Developing a co-design methodology to grow an ecosystem of efficient EO-based application designers
Results and perspectives from the e-shape project

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e-shape

69 partners

7 showcases
37 pilots

4 years grant

agriculture

health

renewable energy

ecosystem

water

disaster

climate

The e-shape project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 820852

e-shape

EuroGEO Showcases: Applications Powered by Europe

EuroGEO

GEO GROUP ON EARTH OBSERVATIONS

SUSTAINABLE DEVELOPMENT GOALS

UNITED NATIONS PARIS CLIMATE AGREEMENT SIGNING CEREMONY 22 APRIL 2016

UN World Conference on Disaster Risk Reduction 2015 Sendai Japan

More than a project: supporting Copernicus and establishing the European contribution to GEO

- O1: Develop **operational EO services with and for users** active in key societal sectors
- O2: Demonstrate the benefits of the EO pilots through the coordinated downstream **exploitation of EO data and the utilization of existing EO resources (especially Copernicus)**
- O3: Promote the **uptake of pilots at national and international scale**, across vertical markets (private and public) and amongst key user communities
- O4: Enable the **long-term sustainability** of the numerous pilots, their penetration in public and private markets and support their upscaling
- O5: Increase uptake by **raising awareness** on the solutions developed through tailored and well-targeted communication, dissemination and outreach activities

EuroGEO GEO GROUP ON EARTH OBSERVATIONS Copernicus

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Goal: building a co-design approach adapted to the EO context

- Workpackage led by the *Center for Management Science* at MINES ParisTech - PSL University: leveraging our expertise in **design theory** and methods for innovation
- Approach progressively built through **interactions and experimentations with e-shape pilots**

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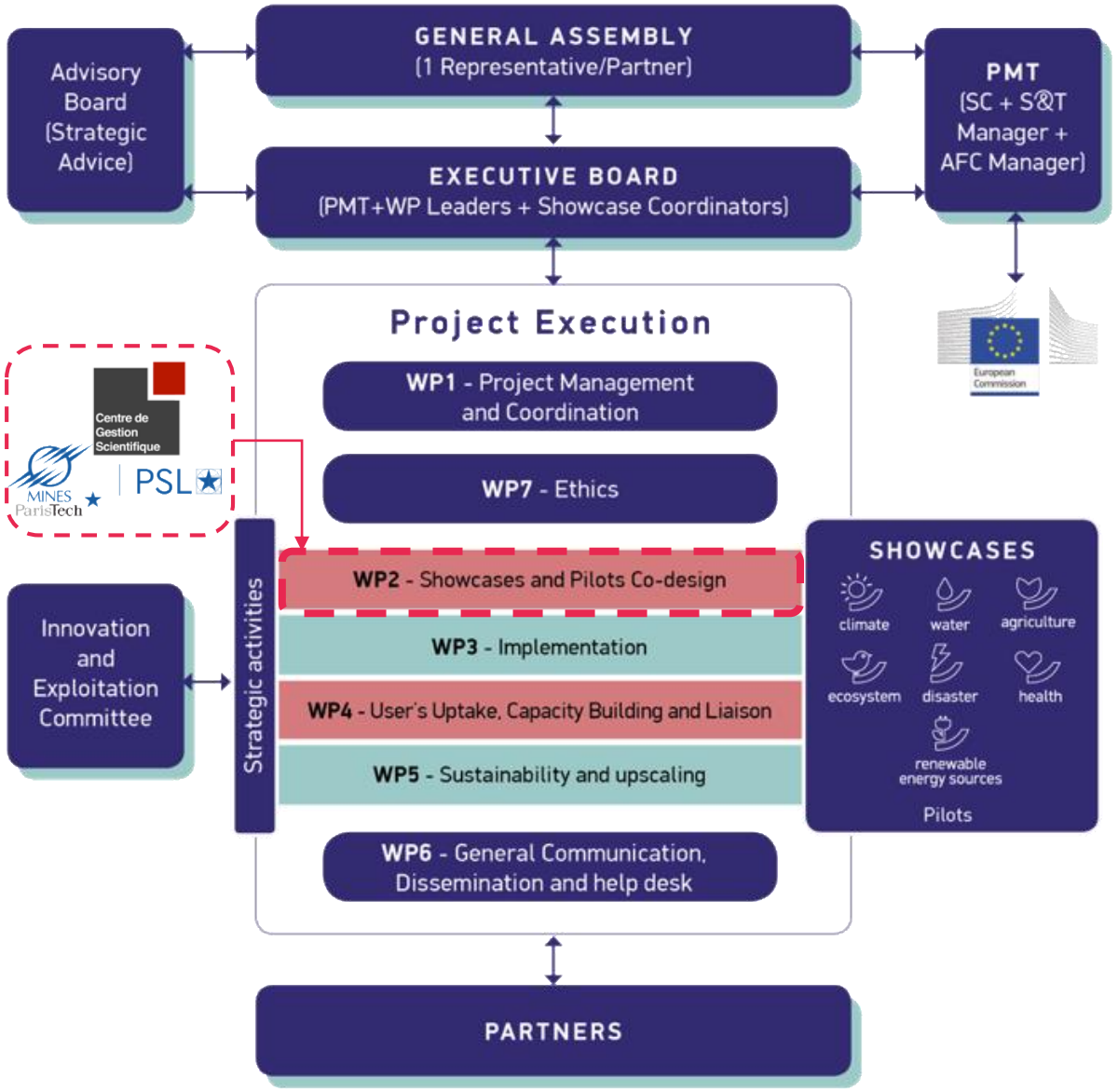

