements

Encouraging results have been seen in identifying past subsidence claims using satellite data. The ongoing challenge is iterating the score to make it more future predictive, increasing the value of the solution further.

Next steps and commercialisation plan

Cost-benefit analysis

Once the risk score is fully developed, a cost-benefit analysis will be carried out to ascertain whether buying satellite data to cover more of the UK represents value for money either in terms of predicting future risk at large scale or in monitoring individual properties following a claim.

Integration into BAU

Integrating a new data source into pricing is very much BAU for Admiral, whether it applies to individual properties or a wider area. The decision on whether to invest and expand in this data will depend on the cost-benefit analysis of the final product.

Engagement with USB Programme

Exploration Workshops

Admiral attended two 2024 Exploration Workshops held in PwC More London. *"We engaged in the set of exploration workshops, which were instrumental in our selection of an appropriate use case of satellite remote sensing data for Admiral, and in our subsequent decision to engage with the programme and apply for the grant funding."*

Financial Services

Renewable energy resilience

Building satellite-derived climate models to understand financial impact of changing wind resources led by Equitix

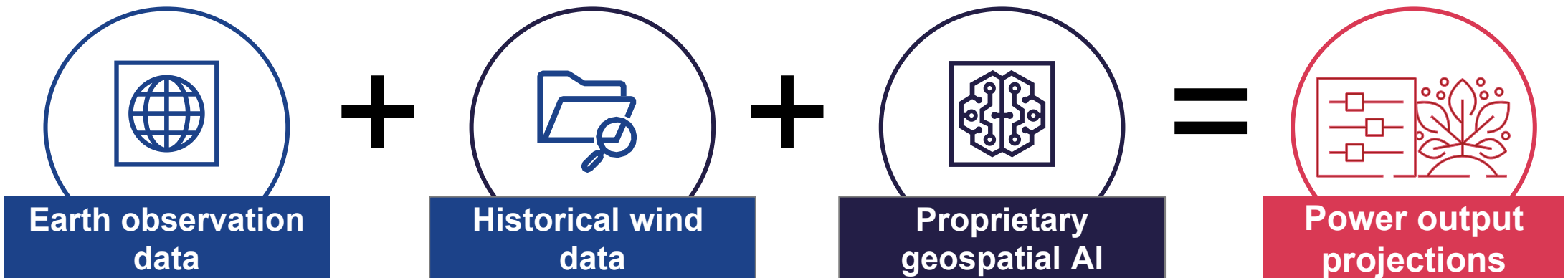


Situation

Consortium members

Sust Global.

- Climate change is set to reshape global wind patterns, with wind speeds potentially changing by up to 30%. This could significantly impact the operations and financial performance of wind assets.
- Recognising the critical importance of these projections, **Equitix** has taken proactive steps to support resilience and profitability of their assets. Changes in wind speeds directly impact energy generation, which in turn can affect asset valuations and returns.
- Equitix partnered with **Sust Global** to build high-resolution wind speed projections using Sust Global's innovative geospatial artificial intelligence (AI) approach and satellite data. Equitix incorporated the projections into their investment processes, developing new climate-adjusted capacity factors.



Actions taken by Grant Project

- Partnership formation**
Equitix partnered with Sust Global to leverage their expertise in satellite-derived observational data and geospatial AI, aiming to quantify climate risks and opportunities in wind energy investments.
- Model development**
Sust Global applied its geospatial AI approach to build climate-adjusted wind power generation projections. To build the projections, Sust Global used a Global Climate Model, geospatial data and bespoke site-level data to create high-resolution wind speed models to project energy generation across Equitix's portfolio.
- Data implementation**
The climate metrics derived from this analysis are intended to be decision-useful and transferable for full integration into the investment lifecycle and risk management processes.

Solution developed by Grant Project

This solution was innovative in several ways:

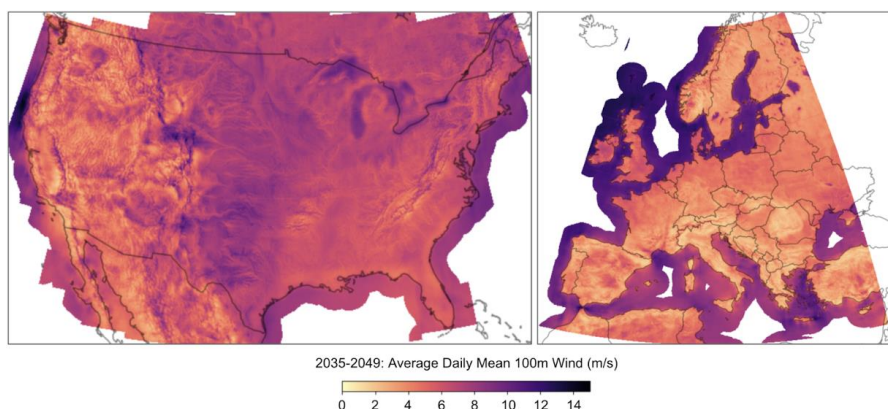


Image 1: Screenshot of wind speed model

High-resolution wind models

Developed wind speed models with a resolution of 5 km, significantly improving over previous models with 100 km resolution. These models integrate satellite and terrestrial data for bias correction and enhanced accuracy.

Data-driven investment processes

Integrated high-resolution climate data into wind energy investment workflows, enabling better risk assessment and decision-making.

Quantitative climate risk insights

Provided actionable insights tailored to Equitix's portfolio management processes, supporting informed investment decisions and long-term resilience in the wind energy sector.



Financial Services

Renewable energy resilience

Building satellite-derived climate models to understand financial impact of changing wind resources led by Equitix



Impact from Grant Project



Risk mitigation

By integrating forward-looking climate data into investment processes, Equitix can proactively mitigate and avoid climate-related risks in its portfolio.



Opportunity scoping

By assessing novel data sources, Equitix can look to optimise returns by identifying and investing in sites where climate change will increase wind speeds and asset performance.



Climate methodology development

Through leveraging the learnings from this project, Equitix can apply climate data to other sectors beyond wind enabling the creation of a company-wide climate methodology.



Image 2: Wind turbines used for wind speed models



Image 3: Wind turbines used for wind speed models

Lessons learned from Grant Project

Climate-informed decision making

Equitix and Sust Global collaborated to develop climate-adjusted asset performance and financial metrics creating key learnings for bridging the gap between climate and finance, a crucial process as the impacts of climate change become more pronounced.

Next steps and commercialisation plan

Commercial expansion

Sust Global is commercialising its wind energy generation models, which are globally available, to support climate-informed decision making across the wind energy sector and facilitate the development of a more resilient energy grid.

