



FIRE | European Forum for Earth Observation

The Now & Tomorrow of Earth Observation



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THE EO ADOPTION PARADOX

While a lot of work still needs to be done ...

For many use cases

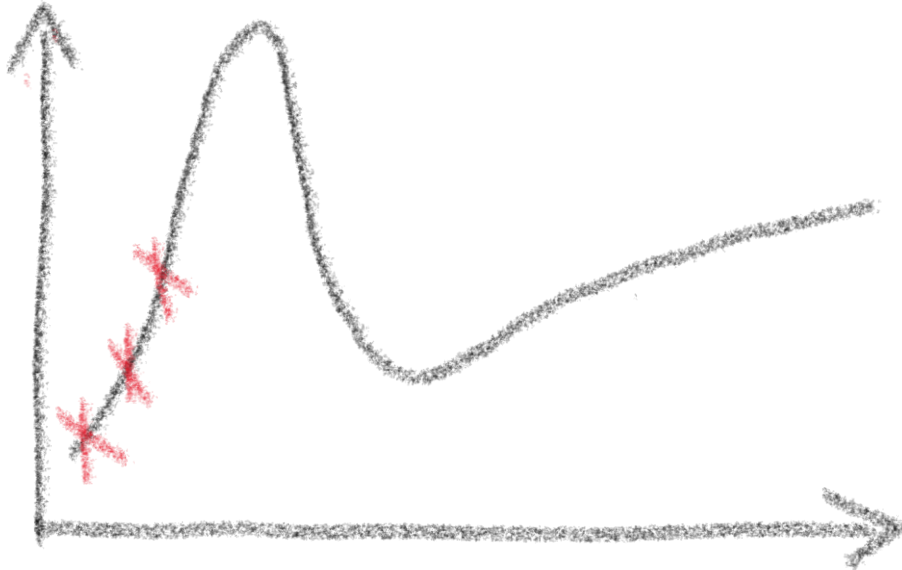
1. The data is on the market
2. The technology is demonstrated
3. The business case is clear cut
4. The capital is available

But we don't see them in practice ...



NEED FOR A BIT MORE RESEARCH

Why don't we see mass adoption yet?



Key questions:

- What are the barriers for adoption?
- How can organisations overcome these barriers?

6 MARKET SECTORS IN FOCUS



**MARINE /
MARITIME**



RAW MATERIALS



AGRICULTURE



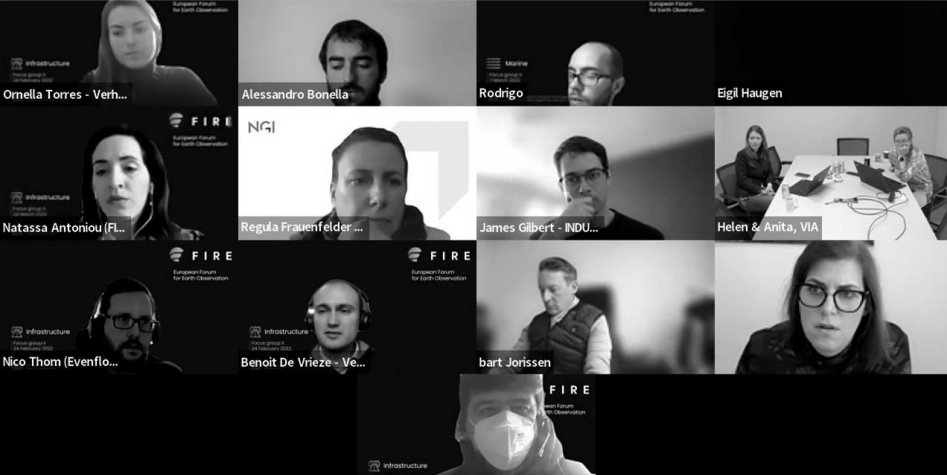
WIND ENERGY



**URBAN
DEVELOPMENT**



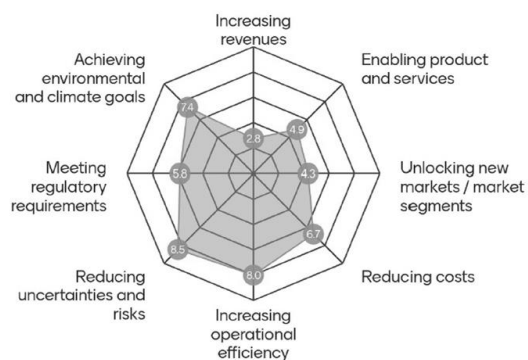
INFRASTRUCTURE



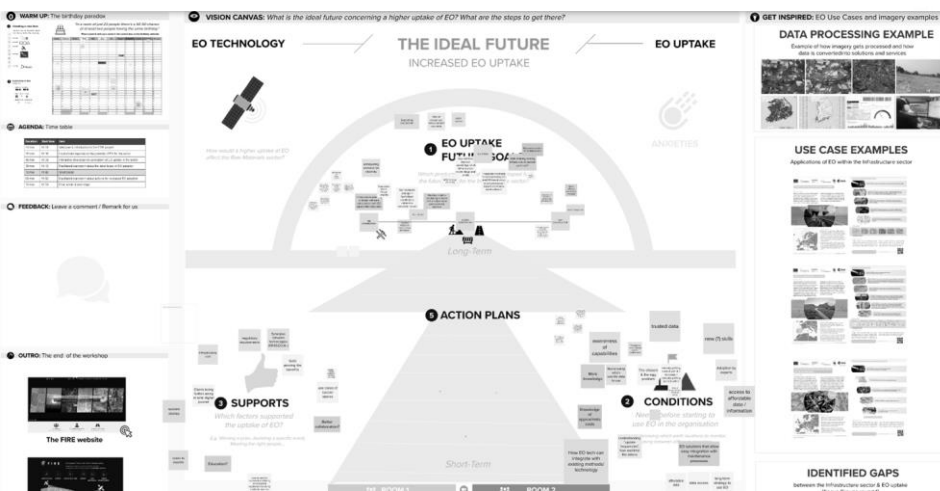
MARKET SECTOR USER DIALOGUE

→ Interactive workshops with diverse groups of users

How could EO data benefit your organization?



1. What is the current situation?
2. What is the ideal future situation?
3. What actions are needed to get there?



WHAT DID WE DISCOVER FOR EACH SECTOR?



