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# COLLABORATION EARTH WORKSHOP OUTCOME REPORT

Stevenage | May 14 2025

BIOMASS In-orbit (Artist View)  
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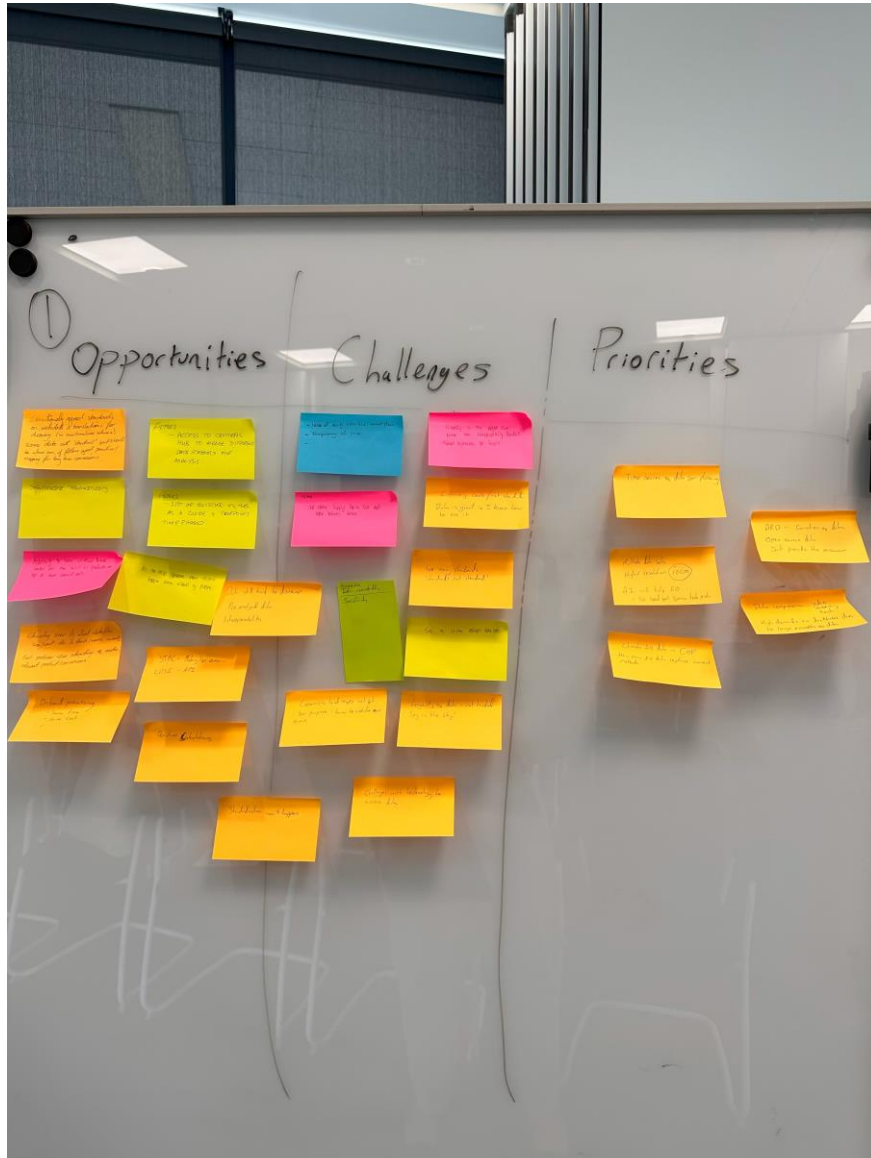
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# The 'Golden Age' of EO: End-user opportunities, challenges & requirements for effective Earth Action

USA - Florida - After Hurricane Milton  
Sewage draining away into the Sea  
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- **Focus:** Exploring, from an end-user perspective, the opportunities and challenges associated with the current and upcoming service offerings for improved climate action decision-making.
- **Rationale:** This point in time feels like an inflection point in the world of Satellite EO, and EO has long been regarded as the silver bullet for climate intelligence and action. We do see fantastic progress being made in climate intervention informed by EO intelligence, but we also know there is a wide gap in uptake and many hurdles to mainstream adoption. How can we build on the successes and services in a rapidly changing future?

## Opportunities

- The participants envision a global ecosystem where data is not only abundant but meaningful; where international standards on metadata and translations ensure timely and relevant discovery, and a universal, shared terminology paves the way for true interoperability. But even more important than the data itself is the connection between producer and user. Educating users on what data and observations can and cannot do, highlighting the limits, caveats and potential errors becomes vital.
- Efficiency enters the picture through onboard edge-enabled processing, cutting both time and costs by allowing satellites to pre-process data before it even reaches Earth and when the data arrives, a central hub with smart filters that merges multiple data streams, aided by a dynamic list of existing filters with clear timelines and purposes.
- What is most exciting for all is the role AI will play as an agent to uncover insights underpinning all analysis. Discovery improves, analysis accelerates; and pre-analysed, interoperable datasets become more useful than ever. Technologies like STAC (Spatio Temporal Asset Catalog) and CDSE-API further simplify access. On the horizon quantum calculations is poised to revolutionise how we compute and interpret EO data.