Additionally, Sust Global is applying its Geospatial AI approach to other asset classes to enable climate resilience across the infrastructure investment industry.

Integration of climate metrics

Equitix has developed climate-adjusted analytics to inform investment and asset management process and will leverage these to make climate-informed decisions across teams.

Equitix will also apply learnings from this project to other sectors in its portfolio to continue leading on the creation of climate-informed strategies in alignment with the Task Force on Climate-Related Financial Disclosures.

Engagement with USB Programme

Equitix Limited and Sust Global presented at the IPFA Webinar with UKSA in October 2024.

Financial Services

Nature and climate management and disclosure

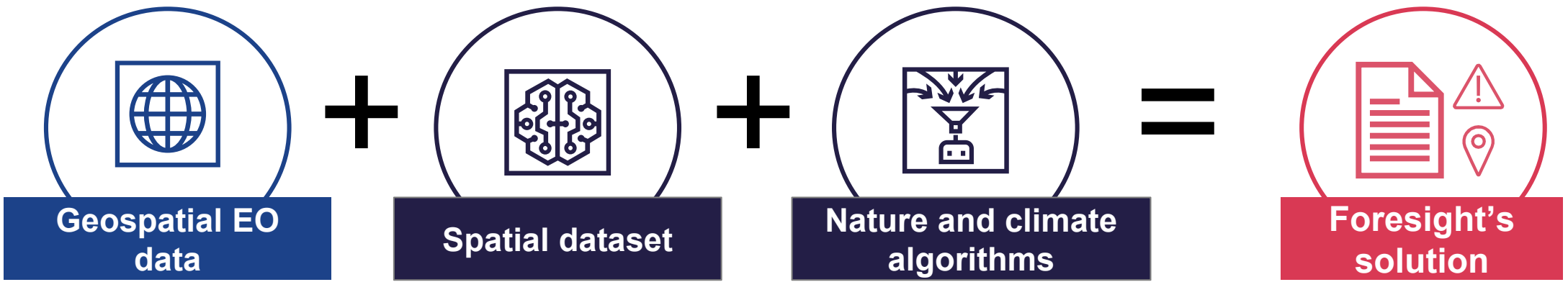
Advancing satellite-derived insights for nature and climate management and disclosure led by Foresight Group



Situation

- Sustainability reporting requirements, including the Taskforce on Nature-Related Financial Disclosures (TNFD) and International Sustainability Standards Board (ISSB), are set to become mandatory. **Frontierra** is helping financial service companies prepare for reporting by developing a robust, data driven platform that can enable integration of nature and climate-related risk into due diligence and asset management processes.
- In collaboration with Frontierra, the **Foresight** Infrastructure Sustainability team are developing a platform that leverages geospatial analysis and Foresight's own spatial dataset to provide detailed, location-based insights, enabling proactive risk management and enhanced reporting capabilities.

Consortium members



Actions taken by Grant Project

1 Partnership evolution

Foresight partnered with Frontierra, building on a pre-existing relationship formed during a pilot TNFD project. Expanding the project through the USB programme was a natural progression, which has been successful due to clear communication and aligned goals that supported the partnership's success.

2 Platform design

The platform was designed with accessibility in mind, catering to users with minimal experience in nature and climate analysis. It generates automated reports that combine Foresight's information with detailed analytical outputs, providing comprehensive insights for asset and portfolio management.

3 Stakeholder feedback

Foresight plans to engage internal stakeholders during the live demo phase to gather critical feedback. This iterative process will help refine the platform to better align with organisational needs and support its effectiveness in day-to-day operations.

Solution developed by Grant Project

This integration was innovative in several ways:

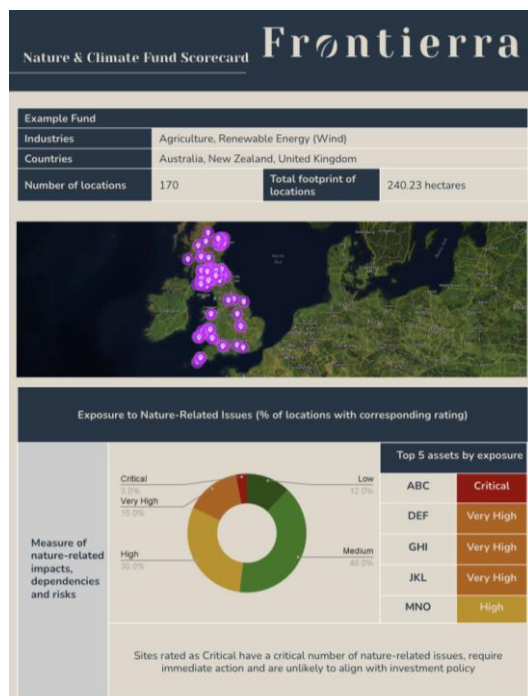


Image 1: Fund level report

Satellite and terrestrial data integration

The platform integrates satellite and terrestrial data, leveraging innovative algorithms to analyse nature and climate-related risks. It delivers detailed, location-specific assessments, fills critical data gaps, and provides actionable insights to enhance asset management and due diligence processes.

Extensive datasets

The use of geospatial data for analysis is still in its early stages within the financial sector, especially when incorporating entire asset footprints. Therefore, analysing Foresight's entire real-asset portfolio footprint with existing data and satellite-derived datasets provides more accurate outputs.

Automated reporting

The tool generates user-friendly, automated reports that consolidate Foresight's information with advanced analytical outputs.

Financial Services

Nature and climate management and disclosure

Advancing satellite-derived insights for nature and climate management and disclosure led by Foresight Group



Impact from Grant Project



Operational efficiency

Automated insights generated by the platform streamline complex analytical tasks, reducing time and effort while delivering bespoke outputs. This efficiency enhances data integration across Foresight's systems, enabling accurate, data-driven reporting and operational improvements.



Risk reduction and resilience

The platform aims to enhance Foresight's ability to identify and analyse both climate and nature-related risks and opportunities. With its global and diverse real assets portfolio, Foresight aims to leverage the tool for proactive risk management, enabling more effective mitigation of nature and climate-related risks.



Regulatory compliance

The platform aims to support Foresight's adherence to emerging mandatory frameworks, such as TNFD, by providing robust, location-specific assessments. These capabilities aim to support comprehensive and accurate reporting against regulatory disclosure requirements.