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The Now & Tomorrow of Earth Observation for **Marine & Maritime**



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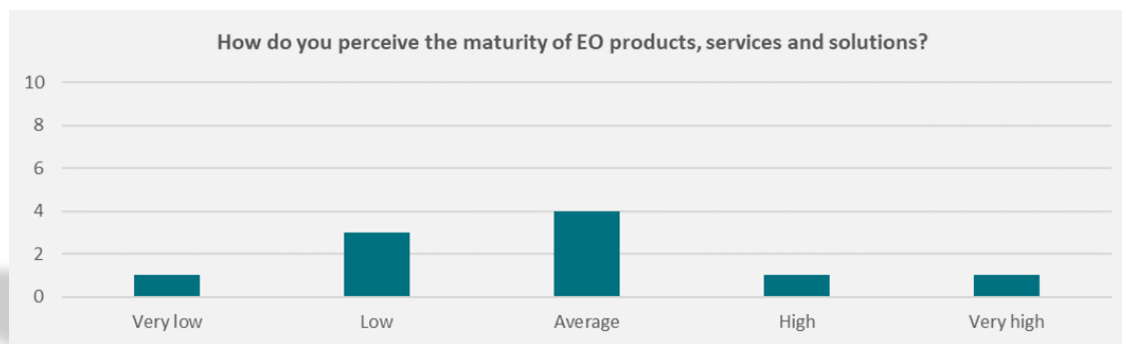


What is in for the customer?

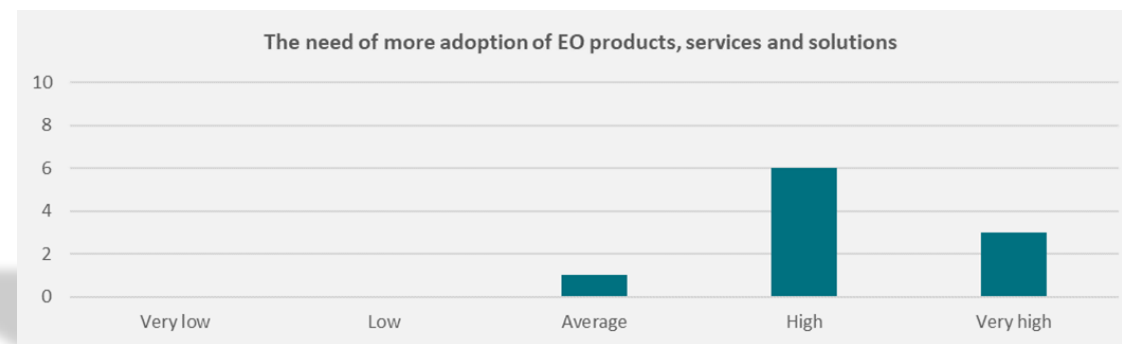


With new constellations with new capabilities being deployed, in the following years there are going to be numerous opportunities for unlocking new market needs that at the moment can't be solved

EO maturity versus adoption

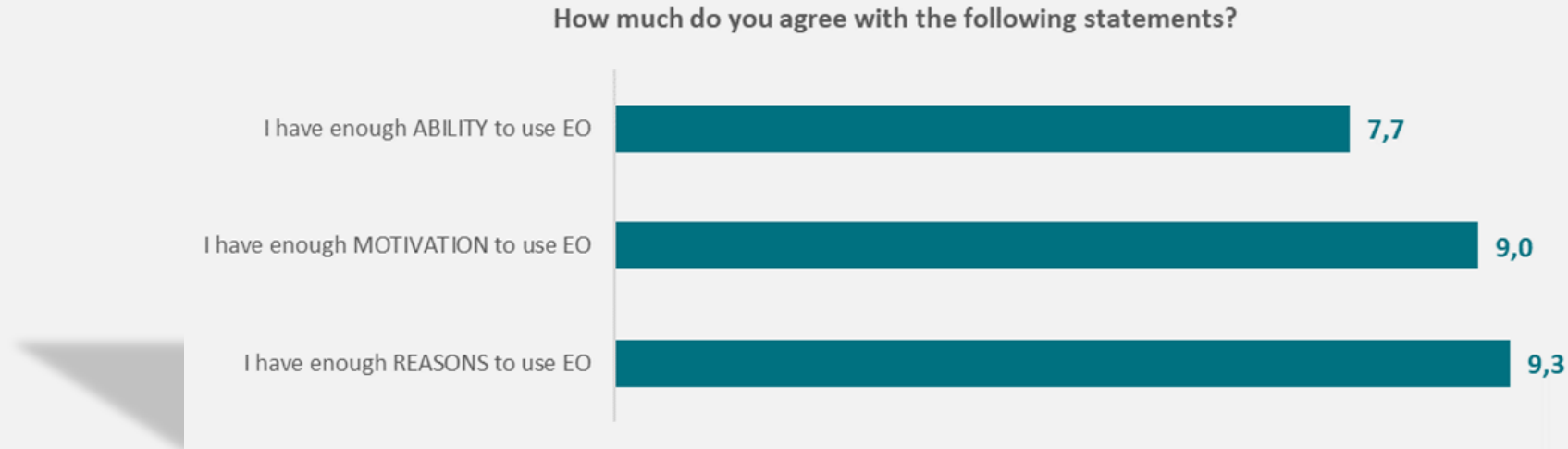


- The solutions that exist on the market are not matched to these subsectors and their needs.
- EO industry should put more effort in understanding their specific problems and create solutions that solve them.
- Data services that provide data not so easy to use by stakeholders



- Lack of technical capabilities to work with geospatial data and difficulty to understand the data
- Disconnect between what customers need and the solutions offered by the EO sector
- Solutions need to have a balance between being scalable and being customizable enough

What holds back organisations to use EO?



“The EO industry has to provide solutions that do not require the customer to have EO capabilities in house to implement them”

Future vision on EO applications



1. Detection of large and small vessels in near real time for operational needs:
 - detection of illegal activities at sea
 - search & rescue operations.
2. Decision support tools for offshore renewable energy:
 - Planning/operation/decommissioning.
3. Real time forecast:
 - local currents/waves/wind at high spatial resolution.
4. Carbon sequestration
 - Tools that promote ocean-based carbon offsetting

Drivers for EO user uptake



Necessary conditions

solve first

- Transparent data market
- Amazon paradigm: EO is easy to consume and solves a problem



Supporting factors

use in action plans

- Understand and measure Climate change
- Support of relevant actors (ESA, EC)
- Advocacy and promotion
- EO-friendly regulation

Key actions to accelerate adoption

In the maritime sector

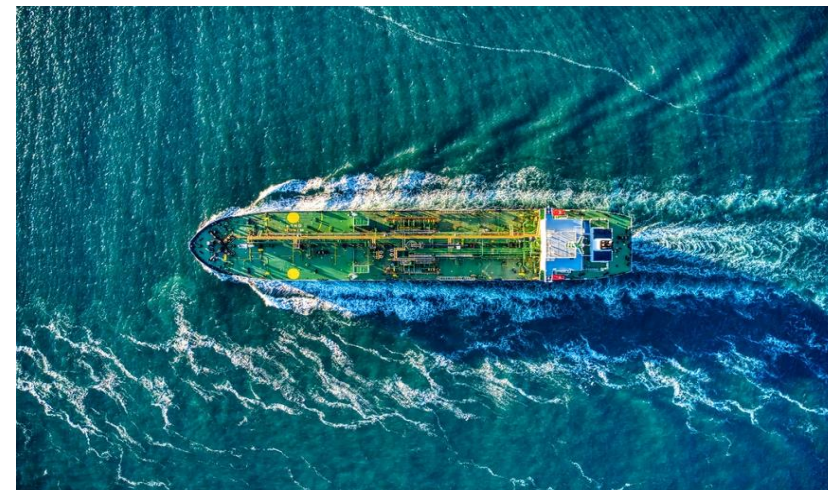


Playbook

Develop a reference playbook with guidelines on how maritime companies can start using EO.



