UK SPACE AGENCY

Unlocking Space for Business Project monitoring and evaluation final report

May 2025

Contents

Glossary of terms

Table 1: Glossary of terms used in the report

Term/acronym	Meaning
Barriers	Barriers or root causes of barriers
Data integrators and aggregators	Organisations that support end users with the integration of satellite data
End users	Businesses that directly utilise or consume data derived from space-based assets, such as satellites, to gain insights, make informed decisions, and drive innovation in either the financial services or transport and logistics sector
ROI	Return on investment
R&D	Research and development
SBRI	Small Business Research Initiative; commercial mechanism to provide funding through a contract rather than a grant. These are now known as Contracts for Innovation
Space solution	Space data, technology, applications and services
Suppliers	Organisations that provide satellite-derived data, services and insights to customers (i.e. end users)
USB	Unlocking Space for Business project

1. Key findings

Overall, the evaluation found evidence that Unlocking Space for Business (USB) project initiatives were successful in tackling the root causes of barriers to adoption of satellite-derived data, applications and services by private sector end users.

Aspects which were found to be particularly effective in overcoming barriers were:

- The tailored content of exploration workshops which were facilitated flexibly to provide end users with an in-depth understanding of space solution use cases that were most relevant to their needs.
- The profile and networks of the UK Space Agency and PwC, which encouraged end users and suppliers to engage with the project and forge connections in the space sector.
- Funding rounds (Small Business Research Initiative and grant) which focused on strengthening the commercial viability and demonstrating return on investment (ROI) of a space solution. The opportunity for end users to lead and to specify a particular use case they wanted the project to serve meant the project produced clear evidence of a ROI.
- Effective linkages between complementary USB initiatives, so that each initiative moved end users along their adoption journey towards a demonstrator phase.

USB initiatives were most effective where:

- The right roles in end user organisations engaged with the right initiatives. This included C-suite roles engaging with initiatives that increased knowledge and understanding of how benefits can be derived from a space solution (to gain buy-in from key internal stakeholders), and roles with responsibility for exploratory R&D work, such as those in thought leadership or innovation, leading grant projects.
- End users had a baseline level of knowledge, contacts and understanding of the potential benefits of a space solution. This included end users having already worked with a supplier and/or made some preliminary explorations of space solutions. This moderate level of experience supported buy-in to engagement with grant-funded projects among internal stakeholders.
    - However, end users and suppliers which were most knowledgeable and experienced with using space solutions found USB initiatives that were designed to increase knowledge to be more limited in their usefulness.
    - Nevertheless, end users with the least experience and knowledge of space solutions found their knowledge and understanding of the potential benefits of a space solution increased through participation in USB initiatives.

Areas for improvement suggested by participants centred around:

- A desire among suppliers for a UK Space Agency summary of learning from the USB project and roadmap of future support which builds on this learning.
- A greater focus on the transport and logistics sector.
- Support for end users to ensure the grant funded project lead role places minimal demand on their time and resource, including streamlined administrative processes.

2. Executive Summary

2.1 Methodology

Between August 2024 and March 2025, a total of 77 in-depth interviews were carried out with audiences who had engaged with various Unlocking Space for Business (USB) initiatives. This included private sector end users (referred to in this report as 'end users') who attended exploration workshops, grant funded project consortium members, Small Business Research Initiative (SBRI) contract holders, and space solution suppliers, aggregators and integrators (referred to in this report as 'suppliers') who attended a supplier insight event. Interviews explored their experiences and views on the impact of the USB project on the adoption of space solutions by end users.

The monitoring and evaluation research tested a high-level theory of change that businesses need knowledge of space solutions and how they can benefit their business, connections with data suppliers, and funding opportunities, to move closer to adopting relevant space solutions. Analysis informing this project identified six root causes which underpin the barriers to adoption of space solutions by end users, with four relating to end users, and two to suppliers. These barrier root causes are referred to in this report as 'barriers'. Those bolded in the list below were prioritised for intervention within this pilot.

- **End user barrier one: Unawareness and misconception of opportunities**
- **End user barrier two: Business case / return on investment (ROI) isn't persuasive**
- **End user barrier three: Not easy to derive benefits or integrate into end user workflows**
- End user barrier four: Limitations on data availability and quality
- Supplier barrier one: Limited understanding of customer challenges
- Supplier barrier two: Siloed solution offerings

2.2 Findings

This report considers the extent to which each of the six barriers were addressed by USB project initiatives.

2.2.1 End user barrier one: Unawareness and misconception of opportunities

Of all USB initiatives, exploration workshops were deemed to be one of the most effective in tackling the barrier of unawareness and misconceptions of opportunities to use space solutions. During the workshops, end users were able to define and focus on a particular use case for a space solution which was most relevant to their business, and learn about the latest standards of space data quality and availability. However, end users with a higher baseline level of organisational experience of using space solutions found that the exploration workshops were less effective in increasing their knowledge and understanding of opportunities to use space solutions. This group of end users suggested that exploration workshops would have been more useful for them if they had explored the longer-term vision of how space solutions could become an integral part of technical solutions in the future, and facilitated exploration between suppliers and end users around how space solutions could form part of end users' complementary technology needs.

Suppliers perceived that, due to the UK Space Agency and PwC's brands and extensive network of high-profile end users, USB initiatives provided a platform from which they increased their profile among end users. Echoing this view, through engagement with USB initiatives, end users had increased their understanding of the space applications sector and how it could support end users' business needs.

Learning and development webinars and summary videos aimed to address end users' lack of awareness of opportunities. The low number of webinar attendees and views of summary videos means the extent to which they helped to tackle this barrier is unclear, although it can be assumed that their value was limited, given the low level of engagement with this initiative Where the summary videos have been published externally, it may be difficult to track the value as there are no direct forums for feedback.

2.2.2 End user barrier two: Business case / return on investment (ROI) isn't persuasive

Grant funding de-risked pilot projects for end users, which enabled them to take the opportunity to work closely with a supplier to develop a solution that met their business needs and provided a clear ROI. Suppliers and end users found grant funded projects led to increased efficiency and accuracy of data, which provided a clear ROI for the end user. Similarly, suppliers found that SBRI feasibility studies enabled them to explore the commercial viability of a space solution product with end users. This learning enabled suppliers to develop a clearer, more persuasive ROI for their product.

Exploration workshops also increased end users' understanding of the value that could be derived from satellite solution use cases. By presenting and exploring clear case studies of use cases through interactive discussion, workshops helped end users to understand the ROI that they could potentially derive from satellite solutions.

In addition to the case studies presented in exploration workshops, a collection of case studies were published externally on GOV.UK in an attempt to demonstrate to end-users how businesses could unlock value from satellite solutions, and provided examples of activity across the world.

2.2.3 End user barrier three: Not easy to derive benefits or integrate into end user workflows

Participants deemed USB initiatives to have provided end users with knowledge and resources (in the form of both contacts and funding) to enable them to more easily access, use and derive benefits from space solutions. End users were able to specify the particular use case that they wanted the grant funded project to serve, so that by the end of the project they were able to, or were closer to being able to, derive target benefits from the project and integrate the solution developed into their workflows.

Nevertheless, end users leading grant-funded projects experienced some challenges with administrative tasks, such as setting up internal financial administration processes to be able to accept grant funding (for which there was often no precedent in large financial institutions). End users who found the role of leading a grant funded project less demanding were typically those that had internal budget and resource already allocated to exploratory R&D work or received administrative support from other members of the consortium. They also appreciated clear direction from the UK Space Agency project managers, and minimal reporting requirements.

When making the initial decision about whether to be involved in a grant funded project, one group of end users (typically where the individual representing the end user organisation worked in a revenue-generating role such as fund manager) anticipated that leading the project would require investment of time and resource which they could not afford. In these project consortia, the supplier had consequently taken on the bulk of the administrative and project management tasks to relieve the end user of this burden.

End users explained that exploration workshops helped them to more easily derive benefits from space solutions by providing clarity and understanding of how to engage with the supplier sector, including via a breakdown of the supplier landscape. Similarly, grant funded project consortia included a data integrator organisation, which integrated 'raw', disaggregated space data to make it easier for end users to integrate and derive benefits from. In addition, there was evidence of good linkages between USB and other programmes of support for end users, and between different initiatives within the USB project, which moved end users further along the adoption journey. For example, by engaging with initiatives earlier in the USB project, such as roundtable events and networking events, end users became aware of opportunities to engage with further USB initiatives, which moved them closer towards the pilot phase of grant funded projects.

2.2.4 End user barrier four: Limitations on data availability and quality

Although limitations on data availability and quality was not a barrier that was prioritised for targeted intervention in this pilot, there was some evidence that USB funded projects had some influence on tackling this barrier. One of the central aims of grant funded projects was to improve data availability and quality to provide end users with a ROI. Grant funded projects commonly involved increasing the level of automation and accuracy of space solutions through, for example, a higher level of resolution of images or improved processing speeds. This in turn derived other benefits such as higher revisit rates of landscape assessment and more efficient processes for end users. Similarly, the technical developments of some SBRI feasibility projects increased the availability and quality of data.

2.2.5 Supplier barrier one: Limited understanding of customer challenges

A number of USB initiatives, particularly SBRI feasibility studies, helped suppliers overcome the barrier of limited understanding of customer challenges. SBRI project suppliers typically ran engagement activities with potential end users of space solutions to better understand customer challenges and how space solutions could help customers address those challenges. Building on this understanding, a number of SBRI projects were successful in applying for a USB grant and other sources of funding to develop their product further. Grant funded projects enabled suppliers to work closely with an end user over the course of the project to develop an in-depth understanding of the particular challenges faced by that end user, and how the solution they were developing could address those challenges.

Suppliers reported that USB networking events enabled them to connect with end users, which in turn helped them to better understand end users' challenges and needs. In addition, through the exploration of use cases, supplier events increased suppliers' understanding of the nature of customer challenges and ideas of how to address those challenges. However, there was also a view among suppliers that the supplier events focused more on the challenges of engaging with end users, whereas they would have found insight into the range and nature of challenges faced by end users more useful. They suggested that such insight would allow suppliers to understand end users' needs, and work out whether and how space solutions

could meet these needs. Suppliers that had been working in the sector for a longer time – typically decades – and which had not engaged with other USB initiatives, were most likely to make these suggestions and to perceive the impact of supplier events in helping them overcome this barrier to be limited.

2.2.6 Supplier barrier two: Siloed solution offerings

Although the barrier of suppliers developing siloed space solution offerings was not prioritised for targeted intervention in this pilot, there was evidence of USB initiatives tackling this barrier. As grant funded projects neared completion, end users had either already integrated the solution developed under the project into their workstreams, or were optimistic that this would happen in the near future. End users found that exploration workshops, particularly when attended by C-suite leadership, increased their organisational understanding of how space solutions could be incorporated into their broader technology architecture.