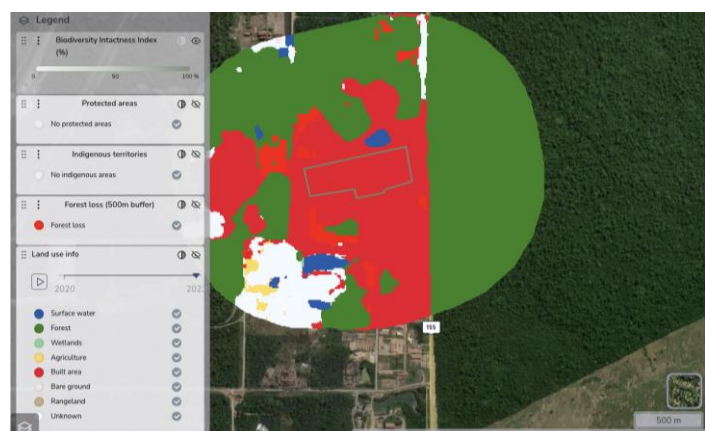


Image 2: Asset level – geospatial data interface

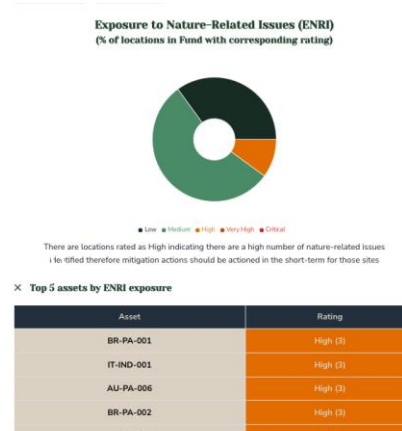


Image 3: Portfolio level - nature ratings and map view

Lessons learned from Grant Project

Simplifying spatial data for stakeholders

Spatial data and analysis can be complex and challenging for non-experts to engage with effectively. To address this, it is essential to prioritise the translation of complex information into accessible, user-friendly formats. Tailoring communication to the varying levels of expertise across stakeholders enables the value and benefits of the data to be clearly understood, fostering greater engagement and organisational alignment.

Next steps and commercialisation plan

Commercial expansion

Frontierra aims to extend the solution's reach by incorporating it into its existing service portfolio. They plan a post-project marketing campaign to raise awareness, submit a case study to TNFD, and participate in industry conferences, leveraging these platforms to highlight its innovative approach.

Integration into BAU

Foresight Group is evaluating the platform's potential for regular use in investment and portfolio management processes. If the platform achieves widespread adoption, the next phase will be to provide refined sector-specific risk analyses to support actionable and tailored insights.

Engagement with USB Programme

Foresight Group participated in a USB Supplier Event in October 2024.

Supplier Insight Events

"The event presented interesting insights on the operational side of the satellite data environment."

Financial Services

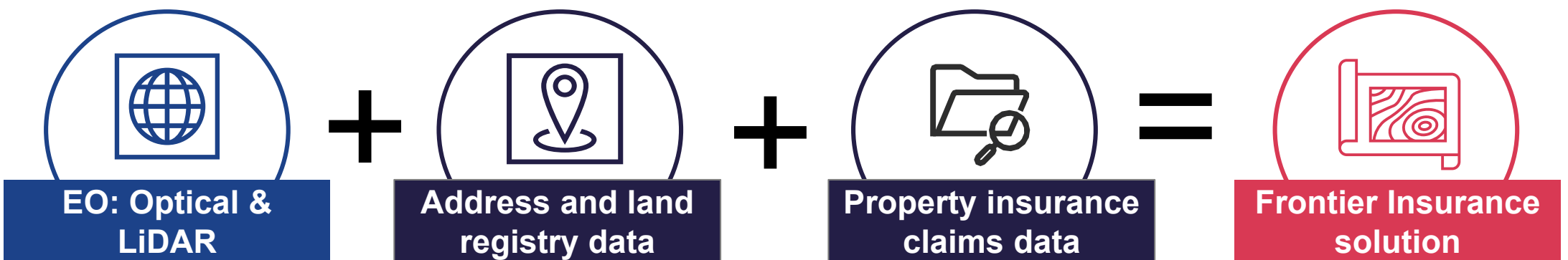
Residential property roof assessment using satellite imagery *Led by Frontier Insurance*



Situation

- For residential property insurance, roof assessments, including identifying high-risk structures, significantly influence underwriting risk in residential property insurance.
- Roof condition and design impact both claim likelihood and insurance premiums, making accurate assessments critical for insurers and homeowners alike.
- **Frontier Insurance** has partnered with **Sharp Sky Analytics** to develop an innovative solution that leverages geospatial and satellite-derived data to address this challenge.
- By combining address information, cadastral land registry data, satellite imagery, aerial light detection and ranging (LiDAR) and proprietary claims data, the tool provides precise roof metrics and can feed directly into underwriting models, offering a competitive edge in insurance pricing.

Consortium members



Actions taken by Grant Project

1 Partnership formation

Sharp Sky Analytics connected with Frontier through mutual contacts, driven by discussions on leveraging geospatial and satellite imagery for property insurance underwriting. This collaboration laid the groundwork for developing a solution that integrates advanced data analysis into underwriting processes.

2 Product development

The consortium trialled approaches for deriving roof structure including optical imagery segmentation and digital surface models. Sparkgeo also investigated object detection techniques to identify high-risk structures with optical imagery, resulting in a working proof of concept for each.

3 Testing

In the latter half of the project, Frontier is assessing the proof-of-concept analytical tools to quantify the underwriting and conversion advantages.

Solution developed by Grant Project

This integration was innovative in several ways:



Image 1: Screenshot of roof assessment

Data aggregation

The solution combines diverse data sources, including satellite imagery (optical and LiDAR), terrestrial technologies like aerial LiDAR, and property datasets such as OS AddressBase Premium and cadastral Land Registry Data. These inputs are analysed alongside Frontier's proprietary underwriting and claims data to generate detailed property roof metrics.

Enhanced underwriting

The tool leverages geolocation to return precise roof attributes and risk metrics. These are integrated into underwriting models, improving pricing accuracy and giving Frontier a competitive edge in property insurance underwriting.



Financial Services

Residential property roof assessment using satellite imagery
Led by Frontier Insurance



Impact from Grant Project



Operational efficiency

By considering accurate measurements and classifications of high-risk roof attributes, Frontier can assign a more accurate probability of claims to a property. This score is combined with proprietary data from Frontier regarding property attributes and reflects the likelihood of the homeowner filing a claim related to the roof, which ultimately influences the cost of the insurance premium.



Customer retention

By minimising additional questions during the quote process, especially those seen as leading to price increases, Frontier improves conversion rates from aggregator sites. Customers provide risk details on the aggregator, select a quote, and complete the transaction by answering fewer extra questions, enhancing their experience and boosting conversions.

Lessons learned from Grant Project

Academic code may not align with industry best practices

Code from academic research, particularly in remote sensing and geospatial data science, often does not follow industry standards. Adapting such code for practical, business-focused applications requires significant planning and effort to confirm that it is suitable for production within a proof-of-concept timeline.