**Business models
& solutions**



Green shipping

Explain that transition to green shipping also requires a transition to smart shipping.



Awareness



Key actions to accelerate adoption

In the marine sector



Support tool

Create targeted decision support tool (DST) to support decision makers in taking quick decisions.



**Business models
& solutions**



Fund and develop

Fund and develop advanced EO-based oceanographic data sets that will enable new applications.



Policy levers





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Juan Peña
CEO of Orbital EOS

+



Eva Haas
Head of Strategic Accounts EOMAP



Urban
Get even closer to the customer.

Make it as easy as the weather forecast.



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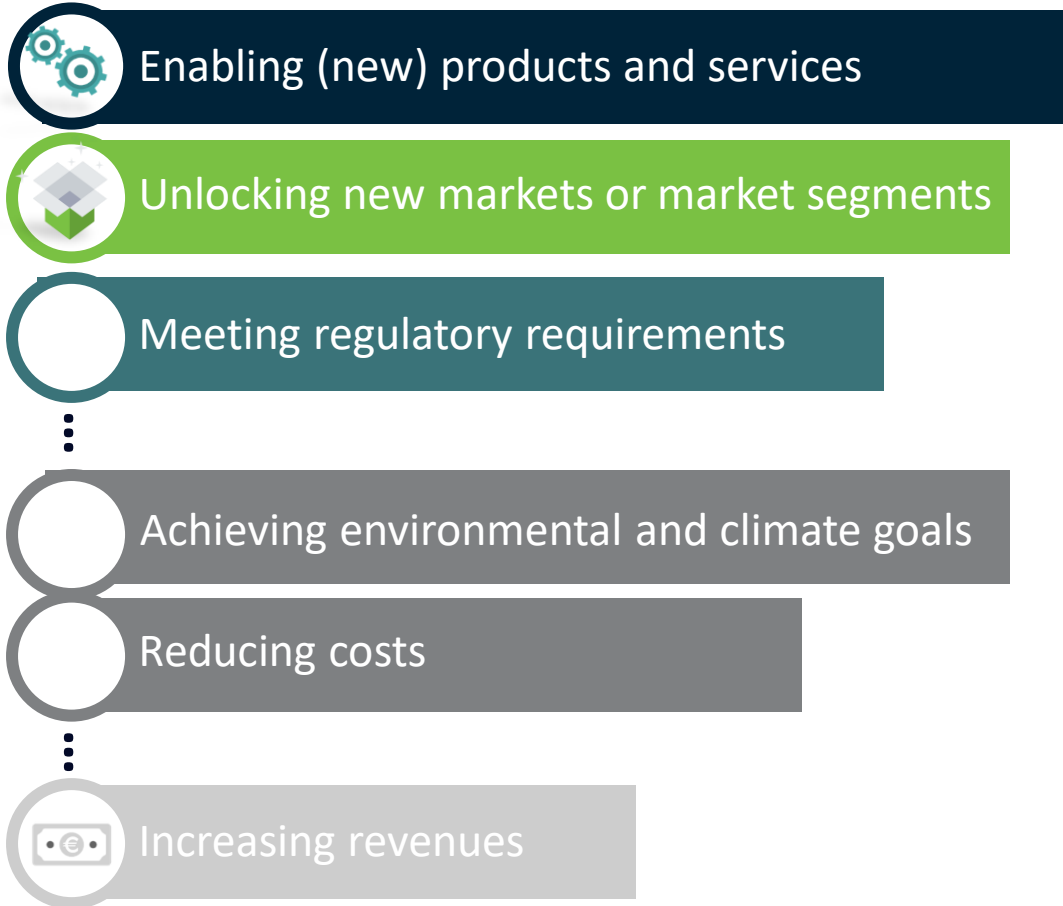


The Now & Tomorrow of Earth Observation for Raw Materials



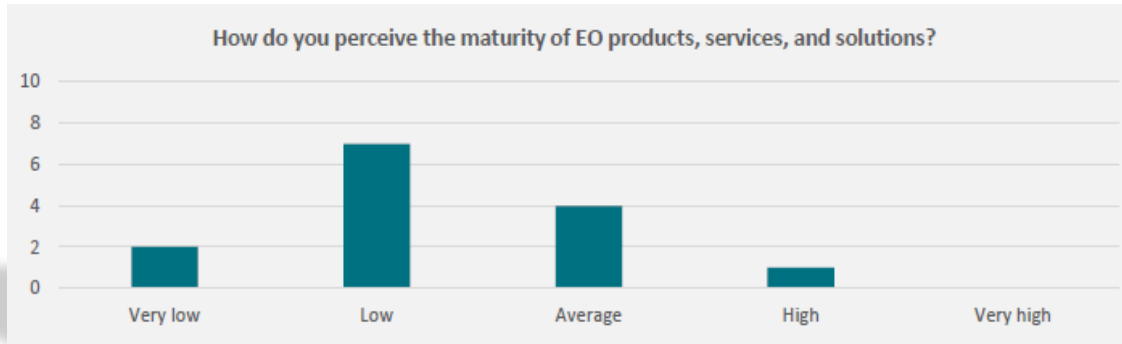
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Organisational level benefits

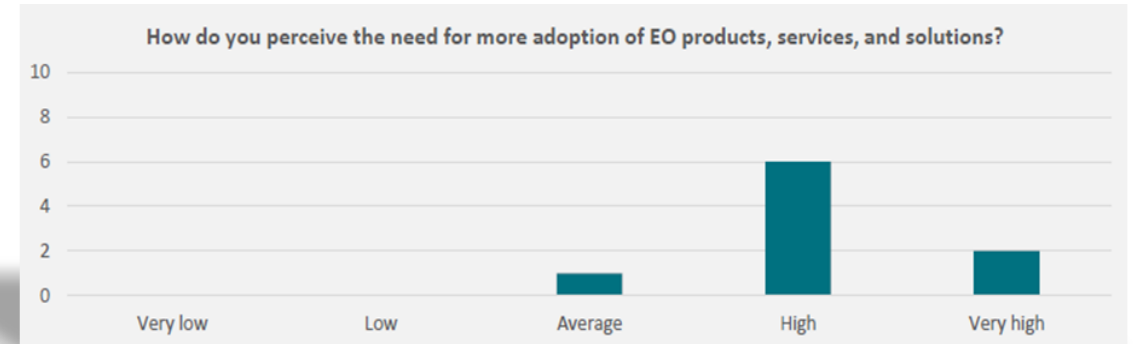


- **Strong links between impact on environment, well-being of people and economic benefits**
- **Improving efficiency across the whole mining life cycle**