2.2.6 Participants' suggestions for improvements

Suggestions relating to multiple USB initiatives included:

- A greater focus on the transport and logistics sector end user organisations and smaller end user organisations.
- More opportunities for direct connections between end users and suppliers.
- Further follow-on support for suppliers from the UK Space Agency after the project ended, such as dissemination of a synthesis of learning from the USB project, an UK Space Agency roadmap of planned activity in this space, and further opportunities for suppliers to promote the offer to end users via the UK Space Agency's network.
- Greater clarity in the grant call specification around the role and requirements of end users in the project lead role.

3. Introduction

This report outlines findings from monitoring and evaluation research with individuals who participated in the project about their experiences of the UK Space Agency's Unlocking Space for Business (USB) project. This section provides background to the research, including details of the project, research aims and methodology.

3.1 Background

The Space Industrial Plan[1] sets a mission to better communicate the impact that space data can have in other sectors, promote its uptake and increase collaboration between space solution suppliers and integrators (referred to in this report as 'suppliers') and private sector end users of space solution products or services (referred to in this report as 'end users').

End users, in this report, are businesses that use data from space-based assets, such as satellites. End users will use this data to give them insights and help them make informed decisions. The USB project targets end users in financial services and transport & logistic sectors.

Suppliers, in this report, are organisations that provide space solutions including satellite-derived data, services and insights to customers (i.e. end users), as well as organisations that support end users with the integration of this satellite data.

The Unlocking Space Programme plays a key role in addressing the Space Industrial Plan mission, accelerating the realisation of customer, operational and environmental benefits from innovative uses of space solutions. The Unlocking Space Programme aims to grow the UK space sector by stimulating investment and demand for space services, data and technology by new stakeholder groups. The programme is delivering four priority projects to meet these aims, which are: Unlocking Space for Business; Unlocking Space for Investment; Unlocking Space for Government – Civil; and Unlocking Space for Government – Defence.

3.1.1 Aims and objectives of the USB pilot project

The Unlocking Space for Business pilot project was an 18-month pilot that ran from October 2023 to March 2025. It sought to drive greater long-term adoption of satellite-derived data, applications, and services across commercial 'end users', i.e. non-space private sector companies operating in the UK. This was to be achieved through end user focused initiatives related to education, engagement, capability development and operational deployment.

As part of the Unlocking Space Programme the USB pilot project's four strategic objectives were to:

- Catalyse investment (directly and indirectly) in satellite-derived data, applications and services by non-space businesses, to grow this market;
- Champion the benefits of space for the UK private sector, including supporting the realisation of business outcomes and helping to tackle the climate emergency;
- Enhance UK influence and reputation as a global leader in the exploitation of downstream satellite-derived data, applications and services; and,

[1] **Space Industrial Plan, 2024**: https://www.gov.uk/government/publications/space-industrial-plan/space-industrial-plan-from-ambition-to-action-advancing-uk-space-industry

- Understand the effectiveness of this project as a pilot for future initiatives.

Satellite-derived data, applications and services underpin 17.7% of UK GDP, and contribute over 75% to the overall space sector market size[2]. However, significant barriers to adoption are being faced by private sector end users, which is preventing the sector from delivering greater benefits for businesses, citizens, and the environment. Analysis informing this project identified six key root causes which underpin these barriers; four relating to end users, and two to suppliers. These root causes of barriers are referred to in this report as 'barriers'.

End user barriers

The barriers in bold below were prioritised for targeted intervention, as they were considered to be most critical and where the greatest impact could be achieved within the pilot project timeframe.

1. **Unawareness and misconceptions of opportunities** - organisations are not aware that space solutions may be relevant to their business performance, and perceive it as too expensive and/or futuristic
2. **Business case / return on investment (ROI) isn't persuasive** - the right information to inform ROI is not being presented to decision-makers in a way that is evidence-based, easily digestible, trusted and comparable against alternatives
3. **Not easy to derive benefits** - the products being offered are not easily accessed, used and integrated by businesses to realise target benefits e.g. it takes too much time, money and resource
4. Limitations on data availability and quality - technical limitations create mismatches in expectations vs. reality of data availability, e.g. resolution, data persistence (revisit rates, cloud cover), timeliness, and service guarantees

Supplier barriers

1. Limited understanding of customer challenges – suppliers have limited understanding of the specific nuances related to customer pain points, operations and priorities, and therefore find it challenging to align and articulate their value proposition in the users' language
2. Siloed solution offerings – suppliers are often competitively developing and selling products in a silo, without enough consideration of customers' complementary technology needs (including terrestrial technology) and architecture integration requirements

3.1.2 USB interventions

To inform the focus of the project scope, an opportunity assessment was undertaken and the preferred option for intervention was tested through engagement with external stakeholders and in workshops with cross-Government stakeholders. The option focused on delivering four key initiatives of: outreach and marketing; user deep dive engagement; user capability building; and user deployment funding.

[2] **Size and Health of the UK Space Industry, 2023**
https://www.gov.uk/government/publications/the-size-and-health-of-the-uk-space-industry-2023/size-and-health-of-the-uk-space-industry-2023

The pilot delivered initiatives within two sectors: the financial services, and the transport and logistics sectors, to deliver tangible benefits within the 18-month timeframe. USB project delivery partners were PwC and the Satellite Applications Catapult.

These initiatives shaped the following project interventions which delivery comprised:

- **Marketing and outreach** - including sector conferences, published global case studies on gov.uk, video and social media outreach.
- **Exploration workshops** - which took place between November 2023 and July 2024, providing tailored, one-to-one support for 27 end user organisations. Each end user organisation could have up to three exploration workshops, each of which were up to two hours long and were run by PwC and the Satellite Applications Catapult facilitators. The workshops were designed to allow end user organisations to explore their problem statement and how space solutions might be able to address this by looking at different use cases. The workshops provided end users with information on the supplier landscape, the types of space solution available and how they could deploy this in their organisation.
- **Networking and insight events** - including five in-person sector-specific networking events held in London, Manchester and Southampton, and four roundtable/online webinars to bring suppliers and end users together.
- **Learning and development workshops** - ten one-hour virtual sessions held for end users, with 5 targeted at financial services end users and 5 targeted at transport and logistics end users. The webinars were run by PwC and the Satellite Applications Catapult as a satellite data 101 for end user businesses, to inform about different types of space solutions and how they can be used within their sector. The webinars were held via MS Teams from March to May 2024.
- **Funding calls** - £5 million of government funding was split between £2 million in **SBRI contracts** awarded to fund feasibility projects (up to £200,000 per project) that were carried out between February and July 2024, and £3 million (up to £400,000 per project) for end user led consortium pilot projects through a **grant call**, which ran from July 2024 to March 2025. SBRI projects comprised 12 feasibility projects conducted by space sector supplier organisations, working with end users in either the financial services or transport and logistics sectors. The aim of SBRI feasibility projects was to develop commercially viable, innovative feasibility studies, aiming to combine terrestrial technology (such as AI, quantum, geospatial data or machine learning) with satellite data and services, to be adopted by UK based businesses. The grant projects were run by an end user led consortium, which typically comprised a satellite data supplier and/or integrator and the end user organisation. The projects used satellite data with terrestrial technology to produce a product or service for the benefit of end user UK based businesses.
- **Supplier events** - two in-person events were held in October 2024 in Harwell and Leicester. The events were run by PwC and the Satellite Applications Catapult for suppliers of space solutions and for integrator organisations. The events aimed to help suppliers understand the challenges that end users are facing and the barriers they face to using space solutions, and provide key actionable takeaways.
- **Insight Report** - a report, ‘The Space Advantage: Enabling Business Transformation in Financial Services and Transport & Logistics’, was published in March 2025; it aimed to provide a comprehensive analysis of how satellite solutions can support a

wide range of UK businesses, through showcasing insights and funded case studies from the Unlocking Space for Business project. These insights were further explored at the Showcase Event.

- **Showcase event** - the Unlocking Space for Business Showcase Event was held at the end of the pilot in March 2025. It brought together USB-funded SBRI and grant projects who presented a summary of their pilot projects to attendees, alongside presentations from end users who participated in exploration workshops, an executive breakfast roundtable for end-user businesses chaired by the UK Space Agency CEO, and a panel on future opportunities for satellite data and AI. The in-person event was attended by end-user businesses in the financial services and transport sectors, alongside space businesses, data integrators, professional services firms and public sector organisations.

3.1.3 Movement of participants across the interventions

The programme was designed to tackle as many of the end-user barriers as possible, and the activities were broadly aligned with each of them. It was also desirable to support organisations along their 'adoption journey' helping them to tackle barriers that may be preventing them from realising the benefits of adopting space solutions. This approach meant that, regardless of maturity, the intention was not to exclude end-user organisations from the programme.

The USB delivery partners maintained a Customer Relationship Management (CRM) internal product to record participation of organisations in USB activities. The following analysis has been conducted internally, based on the CRM data obtained from the delivery partners, on the assumption that it is accurate and reflects the number of participants engaged in each activity.

Figure 1: Participation funnel across the USB activities – all participating organisations

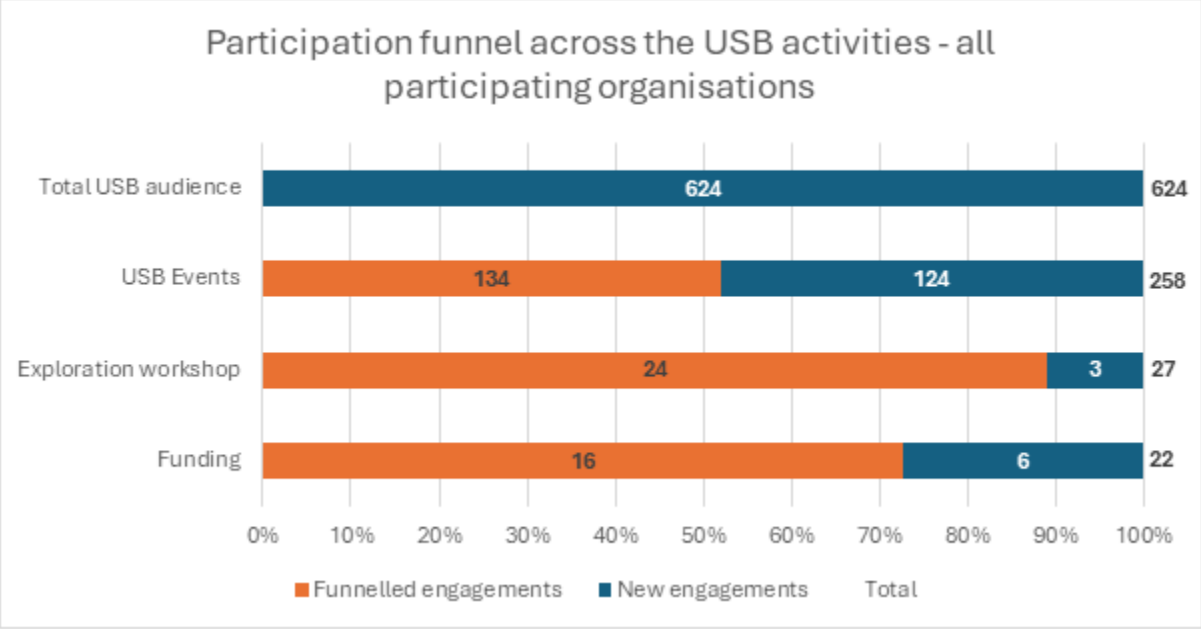

Figure 1 shows a 100% stacked bar chart showing the number of funnelled and new engagements across four categories: Total USB audience, USB Events, Exploration Workshops and Funding.