Custom models may not perform as expected in real-world scenario

While custom models from academic literature may show promise in theory, they can be difficult to reproduce and may underperform on less diverse datasets with limited geographic scope. In many cases, well-established models trained on larger datasets may deliver more reliable and practical results for industry use.

Next steps and commercialisation plan

Commercial expansion

Sharp Sky Analytics plans to expand the use of its solution by engaging with property insurance end users in international markets; Sharp Sky is also investigating development of data sources not currently available. The project's advancements in object segmentation and detection have also informed the development of planned ancillary products, broadening its potential applications.

Resource investment

Following the Proof-of-Value phase, Frontier aims to invest in acquiring updated optical imagery or digital surface models (DSMs) to cover the entire UK, and potentially more often. Additional resources will focus on implementing and monitoring underwriting algorithms that integrate roof data inputs, ensuring seamless integration into business operations.

Engagement with USB Programme

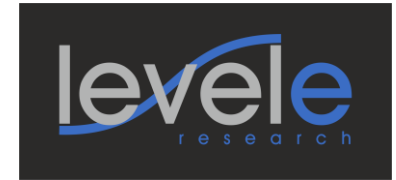
Networking Events

Sharp Sky Analytics attended a Financial Services Networking Event held in London in April 2024. Sharp Sky and Sparkgeo attended a USB Supplier Insights Event held in Harwell in October 2024.

Supplier Insight Events

Financial Services

Using earth observation data for an AI Risk Index *Assessing the impact of environmental events on an investment led by Level E Research*



Situation

- The costs of extreme weather events directly attributable to climate change are estimated at £113 billion (Nature Communications, 2023). 60% of companies in the S&P 500 Index own physical assets that are at high risk of at least one type of climate-change physical risk (S&P Global, 2020).
- Currently, there is believed to be no index product linking Earth Observation (EO) data and financial performance, even though environmental factors have a significant impact on companies' profits.
- The purpose of this project is to develop an AI Risk index (AIRI) that measures the exposure of a company or investment portfolio to environmental factors. By quantifying the exposure of an investment portfolio to environmental factors, end-users can make more informed decisions, reducing idiosyncratic risk.

Consortium members



EOLAS Insight Ltd



Actions taken by Grant Project

1 Partnership formation

The collaborative approach to problem-solving has been essential to Level E and EOLAS Insight's success, with both organisations aligned on strategic goals.

2 Product development

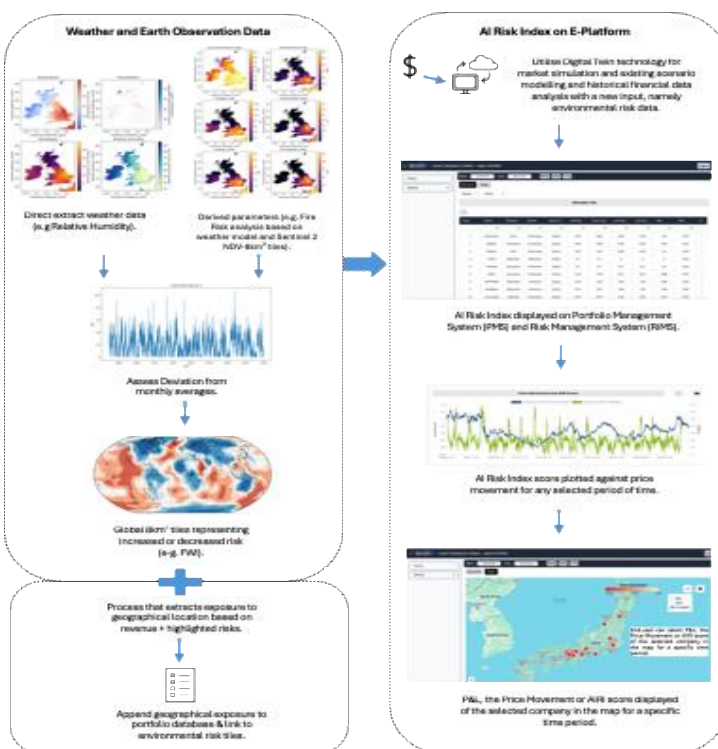
The goal was to help investors mitigate environmental risks and make better investment decisions by combining EO and financial data for a global overview and detailed regional analysis.

3 Field testing

Level E will test the implementation of the Risk Index through demonstrations with the Advisory Panel. Level E is currently engaging with field experts to gather feedback at all stages of development, which is crucial for software development.

Solution developed by Grant Project

The AIRI was innovative in several ways:



Environmental risk insights for any portfolio

Through the E-Platform, investors can see the effects of environmental risks based on a grid reference or a portfolio. End-users would be able to visualise and employ the AIRI linked to each company within the Portfolio Management System (PMS) and Risk Management System (RIMS) to build a robust portfolio or improve investment decision-making.

Integration with investment management processes

Given the complexity of information, Level E developed a multi-sided platform that integrates the entire investment management process and has many features to (i) allow end-users to have access to comprehensive information, and (ii) break down complex information into easily understandable components to enable optimal usage.

Image 1: Architecture of the proposed system

Financial Services

Using earth observation data for an AI Risk Index
Assessing the impact of environmental events on an investment led by Level E Research



Impact from Grant Project



Increased operational efficiency

AI front-end solutions are highly-scalable and offer the possibility to produce profit margins and process vast amounts of data to provide valuable insights. This project helped expand Level E's customer bases and diversify its revenue streams.



Risk reduction and resilience

AIRI assesses the impact of potential environmental events on an investment. By quantifying the exposure of an investment portfolio to environmental factors, investors can make more informed decisions, reducing risk and resulting in portfolios resilient to risks.



Regulatory compliance

Environmental risk is becoming a significant factor in financial decision making in the wake of more stringent environmental regulation. The outputs of this project will have far reaching impacts in the financial sector, with these types of analyses becoming of increasing importance.

Lessons learned from Grant Project

Complexity of data integration

Combining earth observation and financial data is a challenging process that requires expertise in both fields. Developing meaningful insights from these datasets requires robust methodologies and a deep understanding of their respective nuances.

Limitations of existing data infrastructure

Access to high-quality satellite data and facilities for certain companies, regions or sectors proved to be a significant hurdle. The project highlighted the need for more advanced data availability to improve analysis and decision-making capabilities.

Time taken for satellite data processing

Processing and obtaining the required satellite data was more complex and time-consuming than initially anticipated. This underscored the importance of planning for extended timelines when working with large-scale geospatial datasets.