EO maturity versus adoption



“Current EO solutions do not fit the current workflows of the mining sector”



“There is a pot of gold waiting for those who are able to offer turn-key solutions”

Future vision on EO applications



- **Geological mapping**
- Comprehensive **environmental impact monitoring** of mining activities
- **Stockpile measurements**
- Turn-key solutions for **tailing dam and pit slope stability monitoring**

“More advanced applications will be unlocked by integration of EO data with high-resolution locally acquired data from drones, cameras, and sensors”

Elements in the roadmap to the desired future of EO



Necessary conditions

solve first

- Shared understanding between business and technology
- Simplification of the EO landscape
- Openness to transformative change
- Engage decision makers and people in the field
- Georeferenced locations



Supporting factors

use in action plans

- Provide fit-for-purpose, turn-key solutions
- Training, courses, tutorials, and examples
- Interaction with start-ups
- Case studies and success stories

Key actions to accelerate adoption

In the raw materials sector



Free trials for mid- and lower tier organisations



Organisation of “mining safaris”



**Business models
& solutions**



Funding schemes



**Knowledge &
education**



Awareness





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EUR 115.9bn 16% growth

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irene@planet.com



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The Now & Tomorrow of Earth Observation for **Agriculture**

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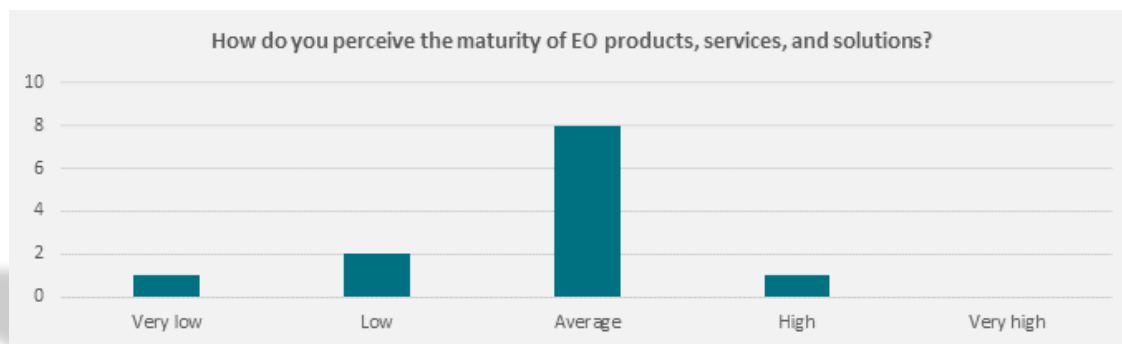
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Organisational level benefits



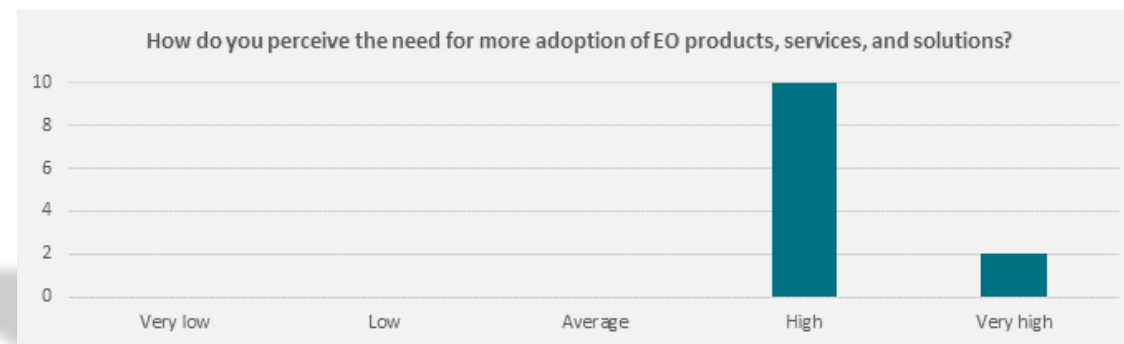
- The transition to **climate neutral** is something that every stakeholder in the industry should contribute to.
- Climate change also brings significant **operational risks**. Limiting these risks is a beneficial use case of EO.
- Increasing **operational efficiency** can lead to gains as simple as saving fuel by using their machines in a more targeted way.

EO maturity versus adoption



“The state of EO in the agriculture sector is relatively advanced compared to other sectors.”

- Overall average **awareness concerning EO’s capabilities** and potential benefits for the agriculture industry
- We can **trust EO-derived information** for some variables; however, the science still needs to evolve to increase the maturity
- EO companies in both upstream and downstream sectors are developing a **new generation of hyperspectral imaging satellite constellations**



“Farmers need to better understand the value that EO can bring to their businesses”

- **Awareness and education** as limiting factors to the uptake of EO in agriculture the sector
- Introduction of **intermediary actors** in the market that can make a **link between the EO industry, farmers and policy makers**
- **More dissemination** of tips and tricks, best practices, and successful use cases

What holds back organisations to use EO?

How much do you agree with the following statements?



“Because we’re not making a lot of money out of it, and there are no compelling reasons, we don’t feel the need to change our current methods”

Future vision on EO applications



- More use cases of EO in the measurement, reporting and verification processes for the **Common Agricultural Policy (CAP)**
- Comprehensive **environmental impact monitoring** of agricultural activities
- Enhanced decision-making support for **precision farming**
- Assessing geographical based risk for **agriculture financing**
- **More involvement of advisory and professional services firms** in the definition of the business case for EO and the implementation of EO products, services, and solutions.
- Farmers use satellite data to find out the ideal timeframe to seed different crops to **maximize the crop yield, use of resources, and sustainability factors.**

Elements in the roadmap to the desired future of EO



Necessary conditions *solve first*

- Understanding data resolution, frequency, and reliability
- Access to in-situ data
- Telecommunication infrastructure
- Data security
- Knowledge and awareness about EO and its benefits.