## Challenges

- Despite all this potential, there's still no easily accessible marketplace where users can browse, compare and acquire EO data and services seamlessly. Transparency of pricing is elusive. Supply often lacks the business focus needed for modern data ecosystems. Interoperability is possible but accessibility lags behind.
- Technology barriers and licensing complexities create even more friction. The biggest hurdle isn't just technical, it's legal. Licensing varies wildly between providers and a confusing mess of standards means 'standardisation' is often just another layer of complexity.
- Users need relevant datasets fast - not months later - to address current and emerging environmental problems. They need confidence that the data they use will remain available and trustworthy over a long period of time.

## Path Forward

- Prioritise time series data that support long-term planning. Deliver higher-resolution datasets down to 10cm. Empower users with AI tools that reduce dependency on space-specific expertise and make EO data central to high-stakes platforms such as the COP climate negotiations, offering robust alternatives to traditional methods.
- Analysis Ready Data (ARD) is another game-changer; curated, open-source and answer-focused. Paired with efficient video and streaming compression technologies, we can meet the rising demand for faster, smarter delivery without buckling under data volume.
- Maximising the power of EO data relies on how best we can we can connect those tools, standardise their outputs and get them into the hands of those who need them, in time to make a difference.



A high-resolution satellite image of Busan, South Korea, showing the city's urban layout, surrounding water, and coastal features. The city is densely packed with buildings and infrastructure, with a prominent harbor area. The surrounding water is a deep blue, and the coastline is irregular with several peninsulas and inlets.

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## Innovating and doing business with the private sector/ commercial services

South Korea - Busan  
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- **Focus:** Focusing on key sectors such as Finance, Energy/Utilities and Agriculture, how can the sector improve its offering and build services to encourage market pull as opposed to market push?
- **Rationale:** We are seeing satellite climate data underpinning the majority of climate risk-related information services across finance and insurance, but why is it so slow to catch up across other applications? Space4Climate funded market research in this area and found the several pain points for adoption, specifically in Agriculture and Finance. Do we agree? What are the other sectors with massive potential?



- In today's data-driven world, Earth Observation (EO) organisations stand at a critical inflection point. The technology is proven. The satellites are flying. The data is flowing. Turning that data into trusted, scalable business solutions - especially with the private sector - is where the real opportunity lies.
- Across sectors, users are not looking for data, they're looking for answers. And EO data, while powerful, is just one piece of a larger solution. Whether in Agriculture, Infrastructure, ESG compliance, or Disaster Response, customers want end-to-end solutions, not just pixels from space.
- The challenge: the current EO ecosystem is fragmented. High-resolution data is often locked in silos. Costs of data, talent and technology are prohibitive for many. End users and paying customers aren't always the same; for instance, farmers may benefit from EO but won't pay directly. At the same time, barriers to entry for new tech providers are high and innovation is slowed by a lack of standardised models, fragmented demand and a heavy reliance on public sector contracts.

## Path forward

- Step 1: Link the “Islands” - Our discussions showed the value of connecting disparate datasets and services into linked “islands of insight”. To build trust and continuity, data providers must forge long-term partnerships with intermediaries and application developers creating a full chain from satellite to solution.
- Step 2: Aggregate and Align Demand - Private sector users have very specific needs, even within the same sector. Yet to scale, EO must consolidate demand and provide sector-ready solutions. This means learning from adjacent industries, aggregating user requirements and using EO Data Hubs not only for data access but also as collaborative spaces for app development and customer engagement.
- Step 3: Build Skills and Lower Barriers - The EO sector needs a skills uplift across the entire chain: students, data providers, intermediaries and end users. From “EO 101” webinars to scale-ready certifications, building capacity ensures the ecosystem can grow. At the same time, we need new business models - ones that reflect real-world customer behaviour and create sustainable returns without overreliance on government contracts.



- Step 4: Let Legislation Lead the Way - Regulations, especially around ESG reporting, are becoming a powerful driver. These are not “nice to haves”, they’re now a “have to have”. EO has a pivotal role to play in aligning product development with incoming policy; organisations can turn compliance into opportunity, especially when backed by proven business cases and accessible archive data.
- Step 5: Embed Social Value and Trust - Big private contracts increasingly factor in social value and transparency. This means EO providers must not only deliver data but also link it to real-world benefits. Ground truthing and field testing are essential to build trust and credibility. Inclusivity among customers and data scientists, analysts and engineers builds better, more relevant solutions.