Next steps and commercialisation plan

Data acquisition

Level E Research will further expand the project by acquiring more data covering more regions, countries and companies, by engaging with a range of different EO data suppliers.

Commercial expansion

The project also sees significant market potential across various sectors, including asset management and insurance. The strategy involves developing a robust suite of commercial products and services built upon the core technology developed during the grant-funded project.

Engage stakeholders

Level E Research plans to engage different types of end-users, such as professional, institutional and retail investors through participating in events and workshops organised by the Investment Association and other organisations.

Engagement with USB Programme

Networking Events

Received SBRI Funding

EOLAS Insights previously received USB SBRI funding and attended a USB Financial Services Networking Event in April 2024.

Financial Services

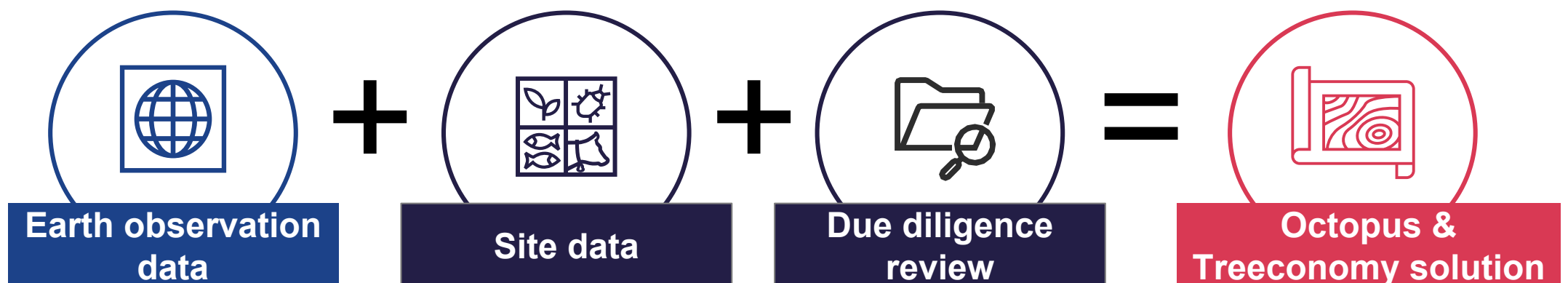
Earth observation for natural capital investment
Harnessing geospatial data for more rapid and confident due diligence of nature-based carbon projects led by Octopus Investments



Situation

- Octopus Investments identified a gap in the UK market for a due diligence tool to assist in their investment strategy. Existing global monitoring, reporting and verification (MVR) satellite services either lacked sufficient data layers or underperformed in the UK, making it difficult to assess site viability quickly and accurately.
- **Octopus Investments** partnered with **Treeconomy** to develop a tool that uses satellite data to validate site viability quickly, saving time and cost. This solution accelerates due diligence, providing a competitive edge, reducing the risk of unsuitable investments, and enabling smarter, faster acquisitions while minimising financial and operational risks.

Consortium members



Actions taken by Grant Project

1 Partnership formation

Octopus Investments has known Treeconomy since its inception and values their team and direction. This long-standing relationship, along with Treeconomy's understanding of Octopus's needs, formed the foundation for a successful partnership focused on creating a practical, usable investment tool.

2 Solution development

Octopus Investments held regular demo sessions with Treeconomy to co-create the product, ensuring it met the investment team's needs. Octopus also reviewed Treeconomy's Sherwood platform to identify improvements, ensuring the tool evolved with the investment process.

3 Collaborative feedback

Throughout the development process, Octopus Investments and Treeconomy actively collaborated, enabling the tool's alignment with the investment team's objectives.

Solution developed by Grant Project

This tool was innovative in several ways:

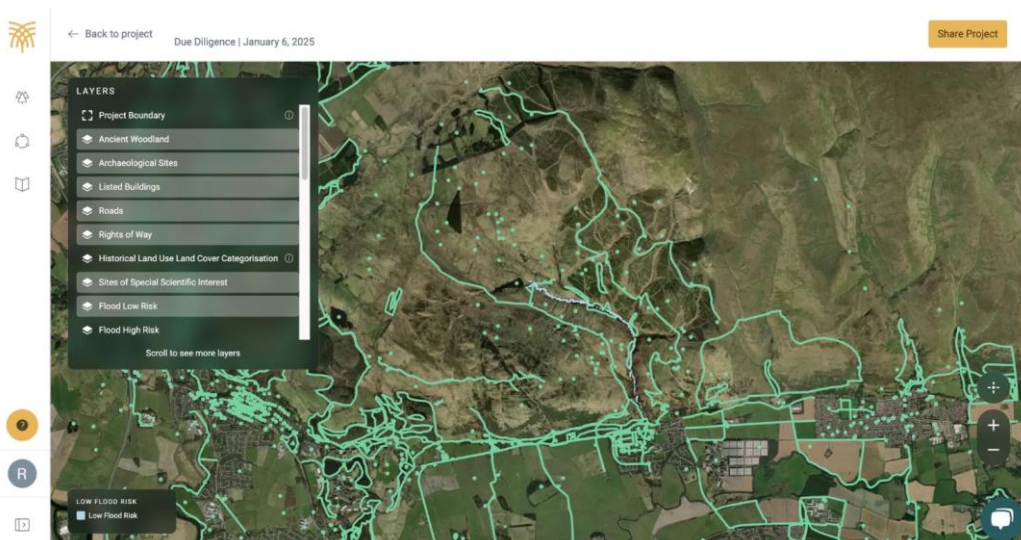


Image 1: The master map combines spatial datasets for an explorable, all-in-one view of layers

Enhanced screening & risk mitigation

Pulling on more than 60 different quality-assured geospatial datasets across multiple categories, the tool provides a thorough assessment to guide data driven investment and project design and development decisions.

In addition to presenting summarised metric results (e.g. area of high flood risk) the tool aggregates all relevant spatial layers for interactive exploration in a master map view.

A comprehensive PDF report can also be downloaded for off-platform use in the investment review process with both internal and external stakeholders.

Financial Services

Earth observation for natural capital investment
Harnessing geospatial data for more rapid and confident due diligence of nature-based carbon projects led by Octopus Investments



Impact from Grant Project



Operational efficiency

The solution streamlines processes, expediting due diligence and reducing costs through improved operational efficiency.



Risk reduction and resilience

By improving data insights, the solution minimises risks associated with asset purchases, enhancing decision-making and portfolio resilience.



Regulatory compliance

Integration of third-party data supports accurate reporting, ensuring alignment with regulatory requirements.