The total USB audience (624) describes the total number of unique organisations that either registered to participate in the project – for example, completing the USB signup form – or joined any of the activities. 258 organisations participated in at least one USB Event; this includes the earlier project activities, such as Networking Events, L&D, trade body roundtables and webinars. Of those, 134 organisations are considered 'funnelled', having completed the USB signup form prior to involvement with a USB Event, with the remaining 124 organisations considered new engagements who had not previously filled in the USB signup form and so had not received information about Events from the USB newsletter.

27 unique organisations participated in the Exploration Workshops, with 24 of them funnelled from previous USB Events, and three considered new engagements who had not previously attended a USB Event.

Funding was awarded to 22 unique lead organisations overall; one organisation was a lead organisation on both the SBRI contract and USB grant. 16 of those lead organisations took part in earlier USB activities (Events and/or Exploration Workshops), and six were new engagements who had not been involved in any previous USB activities.

Figure 2: Participation funnel across the USB activities – end user organisations

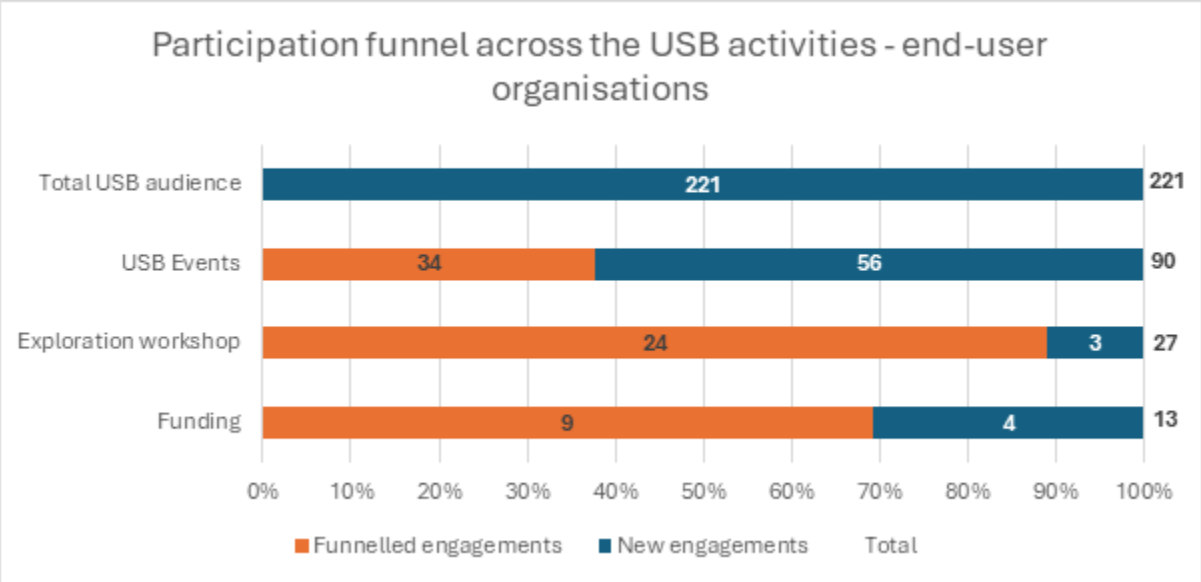

Figure 2 shows a 100% stacked bar chart showing the number of funnelled and new engagements across four categories of end-users: Total USB audience, USB Events, Exploration Workshops and Funding.

221 unique end user organisations – businesses operating in either the financial services or transport and logistics sectors – were involved in the USB project, with 90 of them participating in at least one USB Event. 34 of those organisations are considered funnelled, having completed the sign-up form, with new engagements adding up to 56. The number of organisations participating in the programme was important as USB was launched as a primarily demand led focused project, targeting private sector end-user businesses outside of the space sector.

Of the 22 unique lead organisations who received SBRI or Grant funding, there were 13 unique end-users. Nine of those end-user lead organisations took part in earlier USB activities (Events and/or Exploration Workshops), and four were new engagements who hadn't previously been involved in the USB project. The remaining funding recipients were suppliers or integrators who received SBRI contract funding for feasibility studies.

Overall, the analysis shows that the objective of guiding the participants from one programme activity to another has been fulfilled, with organisations taking part of previous activities increasing as proportion of all participants in the later activities. The programme still allowed for new participants to join at every stage, as designed.

3.2 Research approach

3.2.1 Research aims and objectives

This process evaluation explored the following questions:

- **What has worked well or not, and why?**
- **What could be improved in the future?**
- **Which awareness channels were successful?**
- **Which initiatives worked and which received the best feedback?**
- **Which funding process received the best uptake and feedback?**

The evaluation also explores perceptions of impact by stakeholders, and reports on observable early outcomes. It has been structured by how the programme addresses the barriers to adoption of space technologies identified in the earlier research. The structure is in line with the Theory of Change, described in detail in section 3.2.2.

As the research was conducted at the same time as delivery, it was not possible to address most of the impact and value for money questions at this stage, because it was too early for the anticipated benefits to be realised. Further, a report from Know.Space highlights that there is a 2-year lag for benefits to be realised in this type of investment[3]. As part of the UK Space Agency Evaluation Strategy we will are developing our approach to the long-term monitoring of our programmes[4].

3.2.2 Theory of Change

A high-level Theory of Change (ToC) was developed, based on a problem statement and a vision. A plain text version of this can be found in Annex 1.

Problem statement

The transport and logistics and financial services sectors do not currently fully exploit space technologies. There is an untapped potential for improved business performance in commercial satellite data services, satellite imagery, satellite connectivity and communications, and Positioning, Navigation and Timing (PNT). This is likely due to a lack of knowledge and understanding of how these could benefit them. There are missed

[3] **Returns and Benefits from Public Space Investments 2021**, https://www.gov.uk/government/publications/returns-and-benefits-from-public-space-investments-2021
[4] **UK Space Agency Evaluation Strategy, 2024**, https://www.gov.uk/government/publications/uk-space-agency-evaluation-strategy/uk-space-agency-evaluation-strategy

opportunities as a result, meaning businesses, their customers and society do not experience the commercial, social and economic benefits.

High-level theory of change

We believe that we can move businesses in the transport and logistics and finance sectors to being closer to adopting and benefitting from relevant space technologies if we can:

1. increase their understanding of these technologies and how they can benefit their businesses;
2. connect them with data suppliers, aggregators, technology integrators and insight providers; and
3. create funding opportunities to establish cost-benefits.

Our high-level theory is that businesses need knowledge, connections and funding.

Vision

At the end of the pilot, participating businesses will be closer to exploiting relevant space technologies. We would have learned more about what works, in what settings, for whom and why. Long-term, we want the transport and logistics and financial services sectors, amongst others, to have the means to exploit relevant space technologies. Ultimately, beyond the lifetime of this pilot, we hope this will lead to more investment, and enhance the UK's reputation as a global leader for satellite data exploitation.

Figure 3: Unlocking Space for Business Theory of Change

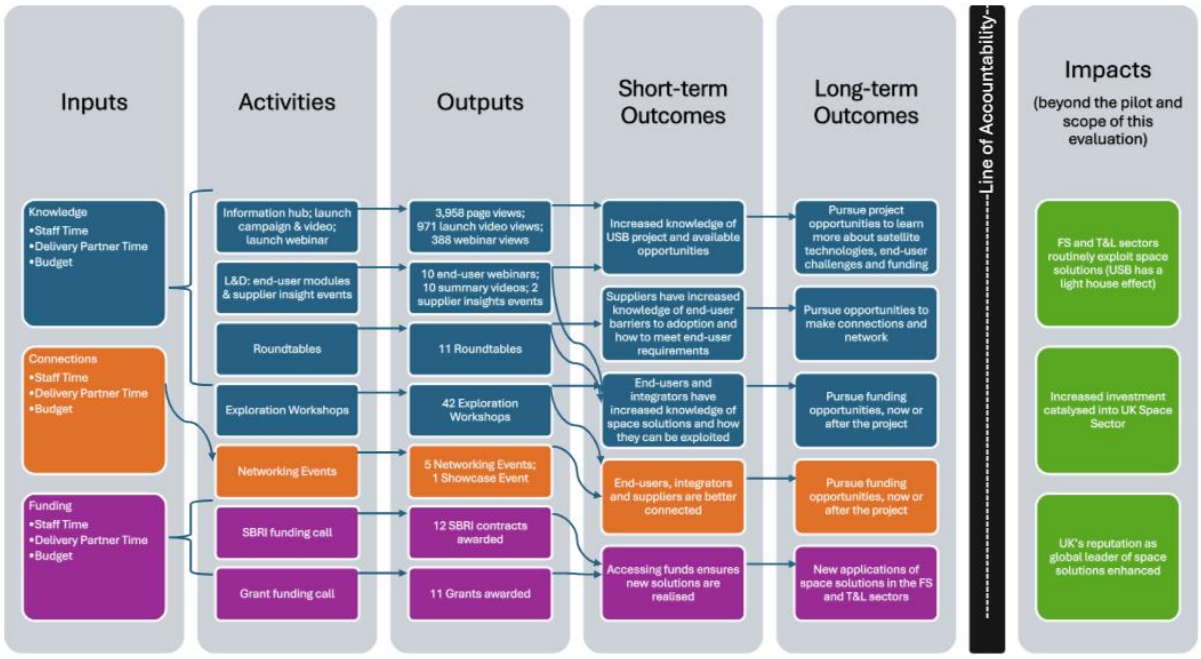

Figure 3 shows the detailed Theory of Change for the USB pilot project. It sets out the key inputs categorised into knowledge, connections and funding, the activities undertaken by the project, the specific outputs from the project as described in section 3.1.2 above, and the short and long-term outcomes from these outputs. The Theory of Change also sets out the anticipated impacts of the project, which are considered beyond the scope of the pilot project and this evaluation.

3.2.3 Methodology

Table 3 provides a summary of all research strands included in the monitoring and evaluation research

Table 3: Research strands across USB monitoring and evaluation research

Timings	Participant group	Aims	Method
August-September 2024	End users who attended exploration workshops, including 15 organisations in the financial services sector, 7 in transport and logistics, and 5 integrator organisations	To explore experiences, views and impact of exploration workshops	13 x 30 minute online interviews
September 2024	Grant-funded project consortium members	To explore experiences, views and impact of grant-funded projects shortly after project kick off	18 x 1 hour online interviews
September 2024	SBRI contract holders	To explore experiences, views and impact of SBRI contracts shortly after projects ended	15 x 1 hour online interviews
October-November 2024	Suppliers who attended supplier event	To explore experiences, views and impact of supplier events	13 x 20 minute online interviews
March 2025	Grant-funded project consortium members	To explore experiences, views and impact of grant-funded projects as projects neared completion	18 x 1 hour online interviews
Total number of interviews completed across all strands: 77			

All interviews were carried out via Microsoft Teams and recorded, with participant consent. The data were thematically organised and analysed using a 'Matrix Mapping' approach. This robust analytical method allows researchers to draw out the diversity of opinions expressed by individual participants, as well as identifying common themes across interviews.