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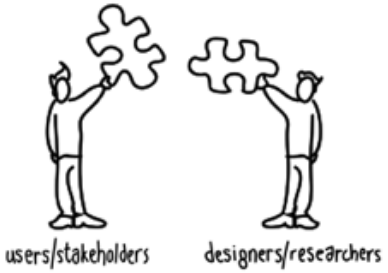
An enriched understanding of co-design driven by e-shape objectives - in line with GEO vision

1. Enhancing cooperation among heterogeneous actors:

- GEO core function - Fostering partnerships and mobilizing resources: *''Connect **users, resource providers, and experts from different sectors** in the domain of Earth observations and environmental information to **form partnerships**''*

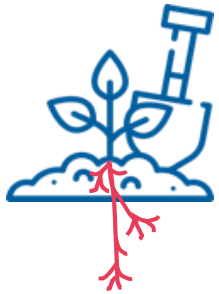
2. Targeting resiliency

- GEO core function - Identifying user needs and addressing gaps in the information chain: *''Obtain commitments from providers and users to ensure these observations, products and tools are **delivered and used in a** comprehensive, coordinated and **sustained way**''*



Usual co-design to fit EO data to user needs by involving users in the design process

*(1) Cooperation limited to the **end user - data provider relationship***
*(2) Mainly considering co-design as a **one-shot action***



'Resilient-fit' co-design to grow a socio-economic ecosystem around Earth observation by strengthening its ability to adapt to future and unexpected evolutions

As a plant being more robust to varying environmental conditions thanks to an expanded root network

*(1) **Designing relationships** between a large range of actors (beyond end-users)*
*(2) Taking a **dynamic and long-term perspective***

e-shape

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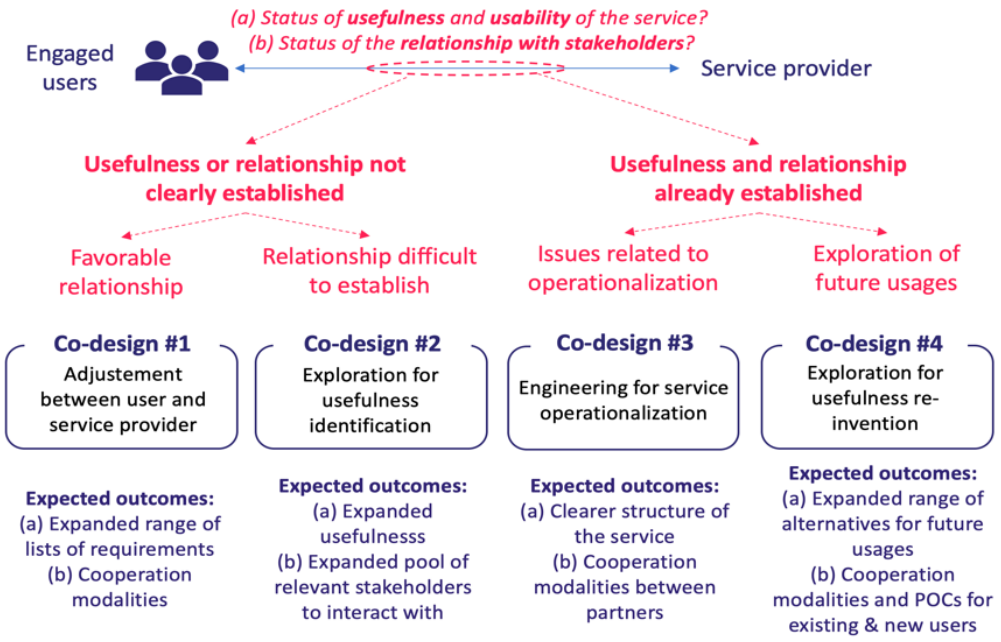
Resilient-fit co-design: diagnosis & workshop