The future of EO in the private sector will be defined not by who has the most satellites, but by who builds the most meaningful connections between data and decision-makers, between sectors and between innovation and real-world value. EO organisations must link their capabilities to customer needs, build talent pipelines and lean into legislation and social impact. That’s how Earth Observation becomes not just a source of data but a driver of global solutions.





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Shaping tomorrow's satellite-based climate  
and nature services

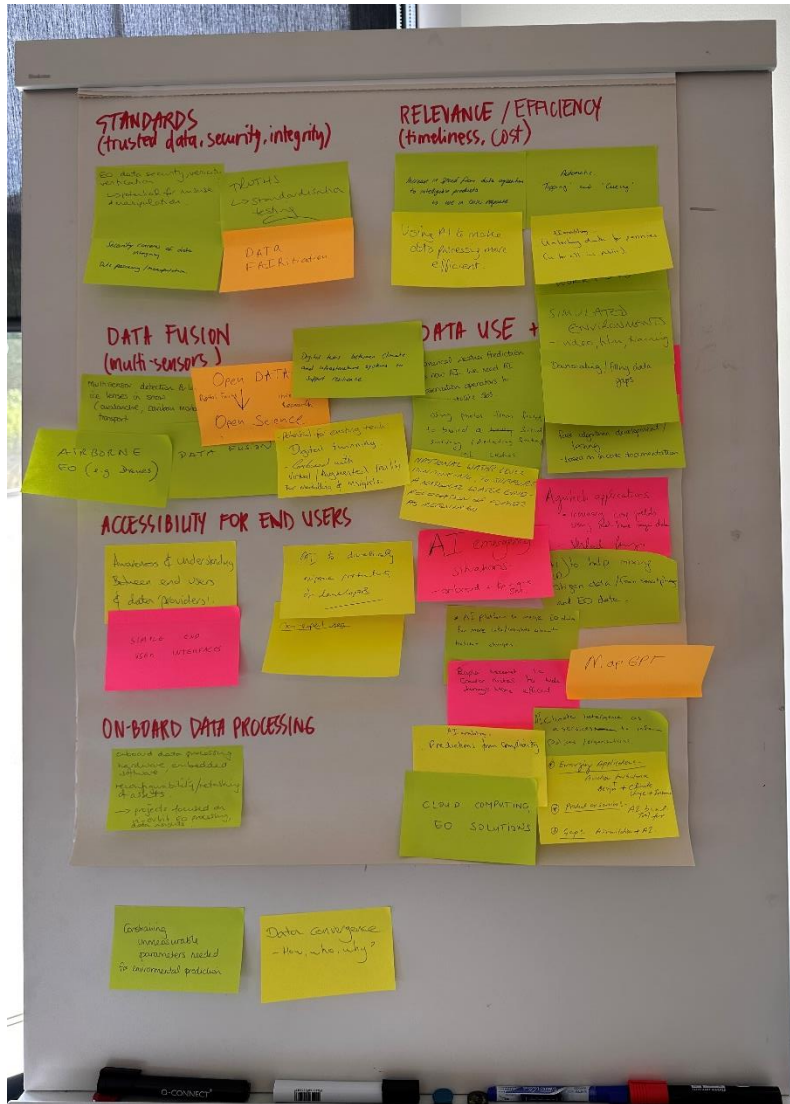
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- **Focus:** Leveraging technologies such as AI/LLMs (large language models) with new data capabilities from commercial and public satellite, what new emerging climate and nature products can be unlocked for both the public and private sector?
- **Rationale:** We are seeing the dominance of AI and LLMs on all tech applications and satellite EO is no exception. Platforms and products are now all powered and being taken to the next level using AI methodologies. What are we unlocking here? Right from being able to extract more details from medium resolution satellite imagery to building new, never seen before insights. Are we set up to fully exploit AI capabilities via support from ESA, UKSA and other funding opportunities ?

In a world facing climate disruption, biodiversity loss, and increasing societal complexity, satellite-based Earth Observation (EO) holds the promise to see further, act faster and understand more deeply than ever before. But turning that promise into impact requires more than just satellites: it demands trust, intelligence and accessibility built into the core of climate and nature services.