The flexible and open nature of qualitative methods enables researchers to respond to participants and explore unanticipated issues relevant to the research questions. The research does not seek to quantify or generalise to the overall population but instead seeks to reflect a range of attitudes and behaviours. Throughout this report, verbatim quotes are used to illustrate particular findings.

4. Findings

This section explores the extent to which the USB project initiatives supported the Theory of Change that businesses need knowledge, connections and funding to move closer to adoption of relevant space technologies, and were successful in mitigating four root causes of barriers to the adoption of space solutions by end users, which are:

- unawareness and misconceptions of opportunities;
- lack of a persuasive ROI compared to alternatives;
- it not being easy to derive benefits/integrate into end user organisation workflows; and,
- limitations on data availability and quality.

It also considers the success of the project in tackling root causes that underpin barriers to adoption which relate to suppliers, which are:

- their limited understanding of customer challenges; and
- siloed solution offerings.

The first three end user root causes were prioritised for targeted intervention in the pilot as they were considered to be most critical and where the greatest impact could be achieved within the pilot project timeframe. However, this section also considers the extent to which the pilot helped to tackle the other root causes (referred to in this report as 'barriers').

4.1 Barrier: unawareness and misconceptions of opportunities

This section considers how different USB project initiatives helped to overcome the barrier of unawareness and misconceptions of opportunities. This is where end user organisations are not aware that space solutions may be relevant to their business performance, and perceive it as too expensive and/or futuristic.

4.1.1 Exploration workshops

Of all USB initiatives, exploration workshops were deemed to be one of the most effective in tackling this barrier by increasing end users' awareness and understanding of opportunities. End users reported that the exploration workshop facilitators had appropriate levels of knowledge and were flexible in their facilitation, adapting it to the needs of the particular end user. A pre-call before the workshop enabled end users to specify the type of use case and level of detail that they wanted to explore in the workshop, which allowed the facilitators to prepare relevant, bespoke content. While some end users wanted a general introduction to space solutions, others chose to explore specific use cases in greater detail. Some of the latter went on to apply for and secure funding to develop a use case further. This included USB grant funding, ESA incubator programme funding and internal budget allocation. Of the 27 organisations that attended an exploration workshop, five organisations applied for a USB grant, two of which were successful and three were unsuccessful with their application.

> *"SAC [Satellite Applications Catapult] did a lot of background research before we started the meeting. So, we could go through, understand their knowledge, review it during the meeting … they knew the right suppliers, they knew the right data sets that were available to help us with that positioning...they did the research around well, if you're looking at satellite imagery... these are the building blocks you need for your*

> *proposition. These are some of the suppliers. However, you can look further into it as part of an R&D project"* (End user, Exploration Workshop attendee)

The workshops enabled end users to define and focus on a particular use case which was most relevant to their business and feasible for further exploration.

> *The workshops helped us understand what data sets are available and [the] wider application of those data sets. It helped us draw clear boundaries around our area - to get clear specification of what we can and can not do. While we thought the potential was endless, we are now in a more realistic realm where we have a focused vision of what we want to achieve. And that was crystalised by the workshop*." (End user, Exploration Workshop attendee)

End users found it particularly useful to hear about the activity of other organisations in their sector in this space, which provided them with an understanding of what was feasible for their own organisation to explore. Furthermore, exploration workshops provided end users with an understanding of how satellite data quality and availability had evolved with recent technical developments. Some end users felt that this knowledge increased the likelihood that they would develop a use case in the future.

> *"Understanding capabilities of satellite data, and the limitations, I had never looked into that before. Being able to have that as one of the technologies that I can include on any future projects, so we can say we can do this, like the detail that I had no idea of before. Like, it goes around every 5 days, and that is enough."* (End user, Exploration Workshop attendee)

However, there was a group of end users who found that the information provided in exploration workshops aligned with what they already knew. That is, it did not increase their knowledge. The extent to which exploration workshops were effective in tackling this barrier depended on the baseline level of organisational experience and knowledge of space solution use cases. End users with a higher level of existing experience, knowledge and understanding of using space solutions found that they did not learn as much from the exploration workshops as end users with lower levels of prior understanding.

> *"It wasn't that relevant or novel for us, so, it was interesting. It just wasn't, you know, mind blowing…When we were talking through it and saying, oh, well, we've heard of that and we've thought about this or we're not, that doesn't excite us that much…they seemed quite surprised. Some of the different use cases, we're already doing some of these things...we're a relatively sophisticated data-driven [end user organisation]...compare us with [other types of end user organisation], I think you're probably going to find a very different sort of base set of knowledge and a different set of requirements"* (End user, Exploration Workshop attendee)

This group of end users suggested that exploration workshops would have been more helpful for them if they had explored the longer-term vision of how space solutions could become an integral part of technical solutions in the future, and facilitated exploration between suppliers and end users around how satellite data could form part of end users' complementary technology needs. These ideas are discussed further in section 4.6.2.

Furthermore, although rare, some of the end users with more experience of working with satellite solutions had concerns about sharing information on their organisations' activity and experience in this space with PwC. This was because they were unclear on whether and how PwC could use any information they shared. This cautiousness was exacerbated when there were a higher number of attendees from the facilitating organisations at the workshop than those from the end user organisation. These concerns made end users more reluctant to talk freely and openly about their experiences and needs during the workshops.

> *"There were a lot of people in the room from PwC, you know, it was a very big session....I got a sense that there were a few people in there who just kind of were there just to really try and hear a little bit about what we were doing rather than necessarily contributing to the actual process."* (End user, Exploration Workshop attendee)

4.1.2 Other USB project initiatives

In addition to exploration workshops, suppliers considered other USB project initiatives to have raised the profile of their space solutions and thereby increased understanding of opportunities among end users more broadly. In particular, grant and SBRI project suppliers considered the UK Space Agency and PwC brands to provide USB initiatives with kudos and connection with an extensive network of large, high-profile private sector end users. This was seen as particularly useful for small start-up suppliers who explained that the UK Space Agency's brand and networks helped them to engage large end user organisations which they would otherwise struggle to engage. Suppliers particularly valued the publicity from the UK Space Agency's announcements of funded organisations, which they felt gave their product or service external validation and raised its profile.

> *"We are already talking about creating financial products, and this is with multinational banks…how do we stand up there and show them that we are actually worth talking to or that we can actually do this? This grant has been a real enabler …because our engagement with the market is very much dependent on customer contact, having that profile and establishing that credibility. Saying 'we've just been awarded a UK Space Agency grant', people then look at that and say 'they must be doing something special' and that opens doors"* (Supplier, grant funded project)

Similarly, USB networking events, particularly the opportunity to present on a panel at the events, provided suppliers with a platform to present their work to end users. Suppliers perceived this to have increased end users' awareness of how space solutions could be relevant to their business performance.

Echoing this view, end users connected with suppliers via a range of USB initiatives, and through these connections their understanding and awareness of space solutions increased. While networking events and exploration workshops provided end users with introductions to suppliers, SBRI and grant-funded projects provided end users with the opportunity to explore in depth the opportunities provided by a particular supplier's products or services.

Grant funded projects in particular allowed end users to develop and increase their understanding of a particular space solution use case which they identified as having potential to meet their business needs. Grant funded projects were generally successful in demonstrating the viability and value to the end user of the space solution use case they developed. For solutions that did not reach the readiness level of integration into end user

workstreams by the project end, they were typically much closer to this stage than they had been at the start of the grant funded project. Moreover, end users had gained an in-depth understanding of further amendments they could make to the solution they had developed under the project so that it could be integrated into their workstreams.

In addition to increasing their own understanding of the space solution, individuals at large end user organisations who led grant funded projects disseminated information about the project among internal teams who were most likely to use the solution in their business operations over the course of the project. For example, some end users delivered internal workshops to educate colleagues in the activities of the grant funded project and the opportunities it presented. By raising awareness within end user organisations in this way, awareness and understanding among the wider workforce increased.

> *"It's been useful for engaging the broader business on 'here's the platform, here are the component parts we've put in place, and ultimately this is when we come to you and ask you sticky questions around nature related risk'. What we are now giving them is the tool to answer those questions specifically"* (End user, grant funded project)

Having socialised internal teams to the grant funded project activity in this way, end users in large organisations noted that they had been approached by other internal teams who had heard about the project activity and wanted to find out more. This indicated an appetite to further increase understanding of how space solutions are relevant to business performance.

> *"I've had requests to present what we've been doing in different departments within the business. And recently our international pricing team have reached out to say, can you spend an hour talking us through it?"* (End user, grant funded project)

Grant funded project end users also promoted their activity among their wider external networks. Raising awareness of their work on the project helped to raise the profile of end user organisations as leaders in this space, which was an incentive for end users to carry out this promotional activity.

Learning and development webinars and summary videos aimed to address end users' lack of awareness of opportunities. The low number of webinar attendees and views of summary videos means the extent to which they helped to tackle this barrier is unclear, although it can be assumed that their value was limited, given the low level of engagement with this initiative.

All 150 attendees at the March Showcase Event were invited to respond to an online survey, but the response rate was low (n=8), meaning these findings are not representative. Respondents found the content of the Showcase Event very relevant (n=7) or relevant (n=1). Six out of eight respondents stated that they were planning to pursue future opportunities in space solutions following the Showcase Event.

4.2 Barrier: Business case / return on investment (ROI) isn't persuasive

This section considers how different USB project initiatives helped to overcome the barrier of a lack of a persuasive business case (ROI). This is where the right information to inform ROI is not being presented to decision-makers in a way that is evidence-based, easily digestible, trusted and comparable against alternatives.

4.2.1 Grant-funded projects

When approaching end users to propose applying for grant funding as a consortium, suppliers found the lack of persuasive ROI a barrier to engaging end users. This end user barrier was more easily overcome where certain facilitators were present, including:

- A pre-existing working relationship between the supplier and end user so that the end user already trusted, was invested in, and understood the ROI of other products provided by the supplier. It was common in such cases for the supplier and end user to have already discussed the potential of space solutions to meet end user needs, so that the end user already had some understanding of the potential ROI. In some cases, the supplier and end user had developed a working relationship on a SBRI project, which facilitated the end user's understanding of a persuasive ROI from space solutions.
- The end user had previous experience of exploring a space solution use case. For example, some end users on grant funded projects had previously developed a proof of concept for a use case. In such cases, it was easier for the end user to secure internal buy-in to and sign off on the grant application because the potential ROI had already been explored and invested in to some extent
- An understanding among the revenue-generating arm of end user organisations (such as the investment or asset management side of a financial services institution) of the limitations of data they were currently using and therefore the ROI potential posed by space solutions.