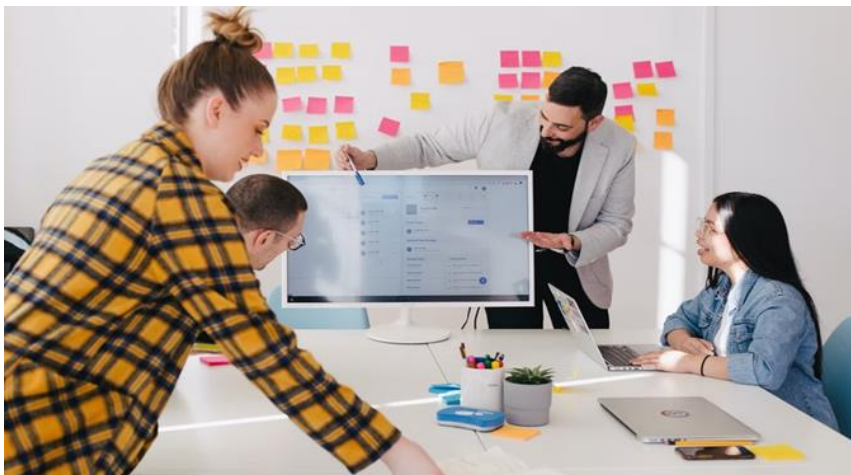


Supporting factors *use in action plans*

- Advisory and implementation intermediaries
- Combining different data sources
- Grants for implementation enablers
- Certification

Key actions to accelerate adoption

In the agriculture sector



Intermediary role of implementer

Advisory and professional services firms as well as start-ups should take up the intermediary role of implementer, **implementing EO technologies in agricultural businesses**



**Business models
& solutions**



Marketplace of challenges

Organise a marketplace of “**challenges**” that can be **solved with EO innovations** rather than conventional solutions. This could facilitate contests, matchmaking, and procurement



**Business models
& solutions**





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Assoc. Prof. Ilias Pechlivanidis

Senior Researcher at SMHI

Project Manager at Copernicus EMS - Floods

Member of WMO Research Board



@IPechlivanidis



Don't predict the future, choose it.

BECOME AN EO EVANGELIST FOR YOUR SECTOR



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The Now & Tomorrow of Earth Observation for **Wind energy**




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Organisational level benefits

 Unlocking new markets or market segments

 Enabling (new) products and services

 Increasing operational efficiency

⋮

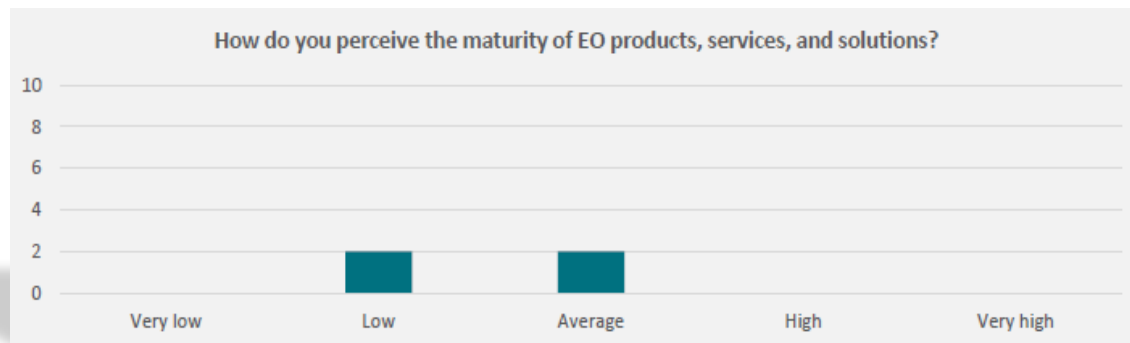
 Increasing revenues

⋮

 Meeting regulatory requirements

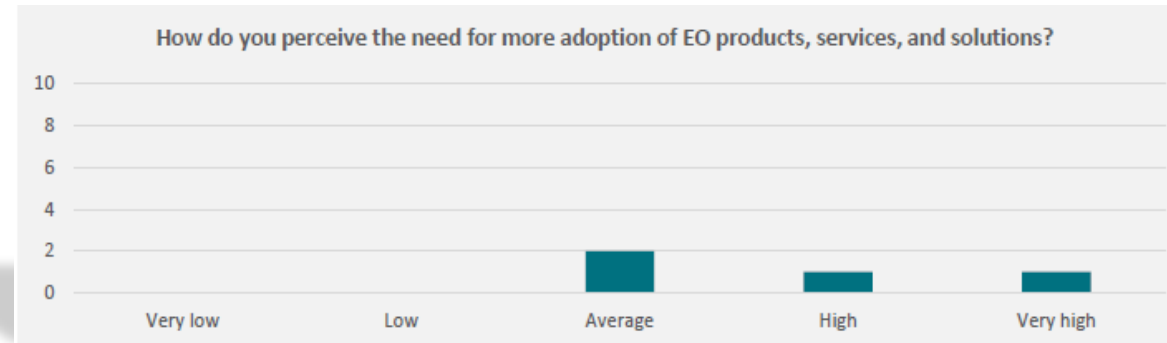
- EO for accelerating innovation opportunities
- Large pipeline of data-based tools for optimizing processes such as selecting wind farm sites, energy production planning, operational decision-making, or emergency management.
- EO not eligible as measurement tool by regulatory instances

EO maturity versus adoption



“It’s not a competition, but a marriage between data. The more data we can fuse together, the better.”

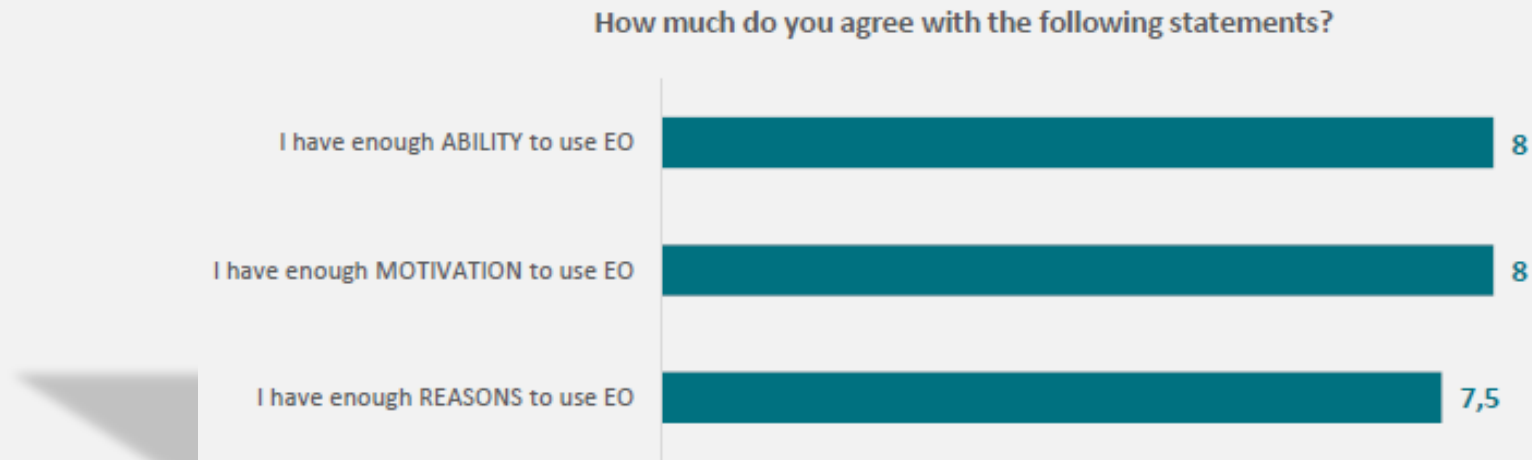
- Long history of using **weather data**, but limited use of atmospheric and oceanographic data.
- Some data is still **not yet available at the resolution and revisit time** at which they become useful for the sector.
- General understanding that EO should not take over the current methods, but **supplement (or “marry”)** them.