#3

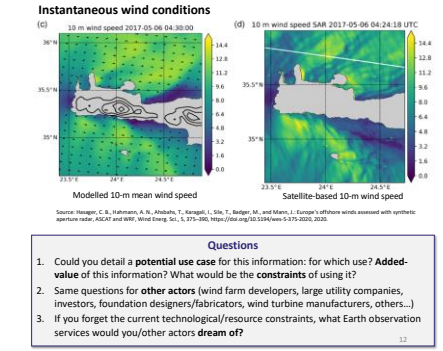
EO resource provider's timeline

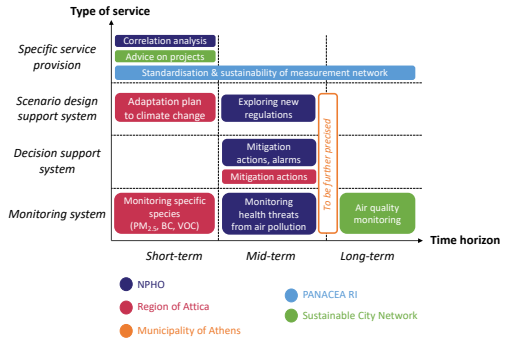
#2 #1 #4 #2

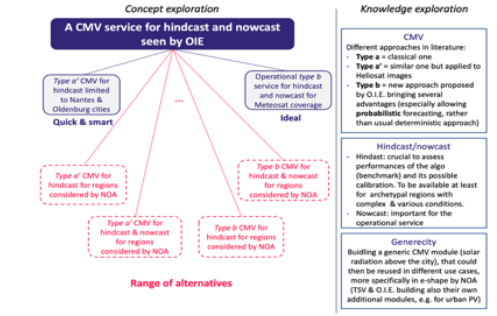
Co-design diagnosis: *scope & context of cooperation*

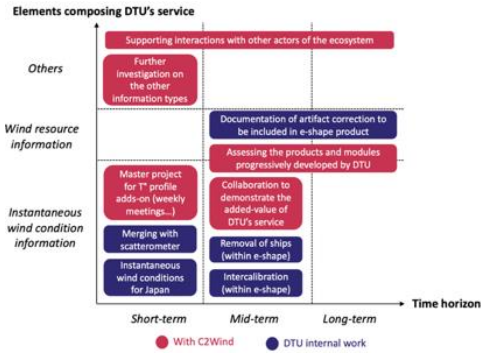


Co-design action: *designing the 'co' and resilience*









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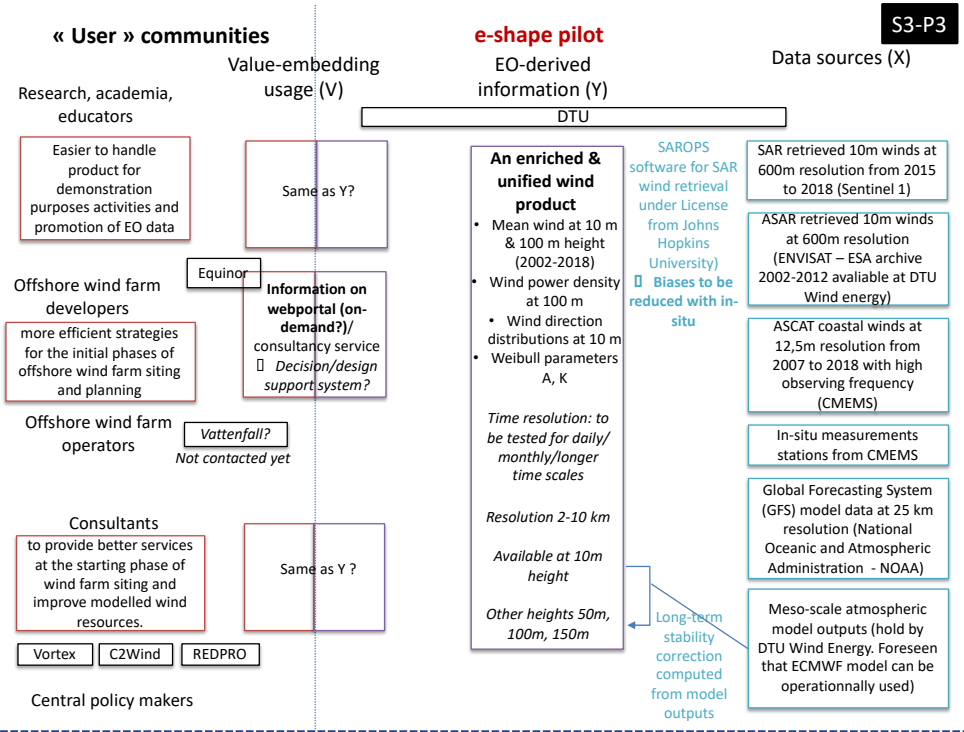
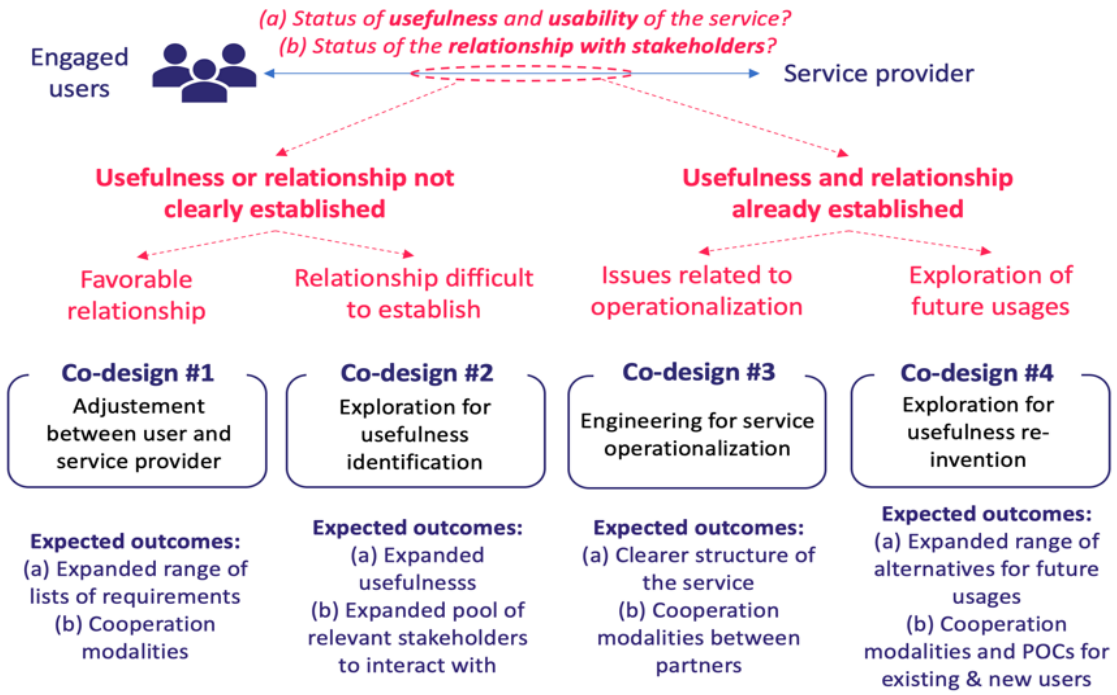
Co-design diagnosis: who? why? when?