  "There's that sort of wider business understanding, where it's not just ourselves on the sustainability side, but other members of the business who recognise that this is a worthwhile focus area." (End user, grant funded project)

Once involved with a grant funded project, end users expected projects to develop a product that would demonstrate a clear ROI. For example, one end user hoped their grant-funded project would demonstrate that space solutions could protect and even increase the value of the assets they manage by providing digestible, decision-useful climate data:

> *"I'm hoping this will give decision-useful information and be tailored in a way that we know people need to see it in order to enact change at the assets where required. So, it will be digestible…and I think that'll be the biggest output...we protect the value of our assets proactively and even increase the value of our assets through better management of both climate and nature...through a robust package of information should you come to sell it...'please buy this asset, it's particularly good because of this reason, this reason, this reason, and here's all the information that comes with it.' That would be the dream "* (End user, grant funded project)

End users leading grant-funded projects explained that their existing technology provides a more generic 'off the shelf' product, with data that lacks nuance and sensitivity. They hoped that the bespoke product developed under the grant funded project would provide a higher level of efficiency and sensitivity, which would provide clear evidence of the ROI.

For the sector more widely, end users and suppliers hoped that the development of satellite data technology through grant-funded projects would lead to the availability of products that provide greater automation, accuracy of data and efficiency savings. The wider adoption by

end users of such improved technology was also expected to benefit end users' customers, for example, via more accurate and lower insurance premiums or improved asset management.

By the point of completion of grant funded projects, some end users were able to demonstrate a clear and persuasive ROI offered by the solution that had been developed under the project. This included quantifiable cost savings which the solution could provide the end user and/or their clients, and other types of value such as a broader range of capability, utility and ease of access to data for the end user organisation.

> *"We've got something that we can go and demonstrate and present the commercial rationale for it, which is pretty clear in my head. The insurance market is about $18 billion a year globally, and we think we can save people 20% off that."* (End user, grant funded project)

Some end users explained that at the point of completion of their grant funded project, their solution required further development to reach a level of readiness where it could be fully integrated into their operations. Nevertheless, the project had demonstrated that the solution had a clear and persuasive ROI, and they expected to integrate the solution in the short to medium term.

> *"What we've got is that really good first iteration. There are a couple of additional features that would require development for us to be able to use it to displace existing systems. And then what we've got is an entirely bespoke system that delivers everything that we need...cost efficiency would be one, and a broader suite of capabilities within that platform...as well ease of access and utility and the specific outputs that it can generate...it would be a seven or eight times better version of what we're currently using"* (End user, grant funded project)

Although end users had often not calculated a ROI offered by their grant funded project solution in monetary terms, they had reached certainty that the solution provided value, and were able to communicate and demonstrate this to internal teams.

> *"We're just deciding where this kind of tool and this kind of information should be placed and whether it's more a kind of risk management function or whether it could be integrated directly into our cash flows and models. And either way in the long term, this could potentially be cash saving. But we can't really quantify that at the moment"* (End user, grant funded project)

4.2.2 SBRI projects

During SBRI feasibility studies, suppliers engaged with end users to explore how to increase the commercial viability and ROI of their product, including how to present evidence of a persuasive ROI to end users. Having used this learning to develop their technology, suppliers reported that the ROI of their product had become clearer and more persuasive. Some SBRI project suppliers felt closer to making commercial sales with an end user as a result. For example, they were discussing a commercial model or pricing structure with end users for the product developed on the project. Others had already taken the product to market since the SBRI project ended. One end user that was involved in an SBRI project explained how the

project demonstrated a clear, digestible, evidence-based comparison against alternatives, which they expected to provide value to their clients.

> *"It showed me that this was a graph I thought would be very nice to show clients, to understand it, because everybody can kind of get behind the [satellite] picture and see that this makes a lot of sense, more than if you said 'well, I think there's more fuel in the forest than in shrubland' which is true, but is not scientific. So, for me this helped a great deal"* (End user, SBRI project)

4.2.3 Exploration workshops

The information presented during exploration workshops provided end users with a greater awareness and understanding of how satellite solution use cases could provide a ROI for their business. By exploring use cases during the workshops, end users learned how satellite solutions had been used and provided a commercial benefit to other organisations in their sector.

> *"The workshops are good in the sense that they came up with loads of different ideas and how peers are using them too and other corporates are using them to help their own clients and generate their own revenue sources"* (End user, Exploration Workshop attendee)

4.3 Barrier: Not easy to derive benefits or integrate into end user workflows

This section considers how different USB project initiatives helped to overcome the barrier of it not being easy to derive benefits from space solutions, because the products being offered are not easily accessed, used and integrated by businesses to realise target benefits (for example, it takes too much time, money and resource).

4.3.1 Grant funding

End users explained that the grant funding de-risked the exploratory work into space solution use cases on grant funded projects. This enabled them to explore the value of space solutions without already having clear evidence of a ROI. End users explained that without the grant funding, they would not otherwise have been able to resource this speculative type of work.

> *"There's a huge amount of risk in doing something that's quite new and different…we'd had [ideas] for years about things that we might be able to derive from satellite data…it had been on our radar as exploratory projects that we're probably not having the time or money to do. And then we went to the [exploration] workshops, and found some much more specific use cases than we'd probably given time or thought to. We probably chose a particularly exploratory project because there was grant funding for it, we wouldn't usually be able to engage with a supplier without the grant funding on the basis of [it being] almost speculative use case. The project we're doing is not something where there's a proven track record of it working... I guess that the grant funding really allowed us to do something a little bit more exploratory, because we weren't having to invest up front in something that we weren't sure of the value of."* (End user, grant funded project)

Similarly, suppliers expressed a view that without the grant funding, end users would not have otherwise afforded the time and resource to explore the benefits that can be derived from space solutions.

> *"The end user, without this grant, would not do this. They can't see past the steep learning curve of adopting this...but the investment in this, that's enough to sort of get them over that hump and then immediately they see the potential value"* (Supplier, grant funded project)

Moreover, end users explained that grant funded projects allowed them to specify the particular use case that they wanted the project to serve, ensuring that the project met the specific needs of the end user organisation. This made it easier for end users to derive target benefits from space solutions than if they had explored off the shelf products available on the general market.

> *"Every way you turn vendors in the typical consulting houses are able to offer you off the shelf products...but it doesn't take too much effort to sort of scrape away at the underlying data and assumptions and methodologies to realise that there are plenty of shortfalls in the analysis presenting products that don't answer the most important question, which is 'so what'?...it doesn't tell us what the financial returns impact will be…With this project, the opportunity to kind of tailor what you want to see …is really important…having direct control over the direction of the project makes it meaningful"* (End user, grant funded project)

Furthermore, grant funded project consortia typically included a data integrator organisation, which integrated 'raw' space data to make it easier for end users to use and derive benefits from. In so doing, data integrators worked with disaggregated data to make it more digestible and easier for end users to access.

> *"[The data suppliers] are making it higher resolution than the original satellite data... to pinpoint that exact location…So, I think the most important thing is kind of tailoring it towards our own investments rather than just having this general overview which we didn't find particularly useful"* (End user, grant funded project)

As grant funded projects neared completion, some end users had already integrated the solution they had developed into their workflows. Moreover, going forward, they expected to develop additional use cases from the data acquired and process developed during the project.

> *"The first [use] we're going to create is going to be ready to go at the end of the project. And then it's just a constant stream of others. You know, what else can we learn? So, it's not a one off. We'll talk continually and look for [further use cases]...We process [data] at a very low level, which means it allows us to then engineer it in any way that we want...which allows us to go through the process again. So, we've got tangible outcomes, but also a process to actually allow this to continue going forwards"* (End user, grant funded project)

End users explained that by designing their grant funded project solution to be adaptable to a range of different use cases, they had ensured their solution would be scalable to meet a broad range of client needs.

> *We've used the UK context as a as a kind of training data, or training metrics, as a way to understand how it might work. But we've really focused on the ability to kind of plug and play loads of various inputs as well as bespoke or specific solutions, in the hope that we will be able to adapt to various incoming legislation or industry motivations."* (End user, grant funded project)

4.3.2 Exploration workshops

End users explained that exploration workshops helped them to more easily derive benefits from space solutions by providing clarity and understanding of how to engage with the supplier sector. This included a breakdown of the supplier landscape that was discussed during the workshops, and information on which type of supplier could best meet their needs. This knowledge enabled end users to more efficiently and effectively identify and connect with suppliers whose services were most suited to their needs.

> *"As someone approaching the subject from outside the space sector, which was completely alien to me at that point in time, going through these exploration workshops was an eye opener and accelerated the pace at which we understood the whole sector…It's gone from thinking 'how could this work?' to, while we don't understand the structure completely, we do know who to talk to, which is really appreciated"* (End user, exploration workshop attendee)

> *"There was one slide that split all the [supplier] companies up into three different groups...it put the different companies in those different boxes. And for me, that's actually really, really useful. Because ultimately, if I'm looking at something and then I know actually they are data only, there's no analytics there, that's going to require a lot more work from me. Or, if a client says are you aware of this? and I can say well, yes, but you realise…"* (End user, exploration workshop attendee)

4.3.3 SBRI feasibility projects

One of the aims of the SBRI feasibility studies was for suppliers to engage end users to explore this barrier and increase their understanding of how to overcome it. Through market engagement workshops with end users, SBRI project suppliers gained valuable insight into how space solutions could enable end users to derive benefits and integrate them into their workflows. Moreover, through end user engagement, suppliers' knowledge of how to explain this value proposition to end users increased.

4.3.4 Links between USB initiatives

By engaging with earlier USB initiatives (such as roundtable events or networking events), end users were connected to further project initiatives. This made it easier for end users to access the benefits of the broader USB project and moved them further along the adoption journey towards a demonstrator or pilot phase that the grant funding call offered. An example of how one end user moved closer to adoption through links from one USB initiative to another is illustrated in the case study below.

Case study – linking end users from one USB initiative to another

A large financial services organisation attended a USB roundtable event where they learnt more about the USB programme and its various initiatives, and a selection of example use cases for satellite data. Attended by other large, high-profile financial organisations, the roundtable event helped this end user learn about the activity of other organisations in their sector in this space. Attendance by key players in the sector who were already active in the satellite data applications space signalled to the end user that engaging further in the USB programme was in their organisation's interests in order to maximise their competitiveness in the sector. They were made aware of the exploration workshops at the roundtable event, and decided to engage with this initiative.

The exploration workshops made them aware of the grant funding call, and through discussion with the exploration workshop facilitators during the pre-call, arranged for the first of two exploration workshops to focus on their target use case. They were also made aware of the grant funding application webinar for applicants, which they attended. This end user went on to be successful in their grant application.

During one of the exploration workshops the end user was also invited to attend a USB networking event at which they spoke on a panel.

"There was the initial roundtable where we learned about the programme…[the roundtable event] allowed us to gauge what other banks were interested in the data and what their use cases were. So, we got a little bit more oversight into what our peers are doing and how they're thinking about this problem…It was a confirmation that the space is growing…we then knew we were interested in the programme. We then had a workshop following on from that...and we were already along the journey of starting to shape our grant proposal"

4.3.5 Links between USB and other projects and programmes

There was evidence that end users were successfully connected to the USB project from other UK Space Agency and public sector programmes of support. For example, one end user organisation which attended exploration workshops heard about the USB project initiatives through their engagement with the Connected Places Catapult Future of Air Mobility accelerator programme. Another end user heard about the USB project from their involvement in the UK Space Agency Accelerator's Explore programme, and engagement with the Innovate UK Knowledge Transfer Network.