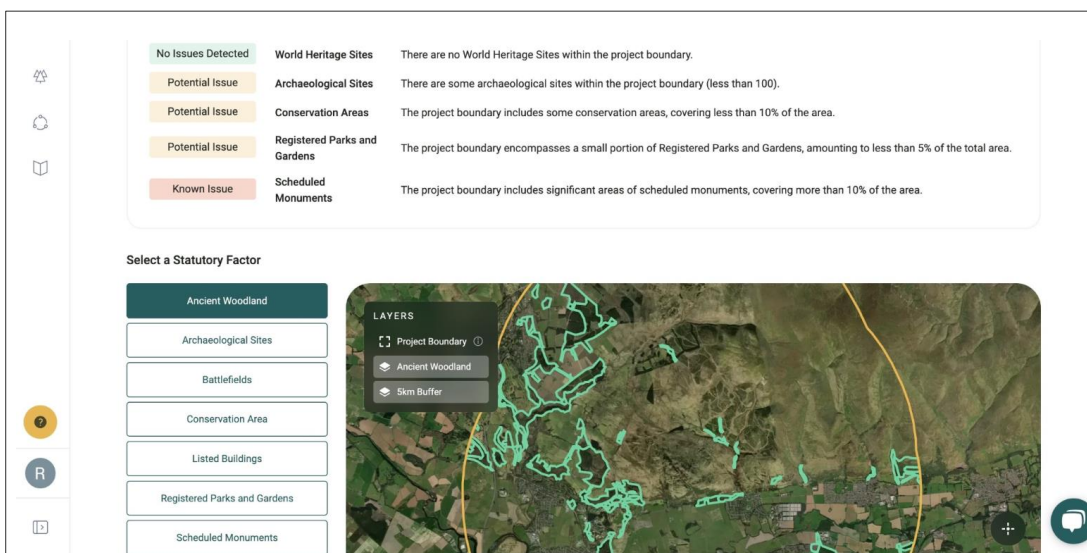


Image 2: The tool delivers insight across a range of categories: Permissibility, Eligibility, Suitability, Risk, Opportunity, and Additional Factors

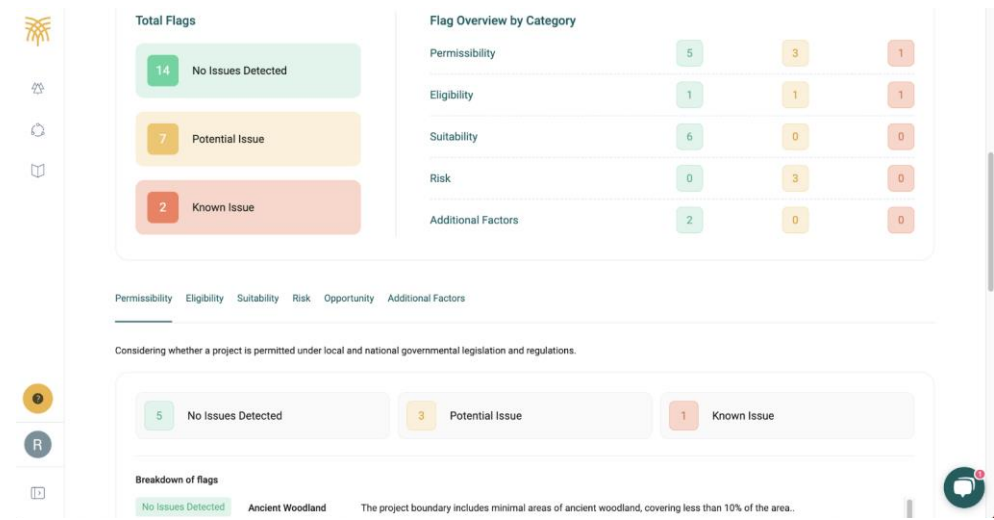


Image 3: A simple “Red-Amber-Green” flagging system draws attention to issues at a glance. Flags are customisable to match internal investment criteria and preferences

Lessons learned from Grant Project

Usability and scalability

A key lesson learned was the importance of ensuring the tool's usability extends beyond those directly involved in its development. It is crucial that the solution is designed with broader usability in mind, allowing stakeholders at all levels to efficiently leverage it for decision-making.

Next steps and commercialisation plan

Commercial expansion

The new due diligence product is integrated within Treeconomy’s existing Sherwood platform. It will be made available to other UK project developers and natural capital investors, before being adapted to new geographies and project types for increased reach.

Integration into BAU

The solution will be incorporated into Octopus Investments’ natural capital strategy post-project completion.

Engagement with USB Programme

Networking Events

Treeconomy received USB SBRI Funding for a feasibility study and attended a USB Financial Services Networking Event in April 2024.

Received SBRI Funding

Financial Services

Nature investment monitoring

Monitoring nature-related financial derivatives using Earth Observation data led by SafeEarthSolutions



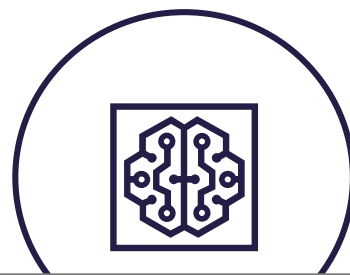
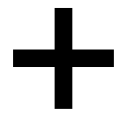
Situation

- The challenge to provide reliable, easily verifiable information for nature restoration projects in the investment market leads to hesitancy from the financial sector to fund these projects, due to the lack of trustworthy data usable at scale.
- **SafeEarthSolution's (SES)** grant project used low-cost satellite data with trained machine learning (ML) models and integrated reporting to enable investors and financial institutions to access reliable and comprehensive nature restoration data.
- The end-product, a Nature Valuation and Monitoring Platform (NVaMP) utilises an innovative algorithm to assess and monitor habitat locations.

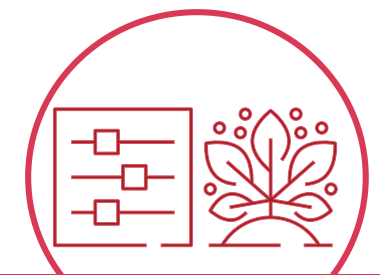
Consortium members



Earth observation data



Machine learning (ML) models



SES solution

Actions taken by Grant Project

1 Collaborative development

SES assembled a team of experts in nature finance, insurance, market economics, AI/ML development, governance and policy, data acquisition and quality.