“Experimentation is needed to fully understand the opportunities where EO could make a difference”

- Substitution of **expensive or labour-intensive** measurement techniques.
- Solve future challenges of **novel offshore wind farm** systems

What holds back organisations to use EO?



“There is a lack of decisive factors to invest in EO”

Future vision on EO applications



- Develop **highly accurate supply and demand prediction models** that can support all types of processes by offering geographically detailed information with a small uncertainty factor. For instance supporting the development of *MetOcean data* and complex *altimetry models*.
- Offering **absolute coverage for extreme weather events**. Use EO based tools as a reliable warning and decision-making system, working together with the operations and maintenance teams to protect workers and the infrastructure.
- Supporting the future **development of the offshore wind branch**, especially in cases where sites are located further from the shorelines.

Elements in the roadmap to the desired future of EO



Necessary conditions

solve first

- **Validation** of data accuracy and granularity
- Ease the **integration with other data-sets**
- Providing **assurance on the return on the investment** of EO solutions



Supporting factors

use in action plans

- Having **budget** for experimentation
- Showcasing **successful stories**
- Having EO-based tools as a **default option** for some of the operations

Key actions to accelerate adoption

In the wind energy sector



More Proof of Technology (POT) studies

Benchmarking studies should help to prove the deltas between the technologies used in the current workflows and novel, EO-based solutions for the wind energy sector.



**Business models
& solutions**



Awareness



Pre-Commercial Procurement (PCP) on an industry level

Using the help of industry funds and the creation of commercial buyer groups to test pilot projects.



Funding schemes



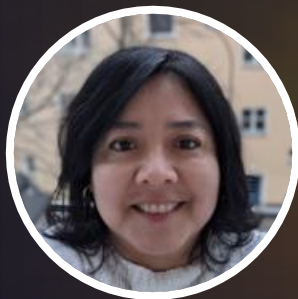


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...

Miriam Gonzalez

Partnerships and Outreach at UP42



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The Now & Tomorrow of Earth Observation for Urban Development



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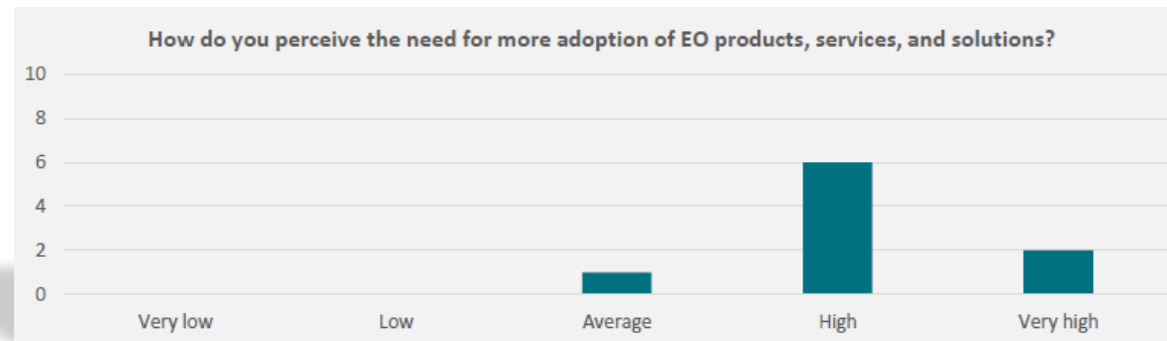
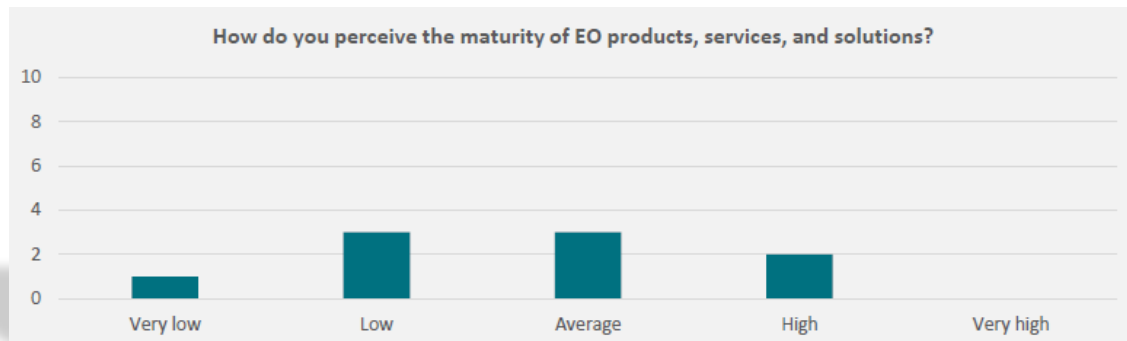
Organisational level benefits



There are clear,
measurable benefits of
using EO solutions for
urban challenges!

*... and the EO community
knows this*

EO maturity versus adoption



“We are reinventing the wheel every time”

- A fragmented EO landscape with a lot of solutions
- Needs of cities are continuously changing
- Requirements of EO products, services, and solutions
 - More customisable
 - More integrable
 - Easier to find, compare, and use

Fragmentation of EO solutions

Fragmentation of the global urban landscape

“We need more EO data culture”

- Better understanding of the value of EO for cities
- More EO education on policy and diversity level
- Data-poor urban environments
- Making EO data more accessible
- Trusting EO data

EO is not ready to be mass-implemented at city scale

What holds back organisations to use EO?

How much do you agree with the following statements?