There were also end users whose engagement with the USB project linked them to other UK Space Agency or ESA programmes. For example, one end user which engaged with USB exploration workshops applied for but was unsuccessful in securing USB grant funding. However, with the use case they had developed with insight gained from the exploration workshops and previous experience of applying for grant funding, they applied for the ESA Business Incubator Centre programme. Having been successful in their application, they were developing a commercially viable, scalable satellite data model through this programme of support. Similarly, another end user which engaged with exploration workshops used the knowledge gained from the exploration workshop to develop a proposal for the UK Space Agency Accelerator's Geo programme, which was successful.

> *"Everything we did in the exploration workshops; I was able to use as part of the interview and the progression with Geo itself...it's part of the UK Space Agency accelerator...We weren't able to build on the road map that UK Space Agency had for Unlocking Space for Business. But it gave a route in to a parallel programme instead."* (End user, exploration workshop attendee)

4.4 Barrier: Limitations on data availability and quality

This section considers the extent to which USB project initiatives addressed the barrier of limitations on data availability and quality. This is where technical limitations create mismatches in expectations versus reality of data availability, such as resolution, data persistence (including revisit rates and cloud cover), timeliness and service guarantees.

Although this barrier was not prioritised for targeted intervention in this pilot, there was some evidence that the funded projects had tackled this barrier.

4.4.1 Grant funded projects

One of the central aims of grant funded projects was to improve data availability and quality so that it would provide end users with a ROI. Grant funded projects commonly aimed to increase the level of automation and accuracy of space solutions through, for example, a higher level of resolution of images or quicker processing speeds. This in turn derived other benefits such as higher revisit rates of landscape assessment, the scaling up of applications, and more efficient processes for end users.

> *"[Grant] funding will help us speed up that process and be able to get the data to the clients quicker... it's all about computer processing power. So, we can build those automations in...once you've done it for that area, it's just a case of pressing the button and repeating it again [for other areas] very easily"* (Supplier, grant funded project)

> *"For this biodiversity metric that we have, at the moment it's being done effectively manually by this boots on the ground method and there literally aren't enough ecologists with clipboards on the planet to be able to do the sort of scale that's going to be demanded by this incoming legislation. So, it's quite clear that this needs to be automated and industrialised, so that's our objective"* (Supplier, grant funded project)

4.4.2 SBRI feasibility projects

Similarly, the technical developments of some SBRI feasibility projects had increased the availability and quality of data that end users can access. This had typically been achieved through faster processing speeds and increased automation of data services, which made it easier for end users to access quality data.

> *"It was sort of our first foray into doing what I would refer to as like a self-serve product. A lot of the work we do at the moment is more reporting and consultancy. There's a lot of 'I need to send someone to this site or I need someone to really look and analyse these results.' This was our first foray into something which is purely customer comes to platform, uploads a shape file or draws it on a map and the computation analysis happens in the background"* (Supplier, SBRI project)

4.5 Barrier: Limited understanding of customer challenges

This section considers the extent to which USB initiatives were successful in supporting suppliers to overcome the barrier of having a limited understanding of customer challenges. This is where suppliers have limited understanding of specific nuances related to customer pain points, operations and priorities, and therefore find it challenging to align and articulate their value proposition in the customer's language.

4.5.1 SBRI feasibility studies

SBRI project suppliers typically ran engagement activities with potential end users of space solutions as part of their feasibility study. The aim of these activities was to better understand customer challenges and how space solutions could help customers address those challenges. This end user engagement helped suppliers to increase their understanding of customer pain points and needs, and how to articulate their value proposition in the end user's language.

> *"The outcomes that we are already seeing [from market engagement workshops] is actually it's strengthened our relationship with the financial services sector. We know the type of language we need to use when we're talking to them around their specific needs, and we are learning to listen better, in terms of that language and actually where they are coming from rather than us pushing tech at them…listening to the problem space. So, it's given us an opportunity to really start understanding that far better and how can we use our specific skills to help them access things like earth observation data in a much more pragmatic way."* (Supplier, SBRI project)

Through end user engagement on SBRI projects, some suppliers developed an ongoing relationship with particular end users. This enabled them to continue to develop their understanding of end users' challenges and needs over time. For example, one SBRI project supplier explained that some end users which they had engaged during the project had agreed to test and provide feedback on iterations of their product as it continued to develop beyond the life of the SBRI project. Another SBRI project supplier had not previously engaged with the financial services sector at all. Through the insight gained from the SBRI project into the specific pain points faced by this sector and how to articulate the value proposition of space solutions, financial services had become a new area of focus for the supplier business.

SBRI funding was therefore generally perceived to be an effective mechanism for addressing this barrier, facilitated by the 100% funding level that was provided to SBRI contract holders. Some suppliers felt that if they had been required to provide match funding, they would not have been able to carry out the feasibility study and therefore would not have made progress in overcoming this barrier. The commercial feasibility focus of the SBRI contract was reported to be rare for R&D funding, and yet critical for overcoming this barrier.

> *"There's always a danger with R&D funding, where you're effectively your own customer, that you're going to build what you want to build rather than what the customer wants to have. Having something where actually there's a commitment to bringing in a customer who provides the ask and the requirements, I think it provides a bit of focus that we don't necessarily get through co-funded opportunities."* (Supplier, SBRI project)

4.5.2 Linking SBRI projects to sources of follow-on funding and support

With greater understanding of and confidence in how to align their product with customer needs and articulate this in their language, SBRI project suppliers had typically continued to develop their product after the SBRI project ended. For some projects this involved further engagement with an end user, such as by carrying out a demonstration event to showcase the capabilities of the product to the wider end user organisation. Some SBRI project suppliers had applied for and secured further funding to develop their product, for example, by developing a minimum viable product for which an end user would be an early validator.

Three organisations that were involved in SBRI projects were successful in applying for USB grant funding to develop their product further. Other examples of funding sources accessed after SBRI projects concluded include the Connected Places Catapult, European Space Agency funding, and seed and venture capital investment. Suppliers which had secured further funding or investment felt that without the understanding of customer needs that they gained through the SBRI project, they would not have been able to secure further funding to develop the value proposition of their product.

> *"[The SBRI project] helped us to solve some of the problems that we really needed to solve…and develop our ideas at a quick pace and build really strong relationships with some of our key stakeholders. As a direct result of it, we've been accepted onto an accelerator programme run by the Connected Places Catapult…we're going to be building a [specific product]"* (Supplier, SBRI project)

4.5.3 Grant funded projects

Suppliers in grant funded project consortia worked closely with end users to develop an in depth understanding of the challenges they face, and how a solution could help end users overcome those challenges. Typically, suppliers sought end user feedback on the solution they were developing at regular intervals throughout the course of the project, making tweaks and amendments in response to the feedback received. Similarly, end users on grant funded projects demonstrated their solution to clients in a range of sectors, and sought their views on how the solution could be refined to increase its utility and value to those clients. This feedback was relayed by the end user to the supplier, who was able to make the necessary amendments to the solution so that it could better meet the needs of the end user's clients.

This understanding of end user challenges helped suppliers in project consortia to develop their products to make them more marketable to their customers. By the time grant funded projects were coming to a close, one supplier had already secured a commercial contract for the solution they had developed, and expected to secure additional contracts going forward.

"We've got a concrete commercial contract win off the back of the technology we've developed, and we look forward to taking that further and securing more. So our business development team are very happy, because they've got a more mature product that they're able to take to customers. So, it's really helped us with our pipeline" (Supplier, grant funded project)

4.5.4 Networking events

Suppliers reported that USB networking events helped them to connect with end users. This prompted conversations between suppliers and end users (some of which continued after the events) which helped suppliers to better understand end users' challenges and needs, and

where their product could fit in the value chain. Through talking with end users at networking events, suppliers gained a greater understanding of the type of end user whose needs would be best served by their product, that is, where demand for their product lay. The insight that suppliers gained from these discussions helped them to understand how to articulate their value proposition in the end user's language. This insight was used by some suppliers to inform the design of their grant funded projects.

> *"The networking event that I attended was really good. It was during those workshops that the penny dropped that the insurance companies were suddenly looking like being the ideal vehicle as it were…there was one particularly useful conversation with [an end user organisation] which owns a huge amount of land which is absolutely ripe for biodiversity enrichment…so by talking to a handful of organisations we can access a major part of the market. And that was where I really got it."* (Supplier, grant funded project)

4.5.5 Supplier events

Participants who attended supplier events identified ways in which the events helped them overcome the barrier of limited understanding of customer challenges. They explained that use cases were presented by the facilitators from PwC and panel members at the events. This gave suppliers an understanding of the nature of customer challenges and ideas of how to address those challenges, increasing their understanding of their role in the value chain.

In addition, suppliers were able to share learning from their own experiences of striving to address customer challenges during breakout sessions at the events. As an example, one of the breakout session topics of discussion was how to overcome the barrier of jargon used by the space solution supplier sector, and articulate the value proposition in the end user's language. One supplier found that discussing and sharing views on this topic with other suppliers in the session helped them to collectively reach a solution.

> *"One of the things that PwC said was that this industry is shrouded in acronyms that people don't know about. And I and another [supplier] said 'data is data. Where it comes from doesn't really make any difference'. So, when you're trying to get into end clients, talk about data rather than data sources. We were thinking that was an inhibitor to get to the end business. But we said you can simplify that into, it's data. I think that worked"* (Supplier, supplier event attendee)

However, there was a view among suppliers that the supplier events focused more on the challenges of engaging with end users than the range and nature of challenges faced by end users which could potentially be solved by space solutions. Suppliers that had not engaged with other USB initiatives felt that although it was helpful to articulate and discuss the former, discussion of the latter would also have been useful as this remained a key gap in their understanding.

Suppliers that had been working in the sector for a longer time - typically decades - were most likely to perceive the impact of supplier events in helping them overcome this barrier to have been limited. They felt that there had been discussion of this type of challenge in the sector for many years, and, with the exception of one or two use cases that were presented, the supplier event did not surface a significant amount of new information or learning on the nature of customer challenges and how to overcome the challenges of engaging with suppliers.

> *"There was a slight sense of we could have told you a lot of that five years ago or 10 years ago...but nobody listened. Now it's in a well-structured, well-organised way with lots of voices saying the same thing. Maybe it's a moment in time to actually act on those issues...maybe it's a significant moment to say, right, we all now know this. It's all out in public. So, what are we going to do about it? And that would be the only shame is if this programme stops now, states the bleeding obvious or doesn't use that to consider what activity can occur to take this forward and start breaking down some of these barriers"* (Supplier, supplier event attendee)

4.6 Barrier: Siloed solution offerings

This section considers the extent to which USB initiatives addressed the barrier of siloed solution offerings. This is where suppliers competitively develop and sell products in a silo, without enough consideration of customers' complementary technology needs (including terrestrial technology) and architecture integration requirements. Although this barrier was not prioritised for targeted intervention in this pilot, there was some evidence of USB initiatives helping to overcome this barrier.