2 Customer research

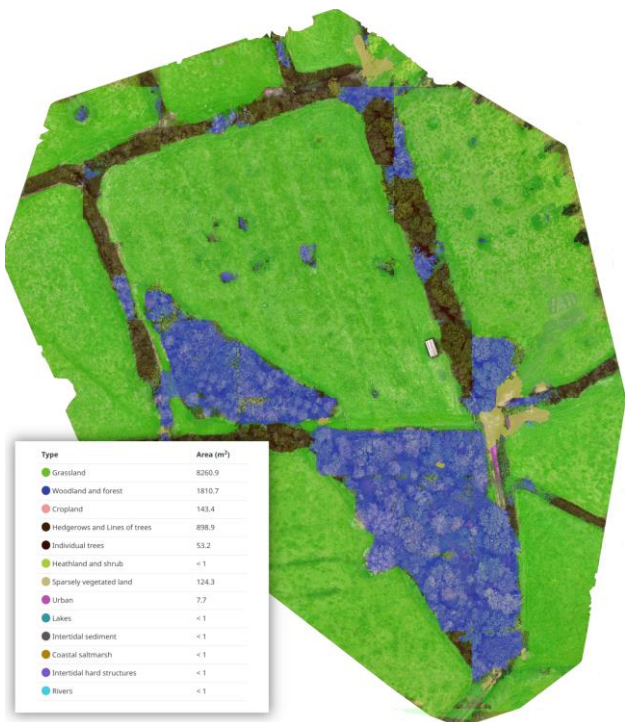
Understanding the current state of the biodiversity market in the UK was a crucial step to identify key target customers that SES could collaborate with on their solution.

3 Field testing

Through outreach efforts, SES successfully secured a licensing partner, Smart Resilience. By enhancing UX capabilities and further training their model, SES plans to field test their solutions using Smart Resilience's customer base for validation and refinement.

Solution developed by Grant Project

This integration was innovative in several ways:



AI / valuation engine

Assesses and monitors habitat locations, biodiversity types and their levels. This allows investors to have accurate, transparent data that is required to confidently engage in nature restoration projects.

Scalable and globally applicable

Combines a modular architecture and low-cost implementation to allow for seamless integration across different sectors and regions. Merging satellite imagery and advanced analytics also supports the platform's tools and methodologies are transferable.

Image 1: Demonstration of NVaMP tool

Financial Services

Nature investment monitoring

Monitoring nature-related financial derivatives using Earth Observation data led by SafeEarthSolutions



Impact from Grant Project



Financial efficiency

The NVaMP offers evidence-based “triaging” to prioritise other assurance asset deployment thereby reducing issuance costs, improving willingness to lend and creating efficiency gain for the financial market. This increased efficiency encourages issuers to utilise Earth Observation (EO) data through platforms like NVaMP.



Risk reduction and improved resilience

The NVaMP platform is able to reduce risks associated with financial investments in nature restoration, by enabling robust monitoring and verification over time. This scalable approach to information management could enable the credibility of biodiversity projects and minimises uncertainty for clients.



Increased regulatory compliance

The NVaMP enhances compliance by providing high-quality, transparent data tailored to meet reporting standards including ICMA, PRI, and IFRS S1/S2. By increasing confidence in alternative data sources, the platform mitigates concerns over certification and strengthens issuers’ ability to meet evolving regulatory demands.

Lessons learned from Grant Project

Limitations in data quality

Confirm that the satellite imagery used meets the required resolution and accuracy to effectively train the model. While current options in the UK offer cost-efficient data, they lack the necessary resolution, highlighting the need for better data availability.

Demand for higher-resolution and more advanced imagery

Address the need for frequent, high-resolution satellite imagery (15cm per pixel) and the integration of advanced data types, such as multi-spectral imagery and photogrammetry, to enable accurate and comprehensive monitoring models for nature markets.

Next steps and commercialisation plan

Explore strategic partnerships

SafeEarthSolutions will focus on expanding its global reach by solidifying partnerships with key international organisations who have expressed interest in using NVaMP to enhance data confidence in nature restoration and green bond programs.

Scale NVaMP for broader adoption

SafeEarthSolutions will continue to position NVaMP as a low-cost, long-term digital tool, enabling it to be tailored to the growing nature investment market; focusing on ESG and enabling transparent reporting.

Engagement with USB Programme

Networking Events

Received SBRI Funding

Supplier Insight Events

SafeEarthSolutions received USB SBRI funding for a feasibility study, and attended 2 of the 2024 Networking Events held at PwC and a USB Supplier Insights Event held in Harwell in October 2024.

“We found it a useful opportunity to understand the challenges and outlook for satellite data.”

Financial Services

Environmental risk evaluation

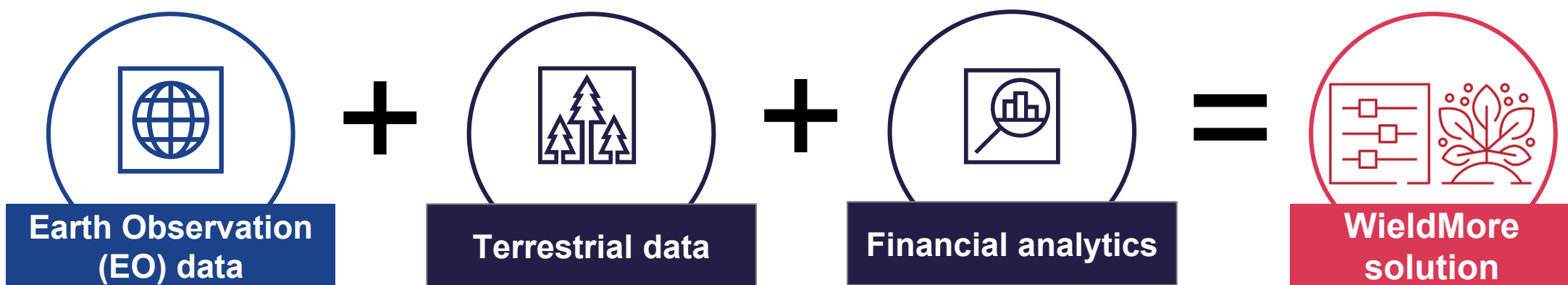
Comprehensive Environmental Risk Evaluation System (CERES) led by WieldMore Investment Management



Situation

- **WieldMore Investment Management** partnered with **Earth Blox** to develop a solution called the Comprehensive Environmental Risk Evaluation System (CERES) that provides a comprehensive view of risk by combining satellite data, which shows real-time environmental changes, with terrestrial data, which adds context through historical trends and operational metrics.
- This combination of data has the potential to enable clients to detect vulnerabilities, predict impacts, and make data-driven decisions with precision.

Consortium members



Actions taken by Grant Project

1 Collaborative partnership

WieldMore partnered with Earth Blox to integrate geospatial data into their risk management solution. This collaboration was built on a shared vision of combining environmental data with investment risk tools, transparent communication, and aligned technical and business goals.