- **Building Trust: Standards, Security, and Integrity** - To build services people can rely on, we must start with trust in the data. Satellite imagery, AI-generated maps, and predictive models must be secure, verifiable and transparent. The risk of data misuse or manipulation, whether accidental or malicious, is real. That's why initiatives like the TRUTHS Mission are vital, introducing international standardisation and verification frameworks for EO data, ensuring it remains trusted and tamper-proof. As we move towards FAIR data principles, making data **Accessible, Interoperable, and Reusable**, we lay the foundations for an EO ecosystem that serves both scientific integrity and public confidence.
- **Seeing the Whole Picture: Fusion, Twins, and Simulation** - There is no single satellite that captures all climate and nature variables. The real power lies in data fusion, integrating multiple sensors (spaceborne, airborne, ground-level) to create a richer, more complete picture of the Earth. From this fusion emerges digital twins real-time, virtual replicas of the natural and built world. These twins, especially when connected between climate and infrastructure systems, can model future scenarios, identify weak points and build resilience into cities, agriculture and energy networks.



- **Democratizing Access: From the Expert to Every person** - For EO services to truly serve climate and nature, they must be useful everyone not just specialists. That means simple, intuitive interfaces, powered by AI that boosts developer productivity and translates raw data into clear, accessible outputs. Onboard processing, smart software embedded directly in satellites, lets us capture, process and deliver insights in orbit, slashing delays and costs. With reconfigurable assets, satellites can be re-tasked in real time to respond to fires, floods, or storms offering faster, more actionable insights when timing matters most.
- **AI: The Great Enabler of Climate Intelligence** – ‘AI-first’ Earth Observation is already transforming weather prediction. AI is now essential in observing, interpreting and applying EO data. This technology has the ability to merge structured and unstructured data to reveal patterns and suggest actions. In climate services, AI fills data gaps, automates tipping and cueing, and enables predictions once thought impossible. It powers national-scale applications such as water level monitoring, as well as hyperlocal insights such as predicting aviation turbulence linked to climate shifts.

To shape tomorrow’s services, we must build on a foundation of trusted data, powered by AI and data fusion and designed for accessibility, speed and purpose. The tools are ready. The data is flowing. The moment to build is now.





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## Innovating for the public sector and supporting nationwide resilience needs

Brazil - Flooded Campina, São Leopoldo, Rio  
Grande do Sul - Disaster Charter Call 1003  
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- **Focus:** Satellite data and services to enhance public services and strengthen national resilience to climate and environment risks and catastrophes
- **Rationale:** We are seeing satellite climate services inform farmers and bankers of risk and impact to assets, in order to safeguard investment and future yields. Why isn't the government leading the roll-out of such crucial intelligence across public sectors, interacting with climate and nature risk impacts? How can we better support and translate our sector investment to public good services?

While the satellites are in orbit and the data is flowing, the public sector, the very place where EO could deliver the greatest good remains largely disconnected from this potential.

- **The Awareness Gap: Making EO Visible, Valuable and Understood** - EO is barely on the radar at local council and departmental level. Even in major agencies like the NHS or regional water companies, the value of satellite data is untapped, not because the data isn't relevant, but because the right people haven't seen what it can do. That's where EO education and exposure must start early. Introducing EO into school curricula, building awareness for career development and embedding EO training into the Civil Service can foster a new generation of data-aware public servants. A dedicated "EO Hub for Civil Servants" where demos show tangible benefits can be a low-barrier entry point.
- **Moving from Data to Decisions: Integration, Demonstration and Trust** – Beyond data, the public needs actionable insights. From real-time emissions mapping to monitoring evolving drought conditions, EO has matured to deliver temporal, layered intelligence not just single snapshots. But this capability must be integrated, not isolated. Agencies like Defra, with its Centre of Excellence in EO, must serve as beacons of best practice. We need more combined public-private partnerships built on shared validation, clear outcomes and mutual learning. That's why co-designed EO playbooks for different departments could fast-track adoption.

- **Making EO Work at Scale: Routes to Market and Budget Alignment** - Despite growing interest, there's little funding for EO projects that mandate collaboration between the public sector and industry. Where money does exist, it's often misaligned: use cases gain interest, but not budget. To solve this, we need:
  - A clearer route to market for EO in the public sector
  - Cost savings communicated better to show value for money
  - A "Space One-Stop-Shop" consolidated capabilities catalogue linked to procurement
  - Tools like AI large language models (LLMs) to bridge the language gap between satellite data and non-technical public officials
  - Establish a common procurement language simplifying how EO is described, purchased and deployed, especially where subcontracting adds complexity.
- **Building the Future Together: Events, Standards and Global Uptake** - A national conference dedicated to EO and the public sector could spark collaboration, set standards and share best practices, ranging from peatland wildfire monitoring for public safety to climate planning. Globally, capacity building in other countries using UK models and skills can accelerate uptake and create exportable public service EO models. Most importantly, validation remains critical. Public decision-making relies on trusted evidence. EO must be tested, repeatable and linked to ground truthing.

With commitment, clarity, and collaboration, EO can influence the way public organisations make faster, smarter and more sustainable decisions for people, nature and climate.





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# THANK YOU!

Bahrain - Durrat Al Bahrain  
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