“The ability isn’t there because the technology is still not mature enough”

Future vision on EO applications



- Better **understanding of the complex urban environment**, *e.g. via digital twins*
- More efficient **climate adaptation plans**
- Make sure to deliver on **civil rights**, *e.g. the right to breathe*
- Link between **urban form with urban function**
- Achieve **urban development goals** more efficiently
- Increase resilience and optimize the management of **short- and long-term risks**, *e.g. urban sprawl*

The EO community
needs to develop
urban-user-friendly
products

Elements in the roadmap to the desired future of EO



Necessary conditions
solve first

Simple

- **Simplification** of the EO landscape
- More **clear communication** about EO's capabilities and limitations
- The **end of one-fits-all EO solutions** and the beginning of tailoring to end-user's needs
- Product **certification and validation** of data

Reliable



Supporting factors
use in action plans

Urban legends

- Case studies and **success stories**
- Organisation of **events** where knowledge is transmitted (in)formally
- **Funding opportunities** and capacity building
- Making **EO more fun!** And less scientific

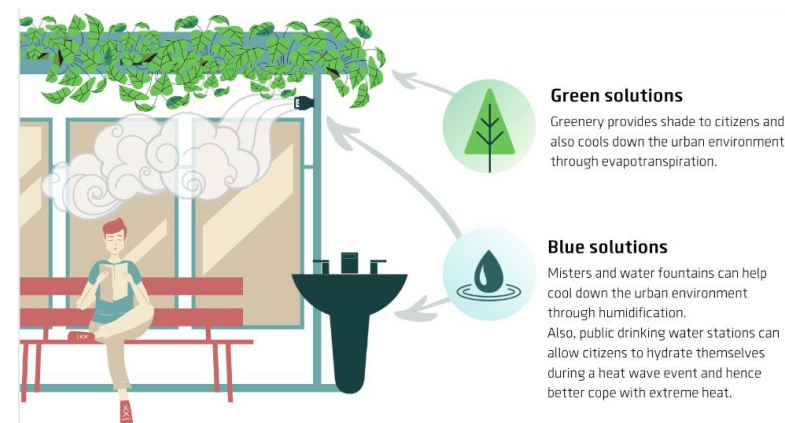
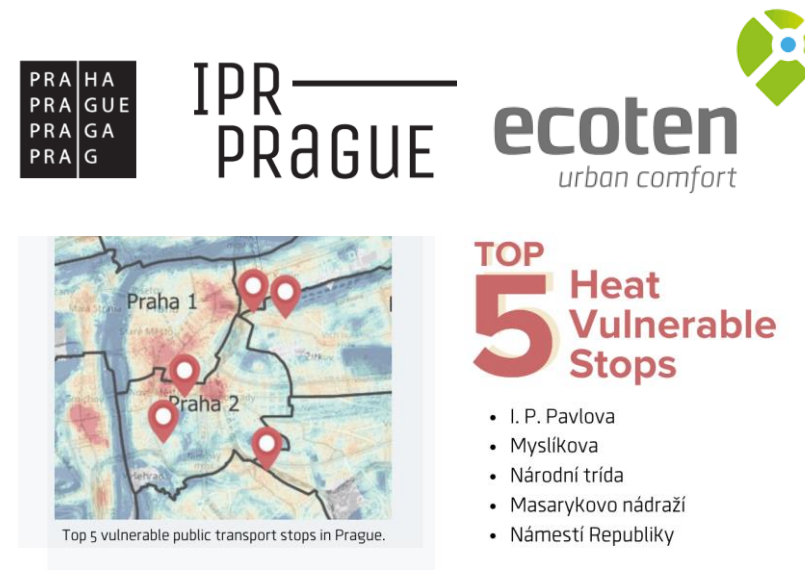
Global

Fun

Events

Clear

Creating urban legends: Stories about real solutions!



Key actions to accelerate adoption

In the urban development sector



Make it the
logical solution!

Make it
simple!



Emphasise the cost-benefit of EO-solutions

Make it clear that satellite data offer the **most cost-effective solution to many urban problems**, in urban decision maker language

Standardisation of EO-solutions

Developing standards for compatibility, opening the door for creating templates or **blueprints to easily translate or adapt existing solutions** to fit the needs of other end-users, or even other urban areas.





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Remco Timmermans – Spaceside O

SPACE MARKETEER AND SPACE DATA APPLICATIONS SPECIALIST



*EO offers real solutions
for real urban problems!*

But not enough city decision makers know about it yet...



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The Now & Tomorrow of Earth Observation for Infrastructure



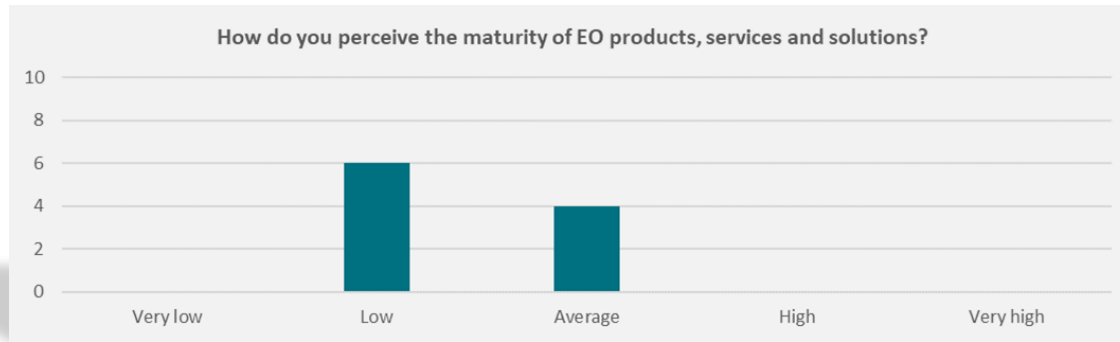
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Organisational level benefits



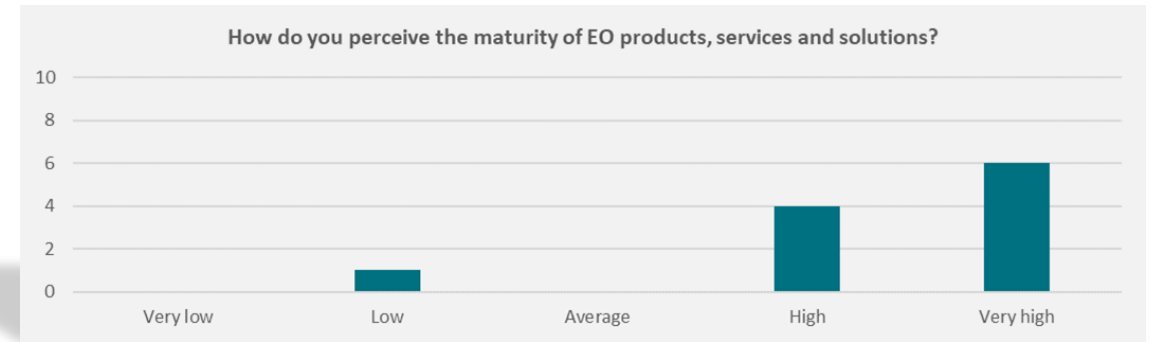
- **Super cost effective for monitoring infrastructure on a large scale**
- **Case for planning and design less clear because requires deep tool integration**
- **Some sector will see a regulatory push**
- **More about reducing/maintaining O&M costs**

EO maturity versus adoption



“More and more applications demonstrated”

- First steps towards user-centric products
- Long road ahead in marketing the technology
- Infrastructure has real needs and is willing to pay
- Maturity varies across the project lifecycle



“First start to use data, then satellite data”

- Need for broader digital transformation
- Integrate data in processes and systems
- Limited knowledge of costs, savings and ROI
- Financial and asset risks are far greater than cost!
- Adoption follows maturity

What holds back organisations from using EO?