2 Development and prototyping

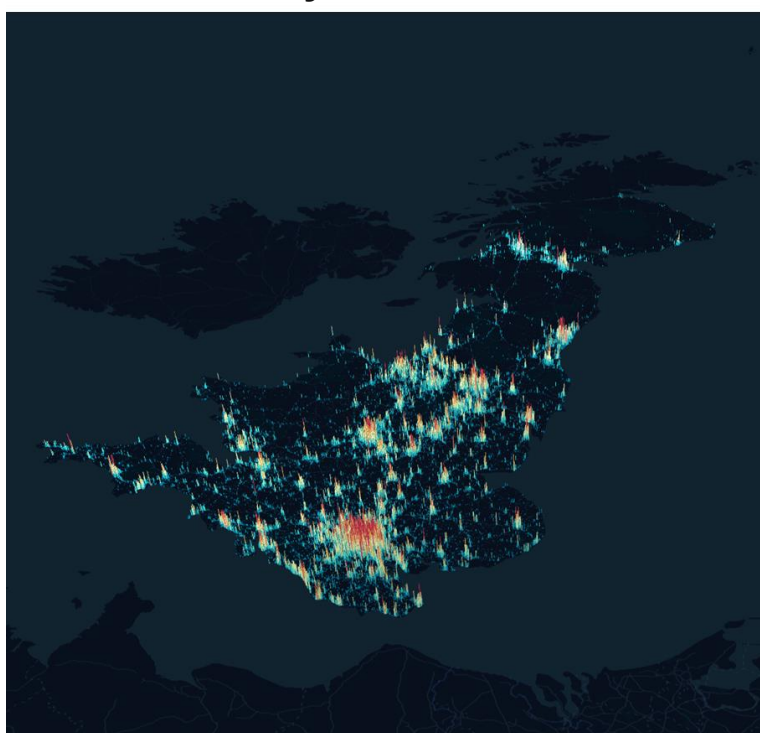
The solution was developed iteratively by creating prototypes that combined emissions, physical risk, and satellite-derived indices into a unified dashboard. Pilot clients provided valuable feedback, such as the need for real-time reporting, streamlined interfaces, and system integration, which directly influenced improved user interfaces.

3 Field testing

Field testing plans include collaborating with select clients to test the solution in real-world conditions, incorporating feedback to enhance accuracy and usability. Testing will also extend across various industries to confirm the scalability and robustness of the solution.

Solution developed by Grant Project

This CERES system was innovative in several ways:



Combining spatial data with financial analytics

The solution innovatively integrates satellite data, such as natural event risk maps and regional heat maps, with terrestrial datasets like emissions records and financial disclosures. By combining real-time environmental insights with historical and operational data, the solution provides a multidimensional view of risk.

Dynamic monitoring and predictive capabilities

The solution's ability to provide dynamic, near real-time monitoring of environmental changes, combined with AI-driven predictive models, makes it highly adaptive. By responding quickly to evolving risks and offering predictive insights, the solution empowers industries to proactively address climate and Environmental, Social and Governance (ESG) challenges.

Image 1: Screenshot of CERES system modelled on steel manufacturing

Financial Services

Environmental risk evaluation

Comprehensive Environmental Risk Evaluation System (CERES) led by WieldMore Investment Management



Impact from Grant Project



Increased operational efficiency

The solution streamlines decision-making processes by integrating real-time satellite data with operational and financial metrics. This could enable businesses to quickly assess risks, reducing downtime and enhancing overall productivity in sectors like energy, agriculture, and logistics.



Increased regulatory compliance

WieldMore's solution aims to enhance clients' ability to meet evolving regulatory frameworks like Task Force on Climate-Related Financial Disclosures (TCFD). By offering transparent, accurate data on emissions, climate risks, and operational impacts, the platform streamlined compliance processes, reducing the risk of penalties or non-compliance.



Risk reduction and resilience

By identifying vulnerabilities through real-time environmental monitoring and predictive analytics, the solution allows clients to take proactive measures against climate-related risks. This improves resilience to events like flooding or heat stress, protecting assets, maintaining supply chains, and ensuring long-term operational stability.

Lessons learned from Grant Project

Importance of high-quality data integration

One key lesson learned was the critical need for high-quality, accurate data to drive meaningful insights. Combining satellite and terrestrial data requires robust processing and validation to make sure that it is reliable, particularly for applications in regulatory compliance and risk assessment.

Incorporating end-user feedback

Engaging with pilot clients throughout the development process underscored the importance of understanding user needs. Feedback on features like real-time reporting, user-friendly interfaces and compatibility with existing systems was invaluable in shaping the solution to better address practical challenges.

Next steps and commercialisation plan

Expand market reach and stakeholder engagement

WieldMore plans to expand its solution by engaging a broader range of stakeholders across diverse industries, including agriculture, energy, and technology. Building on existing partnerships, they also aim to demonstrate the solution's value through real-world field testing and establish new collaborations to drive adoption.

Scale and refine the solution

WieldMore will focus on refining its solution based on client feedback from pilot testing. This includes enhancing real-time reporting features, improving user interfaces for non-technical users, and ensuring seamless integration with existing risk management systems.

Engagement with USB Programme

Supplier Insight Events

L&D Webinars

WieldMore attended a USB Supplier Insight Event and L&D Webinars in 2024. *“These activities were instrumental in shaping our solution, particularly by providing a benchmark to validate our approach, such as using insights from USB support to refine our integration of satellite-derived events risk maps with financial risk metrics, ensuring the solution meets both market, regulatory and operational demands.”*

Map of Grant Funded Lead Applicants

Lead Organisation	Organisation based in
Admiral	Cardiff
Citigroup	London
Equitix Limited	London
Foresight Group	London
Frontier Insurance	London
Level E Research	Edinburgh
Octopus Investments Limited	London
SafeEarthSolutions (SES)	Bristol
Shipping Strategy Limited	Milton Keynes
Sports City Management Company (SCMC)	Manchester
WieldMore Investment Management Limited	London



Figure 1: A map of the United Kingdom highlighting the head office location of Grant lead recipient organisations.



The UK Space Agency (UKSA) was founded in 2010, and supports a thriving space sector in the UK, which currently generates an annual income of £18.9 billion and employs 52,000 people across the country.

We are delivering UK Government's National Space Strategy through three key pillars:

- **Championing the power of space**, encouraging other sectors to use space to deliver better services, tackle the climate emergency and support a more sustainable future.
- **Catalysing investment** by deploying funding and resources to multiply the value of commercial contracts and private capital to maximise the UK space sector long-term growth.
- **Delivering missions and capabilities** that use space science, technology and applications to meet national needs and advance our understanding of the Universe.

Contact us to find out more:

UnlockingSpaceForBusiness@ukspaceagency.gov.uk

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