4.6.1 Grant funded projects

As discussed, suppliers in grant funded project consortia had the opportunity to work closely with the end user to understand their complementary technology needs and architecture integration requirements. Suppliers and end users had regular contact throughout the project to discuss end user needs and requirements. This meant that by the completion stage of grant funded projects, some end users were ready, or expected to be ready in the near future, to adopt the solution developed under the project and integrate it into their existing workstreams. Grant funded project end users hoped the technology developed in the project would be adopted as one of their technology solutions more widely across their organisation.

There was also an ambition among some end users that learnings from grant funded projects would influence thought leadership across the wider sector.

4.6.2 Exploration workshops

End users found that exploration workshops increased their understanding of how space solutions could be incorporated into their technology architecture. The workshops provided a space for internal colleagues who would not otherwise collaborate on this topic to meet and identify opportunities to work together to explore the use of space solutions to meet business needs. This was considered to have been most impactful when senior management or C-suite roles attended the workshops, as they had a broader overview of wider business priorities and how space solution use cases could potentially support the organisation's strategic goals.

> *"We had a lot of people who in our organisation were more senior and they wanted to see how we can use this in the wider business and what opportunities there were. So, we had our CEO there, we had our Chief Risk Officer. I think that actually helped us to get an idea of what we wanted to do. The most important factor that came out of that was getting senior management to think, ok, this is valuable…once we had a clear idea of the projects, what we need to put together. It shows the value of bringing other people in the business into the whole concept"* (End user, exploration workshop attendee)

Individuals from end user organisations who attended exploration workshops disseminated learning from the workshops within their organisation. This was supported by workshop facilitators sharing copies of the slides discussed during the workshops with attendees so that they could take away this resource to be used internally when needed. By sharing learning internally, other teams within end user organisations could increase their understanding of how space solutions could be added to their range of technology solutions.

> *"The mobility team are now involved again and are involved in satellite technology more, so they are now interested and identifying opportunities. We've done internal workshops where I've shared what I've learned as well, so I've shared the information around. The mobility team are already working on other technologies, like AI, so for them to add satellite into the mix, will be really good for them"* (End user, exploration workshop attendee)

However, there was also a group of end users which were more experienced with using space solutions who felt that exploration workshops were less impactful in addressing this barrier. Based on their understanding from the information presented in the workshops, they were of the impression that the space solution market is not yet mature enough to present consolidated and integrated solutions that meet end users' architecture integration requirements. They felt that, in the sector more widely, there was a general lack of collective discussion and exploration between suppliers and end users around how space solutions could form part of end users' complementary technology needs.

> *"[It seemed that] the industry was not quite as mature as it could be…maybe in 2-3 years where there's consolidation and offerings which are more mature and it seems less consultant based…It felt like we've got a load of data that we're trying to make work here and here and here…it doesn't always feel that collaborative. I think it seems to be a bit more transactional. So, it's 'we have this very specific use case that we've got pinned down'. Ok well that's great, but from a value perspective, what else can it do? ...Not expecting them to have all the answers, but it needs people to come together to try and brainstorm a little bit. And there seems to be a lack of appetite for that"* (End user, exploration workshop attendee)

One end user felt that exploration workshop discussions lacked a longer-term vision of how space solutions could become an integral part of technical solutions in the future. They felt that by understanding this, attendees from their organisation might have understood and bought in to the need to explore and develop use cases now, as a step towards that future scenario of space solutions as an integrated solution.

> *"I think [the workshops] were very good at showing sort of a near term use cases that people could sort of grab potentially and if something stuck then great, and it was sort of like, strike lucky. But I think it was less of imagining what the world looks like in 15-20 years...and buying into that strategic vision. There wasn't that I still don't know what the vision looks like…And buy into that first, and then the interim, short term use cases that we've got right now...It would have made it more tangible, I suppose, about how this ultimately will be a cornerstone of what we need to do in the future."* (End user, exploration workshop attendee)

4.7 Delivery Challenges: Funding Calls

This section considers specific feedback from participants on how the USB grant and SBRI funding calls were delivered.

4.7.1 Grant and SBRI funding call linkage

Views on how seamlessly the two USB funding calls of SBRI contracts and grant funding were connected were mixed. One supplier which received both SBRI and grant funding perceived there to be a clear progression from one funding call to the next. This helped them to continue the development journey of a product that had a clear value proposition for end users.

> *"It's a very neat progression because essentially the [SBRI project] was a research question of can this methodology be made to work? And now the [grant project] is great, we like the methodology. Is it now possible to commercialise it? And that's essentially what we're trying to do now."* (Supplier, grant funded project)

However, some SBRI suppliers had not applied for grant funding because they felt that the grant funding call came too soon, part-way through the SBRI project life cycle. For some SBRI projects, this meant they had not completed enough of the feasibility study to be in a position to apply for grant funding at that time, although they were in a position to apply for further funding once the project had completed and the grant deadline had passed. Furthermore, some SBRI project suppliers felt the UK Space Agency communications about the grant funding opportunity were unclear. For example, one was initially under the impression that they were ineligible to apply for grant funding because they were a SBRI contract holder.

> *"We would have appreciated being notified of the grant opportunity. We had been many months in the SBRI process, but it wasn't mentioned to us until we were at the [USB] event. It would have been helpful to have it confirmed that we were eligible to take part, because initially there was some confusion around whether SBRI disqualified us from applying for the grant"* (Supplier, SBRI project)

4.7.2 Grant funded projects – burden of the project lead role

End users which took on the project lead role for grant funded projects typically found that the time and resource they were required to spend on the project was sufficiently minimal that the benefits derived from the project outweighed the investment of resource. End users appreciated that:

- The grant funding application was straightforward and not overly-time consuming to complete. End users typically only wrote certain sections of the application form which were most relevant to their role in the project. Data suppliers in the project consortium used their technical knowledge and, in some cases, their previous experience of writing grant funding applications to write other sections of the application.
- UK Space Agency project managers provided clear information and direction and resolved any queries raised by project leads in a timely manner.
- Project reporting requirements were minimal and not overly onerous.

"[The project kick off meeting] helped alleviate any concerns we had around how demanding the reporting was going to be. it's quite minimal, which is good, it doesn't add too much extra time to our work." (End user, grant funded project)

Factors that made it easier for end users to join a project consortium and lead the grant funded project included:

- Internal budget was already allocated to exploratory R&D work such as the grant funded project. This allowed them to be more responsive in securing resource for this project without needing to go through extensive internal processes to secure buy in and sign off.

  "We do this kind of projects with suppliers and have budget for it allocated in advance. Part of our annual planning would have allocated resource for looking at third party data. And so, we're in a position where we do have the resource for it. And so, we came armed with the time and money to do projects of this nature" (End user, grant funded project)

- The individual from the end user organisation who was leading the project worked in a role that had a focus on this type of work, such as innovation, thought leadership or R&D.
- Previous experience of working with the suppliers in the consortium. This made the process of securing buy in to the grant project from internal stakeholders quicker and easier. In these cases, end users were often keen to continue to support the supplier organisation, as they believed in the value of their work and recognised that small start-ups needed the support of large organisations such as theirs to succeed.

In addition, there were suppliers in grant project consortia who perceived that SME end users found it quicker and easier to secure internal buy in to and sign off on their engagement in the project because they had less internal bureaucracy to navigate than large end user organisations. From the supplier's perspective, this allowed end users to be more flexible and responsive so that they could make the decision to engage in the project in time to meet the application deadline.

Despite these facilitators, some end users that took on the project lead role did face some administrative and bureaucratic challenges which required time and resource to resolve. These included:

- Securing internal sign off and completing internal financial processes that had to be followed for their organisation to be able to accept grant funding. End users explained that as large financial institutions, there was no precedent of receiving grant funding and their internal processes were not set up to do so. Similarly, suppliers cited this lack of familiarity with accepting grant funding and associated processes as a barrier that they faced when approaching end user organisations to propose they apply for the grant as a consortium, because end users anticipated that the role of project lead would be too burdensome.

  "Somebody saying to [the end user], can you put a timesheet together and issue a bunch and the invoicing... it's pretty complex and so for us to be like 'just an FYI, you'll be responsible for this. You'll have to do this'...the majority of them will be like, 'yeah, I actually have a job...I'm not sure we can do that'" (Supplier, grant funded project)

There were suppliers, including some that were already participating in an SBRI project, that found this barrier unsurmountable in the time available before the grant application deadline. End users that were able to overcome this barrier typically had to set up a new internal process to manage the receipt and distribution of grant funding to other consortium members. They reported that this was a time-consuming process that was challenging to meet before the application deadline.

> *"We got bounced around multiple teams until you find the right accounting team that can handle this. We essentially had to create a process to handle those type of payments and the subsequent payments on to our partner. So, that wasn't easy and it definitely pushed us tight in terms of being able to meet the kick off time"* (End user, grant funded project)

Some end users (and indeed, some suppliers) did not realise what the invoicing process would require of end users until the project kick off meeting. Furthermore, when they did set up payment processes, they felt it was more onerous than they had initially realised at the application stage. Nevertheless, by the end of grant funded projects, end users typically perceived these challenges to have been teething issues which had been resolved in the early stages of the projects. They felt that on reflection, the project management role and its administrative processes had not been overly onerous.

- A reluctance in the early stages of grant funded projects to apply for a grant change notice to gain approval for a change to project milestones for fear that the process would be overly burdensome. This resulted in one end user carrying out more work at an earlier phase in the project than they really needed to, in order to avoid having to apply for a grant change notice. However, by the end of grant funded projects, most end users had applied for at least one grant change notice and had typically found the process to be streamlined, straightforward and not overly burdensome.

When deciding whether to be involved in a grant funded project, one group of end users anticipated that leading the project would require too much of their time and resource. In these project consortia, the supplier had consequently taken on the bulk of the administrative and project management tasks to relieve the end user of this burden while still enabling them to derive benefits from the project. This included data suppliers writing most of the funding application and, during delivery, carrying out project management and reporting tasks for the consortium.

This group of end users typically perceived there to be a persuasive ROI of the technology (and so had overcome that barrier) and wanted to support the supplier to develop a product to provide them with the ROI, but felt they could not afford to invest time and resource to lead the project. These end users typically preferred to not receive any grant funding and wanted to take a high-level oversight role in the project. This group of end users included individuals who worked in revenue-earning roles, such as fund manager, and therefore were unable to allocate time to more exploratory or innovative R&D activities.

> *"My CEO straightaway said, 'yeah, go for it, sounds great. Don't spend your precious man hours on this when you could be fundraising etcetera'"* (End user, grant funded project)

Grant project suppliers which were taking on most of the administrative duties felt that without having done so, the end user would not have engaged in the grant funded project. They took the view that the aim of end user involvement in grant funded projects was for the end user to recognise and understand the commercial value of the technology developed, rather than for them to carry out the administrative tasks required of a project lead role. These suppliers considered that by carrying out administrative tasks, they could help end users derive benefits from the technology without having to invest too much time and resource.