How much do you agree with the following statements?



“The motivation is there, despite being oversold in the past, but the engineers shouldn’t need to handle the data”

Future vision on EO applications



- New **planning & design software** suites with integrated EO capabilities
- Industry-standard **stability monitoring software** with a simple interface
- EO data feeds into **digital twins** of infrastructure networks and assets
- Enabler for remote, automated, low carbon footprint **predictive maintenance**
- Accepted and certified methods for **regulatory compliance monitoring**

Elements in the roadmap to the desired future of EO



Necessary conditions *solve first*

- Need **picture of all costs** before getting started
- Need high-res **affordable data** that matches the use case
- **Certified and trusted data** to limit risk exposure
- **High profile industry adoption** and acceptance



Supporting factors *use in action plans*

- Wave of **digital transformation** through the sector will create opportunities to adopt EO
- Also boosting **demand through regulation**
- Success stories and examples
- Access to expertise and training

Key actions to accelerate adoption

In the infrastructure sector

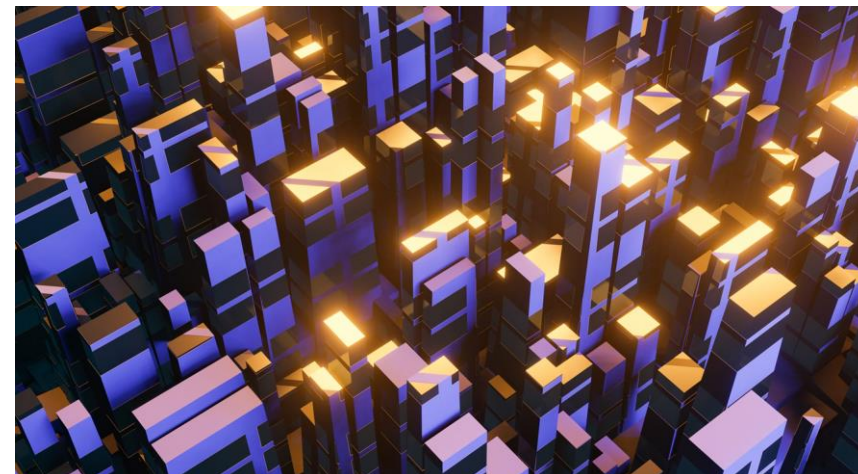


Warranty and insurance for data products

Leverage certification of data products to provide value propositions with extended warranty or even insurance to **limit financial and asset risk**



**Business models
& solutions**



From static base maps to “EO integrated” digital twins

Government and corporate programmes for “EO integrated” infrastructure digital twins to stimulate **technology development and mass-exposure**



Policy levers





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Lucy Kennedy

CEO at Spottitt

*As a sector we must provide
services, not just technology.*

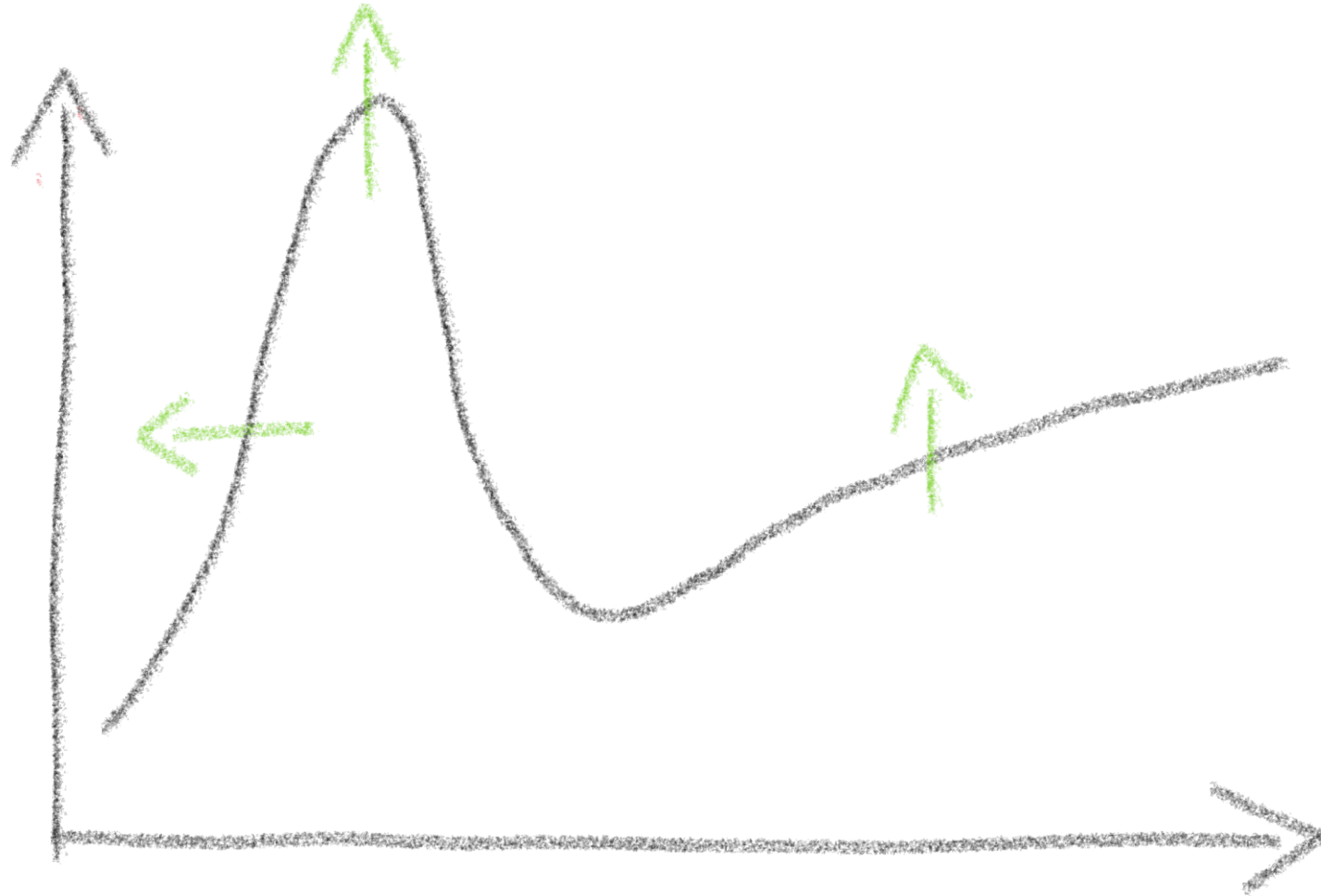
Clarity on ongoing service costs, quality and accuracy, better fit with
user needs



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**SO WHY DON'T WE SEE
MASS ADOPTION YET?**

HOW TO INCREASE & ACCELERATE ADOPTION?





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Thank you!

Benoit De Vrieze & Ornella Torres Melkebeek

Want to know more? Let's have a chat!

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