> *"From my perspective, you want [the end user] engaging commercially in the sense that they want to understand the technology and they want to understand the commercial benefit that they're getting from this. You don't necessarily want [the end user] to get good at administering grant projects. That's not the goal, right?"* (Supplier, grant funded project)

4.8 Suggestions

This section examines the suggestions made by participants for improvements that could be made to the USB project and its initiatives.

4.8.1 Suggestions related to grant funded projects

- Participants suggested that the grant call specification should provide greater clarity around the requirements of end users as project lead of grant funded projects. This should include details of processes they need to go through at the application stage (such as getting sign off from the relevant internal teams such as Finance), the administrative tasks they would be required to carry out during project delivery, and the level of detail of reporting requirements. This would give end users a more accurate understanding of the time and resource they would need to invest in the project, and provide them with more time to complete internal processes and prepare to carry out the project lead role.
- Some suppliers suggested that end users should not be required to take on administrative project management tasks at all, to reduce the burden that the project lead role placed on them and encourage them to engage with projects. They felt that suppliers could carry out the administrative tasks of project management instead.

4.8.2 Cross-initiative suggestions

- There was a perception among some small start-up suppliers that the focus of the USB project was on large end user organisations, whereas these suppliers wanted to engage smaller end users, as they were considered to be easier to engage. They suggested that incorporating SME end users into the focus of USB initiatives would support them with this.
- Similarly, USB supplier and networking events were perceived by suppliers to focus on the financial services sector more than the transport and logistics sector. Although the insight gained into the financial services sector was useful, they would have liked a similar level of focus on the transport and logistics sector.
- Both suppliers and end user organisations expressed an appetite for more direct introductions to each other, so that suppliers could learn about the specific needs of individual end user organisations, and end users could identify specific supplier organisations that could address their particular needs. There was a suggestion that networking opportunities at USB events could have been more targeted, with suppliers

and end users being 'matched' by facilitators based on their particular services and needs. In lieu of opportunities for face-to-face connections, introductions by email were also suggested.

- There was an appetite among suppliers for access to a synthesis of learning from across USB initiatives. Suppliers anticipated that there would be valuable learning from the USB project which they could benefit from, particularly around the challenges faced by end user and use cases for space solutions, as well as how suppliers on grant funded and SBRI projects had successfully engaged end users. They felt that by sharing this learning from the project, the UK Space Agency could help the wider sector continue to progress with engagement of private sector end users.
- When asked what further support, if any, they would like from the UK Space Agency, requests from both end users and suppliers centred around publicity of the work that organisations had carried out under the USB initiatives. The UK Space Agency was perceived to have valuable access to a network of organisations in the sector, which could give organisations a platform that they would not otherwise be able to access.
- Suppliers also expressed an appetite for:
    - The UK Space Agency to develop and publish a road map, informed by the collective learning from the USB project, of how it plans to support development in the sector over the medium term. It was explained that the earlier the sector becomes aware of upcoming funding calls or other type of support that the UK Space Agency plan, the easier it is to be ready to access that support when it becomes available.
    - Follow-up information, advice and guidance to help suppliers develop their product further after the SBRI project end. They required information and guidance on issues such as IP and licensing, staff recruitment, pricing structures and commercial models to take their product to market and grow their company. SBRI projects also suggested that the UK Space Agency endorsement of the solution developed in the project would help them to secure further funding to continue product development.
    - Support with sourcing follow-on funding after grant funded projects ended. As grant funded projects neared their conclusion, some consortia had not yet secured further investment or funding to develop their solution to the point of commercial viability. They expressed an appetite for information and guidance on potential sources of such funding, including any further UK Space Agency funding calls.
- Although there was evidence of individual USB initiatives successfully linking participants to other initiatives, there was a suggestion that the wider USB project, including the purpose, nature, target audience and timeline of each initiative component, could have been communicated more clearly from the start of the project and to those participating in each initiative. For example, suppliers suggested that the UK Space Agency could provide clear information to organisations working on SBRI projects of an upcoming grant funding call. One supplier who attended a supplier event expressed an interest in learning more about the Unlocking Space for Investment project, which had been mentioned at the event.
- If timelines allow, it was suggested that each funding round under the USB project should be consecutive rather than concurrent, allowing the projects of the first round of funding (in this project, the SBRI contracts) to complete before the second funding

call. This would help the projects that participated in the first funding round to be in a position where they were ready to apply for the second funding round.

- Although end users and suppliers considered there to be a number of benefits of PwC's role in facilitating some of the USB initiatives, there was a suggestion that it would be helpful if PwC's role, and the scope and terms of their engagement in the USB project were clarified. This would provide clarity around whether and how PwC could provide strategic support to grant funded projects, and how they might use information they obtained from end users and suppliers about their activity in this space.

5. Conclusion

Overall, the evaluation found evidence that USB project initiatives have had a positive impact on the barriers to adoption of satellite-derived data, applications and services across private sector end users. Suggestions were made for how this impact could have increased further to tackle the barriers that remain.

In tackling the barrier of unawareness and misconceptions of opportunities presented by space solutions, end users found exploration workshops particularly effective. The workshops allowed end users to specify the content they wanted to explore in the workshops so that they provided them with the awareness and understanding of aspects of space solution use cases that was most relevant to them. End users found the facilitators to be knowledgeable and flexible, adapting workshop content and structure to their needs. End users also valued the breakdown of the supplier sector that was provided during exploration workshops, which helped them understand how to engage with the sector.

The UK Space Agency and PwC brands and networks in the sector was appealing to both end users and suppliers, and encouraged them to engage with the project. Suppliers felt the the UK Space Agency brand helped them to connect with end users more easily, and those that were successful in their funding bids valued the surrounding publicity as it helped to raise their profile with end users.

The USB funding calls (SBRI and grant-funded projects) were key enablers for both end users and suppliers to explore in depth how space solutions can address end user challenges and provide a persuasive ROI through increased data availability and quality. End users perceived the grant funding to de-risk the more exploratory nature of grant funded project work, which they might otherwise be unable to fund internally without evidence of an ROI from the space solution product. The opportunity to specify the particular use case they wanted the grant funded project to serve meant that end users were able to work with suppliers to develop a space solution product that offered a higher level of data availability and quality than existing solutions. Similarly, suppliers on SBRI projects found the SBRI funding, particularly as it funded 100% of project costs, a key facilitator to carrying out the feasibility studies. The funding allowed them to explore in depth the challenges faced by end users, and how space solutions could address these challenges. Learning from the SBRI projects enabled suppliers to develop a space solution that offered greater levels of data availability and quality.

According to suppliers which approached end users to propose that they collaborate on a grant funded project, the key challenges they faced was the end user's perception of a lack of a persuasive ROI of space solutions, and that leading a grant funded project would require time and resource that the end user was not able to afford. The lack of a persuasive ROI was less of a barrier for end users when certain facilitators were present, including an already-established working relationship between the supplier and end user; end users having already begun to explore a space solution use case; and an understanding among the revenue-generating arm of an end user organisation of the opportunities presented by space solutions.

End users which were more open to taking on the grant funded project lead role tended to have internal budget already allocated to exploratory R&D work, and the individual from the end user organisation who was leading the project worked in the area of thought leadership, innovation or R&D. There were also grant funded project consortia where the supplier took on the bulk of the administrative and project management tasks to relieve the end user of this

burden while still enabling them to derive benefits from the project. In these consortia, the individual from the end user organisation typically worked in revenue-earning roles, such as fund manager. End users which had taken on the project lead role had generally not found it to be overly-burdensome, supported by clear and responsive project management by the UK Space Agency and minimal reporting requirements.

As grant funded projects were nearing completion, some end users were able to demonstrate a clear and persuasive ROI offered by the solution developed under the project. This included quantifiable cost savings which the solution could provide the end user and/or their clients, and other types of value such as a broader range of capability, utility and ease of access to data. Some end users had already integrated the solution they had developed into their workflows. Moreover, they expected to develop additional use cases in the future from the data acquired and process developed during the project. Other end users explained that their solution required further development to reach a level of readiness where it could be fully integrated into their operations. Nevertheless, the project had demonstrated that the solution had a clear and persuasive ROI, and they expected to integrate the solution in the short to medium term.

Supplier events were useful in articulating the challenges of engaging end users, and brainstorming ideas for how to overcome those challenges. However, they were considered less effective in helping suppliers to understand the nature of the problems faced by end users which space solutions could potentially address. Suppliers which were more experienced in the sector felt that the events did not provide any information about the challenges of engaging end users that they did not already know. They would have preferred the events to have a greater focus on how to overcome the challenges.

There was evidence of the UK Space Agency communications effectively linking suppliers and end users from one USB initiative to another, and from other programmes of support in the sector to the USB project. Although SBRI project teams had also typically gone on to secure further funding to continue to develop their SBRI product after the project ended, there was a view that if the grant funding call had occurred after the end of SBRI projects, SBRI projects would have been in a stronger position to apply for grant funding.

There was an appetite among suppliers for further, follow-on support from the UK Space Agency after the USB project ended. It was suggested that collective learning from project initiatives around how to overcome the barriers to adoption of space solutions by end users would be highly valuable to suppliers. Suppliers also felt that the UK Space Agency brand and network in the sector could help suppliers to continue to raise their profile among end users, and suppliers were keen to engage in any further networking events run by the UK Space Agency, and be made aware of any future funding opportunities.

Other suggestions relating to multiple USB initiatives included a greater focus on transport and logistics sector end user organisations and smaller end user organisations, and more opportunities for direct connections between end users and suppliers.

Annex 1: Unlocking Space for Business Theory of Change

Free text Theory of Change.

Inputs	Activities	Outputs	Short-term Outcomes	Long-term Outcomes	Impacts
Knowledge: • Staff time • Delivery partner time • Budget	• Information hub, launch campaign & video, launch webinar • L&D: end-user modules, supplier insight events • Roundtables • Exploration Workshops	• 3,958 page views; 971 launch video views; 388 webinar views • 10 end-user webinars; 10 summary videos; 2 supplier insight events • 11 Roundtables • 42 Exploration Workshops	• Increased knowledge of USB project and available opportunities • Suppliers have increased knowledge of end-user barriers to adoption and how to meet end-user requirements • End-users and integrators have increased knowledge of space solutions and how they can be exploited	• Pursue project opportunities to learn more about satellite technologies, end-user challenges and funding • Pursue opportunities to make connections and network • Pursue funding opportunities, now or after the project	• FS and T&L sectors routinely exploit space solutions (USB has a lighthouse effect) • Increased investment catalysed into UK space sector • UK's reputation as global leader of space solutions enhanced
Connections: • Staff time • Delivery partner time • Budget	• Networking Events	• 5 Networking Events • 1 Showcase Event	• End-users, suppliers and integrators are better connected	• Pursue funding opportunities, now or after the project	
Funding: • Staff time • Delivery partner time • Budget	• SBRI funding call • Grant funding call	• 12 SBRI contracts awarded • 11 Grants awarded	• Accessing funds ensures new solutions are realised	• New applications of space solutions in the FS and T&L sectors	