- Helping the pilot to formalize its **objectives** and **understanding** about the users' communities
- Identifiying the relevant types of co-design actions **at different time horizons**

*"The co-design diagnosis was very well structured […] It was **very good to have short-term and long-term**, this helped us to come back couple of months after and see what we had said for the long-term and what is now time to implement."* ***(Alexia Tsouni, NOA)***

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Co-design action: guidelines for resiliency

Possible agenda for a 3h workshop agenda (timing to be adapted)

- **9h - 9h15 – Introduction**
- **9h15 – 9h30 - Phase 1**: Demonstration by the pilot (prototype of the service + expertise, competencies…)

Pilot	Participants
Speaking	**Active listening:** *to what extent might the service be useful for me? Any issue raised?*

- **9h30 – 10h45 – Phase 2**: Knowledge shared by each user

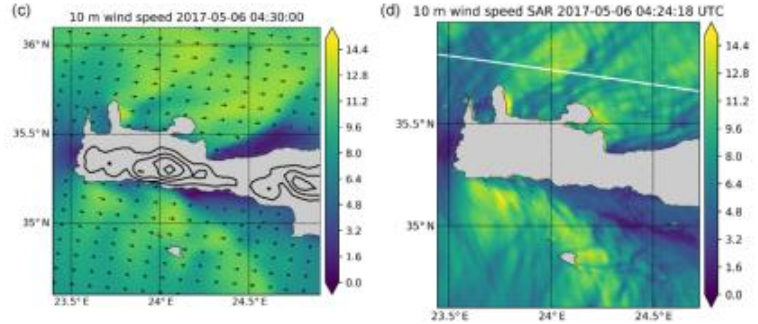
Pilot	Participants
Active listening: *New features to be added? Adapted relationships with the users? New relevant actors to be involved?*	**Speaking, reacting on pilot demo**

- **10h45 – 10h55 - Break**
- **10h55 – 11h45 - Phase 3**: Enrichment of list of requirements and agreement on future relationships

Pilot	Participants
Suggesting	**Reacting**

- **11h45 – 12h** - Wrap up and next steps

Instantaneous wind conditions



Modelled 10-m mean wind speed — Satellite-based 10-m wind speed

Source: Hasager, C. B., Hahmann, A. N., Ahsbahs, T., Karagali, I., Sile, T., Badger, M., and Mann, J.: Europe's offshore winds assessed with synthetic aperture radar, ASCAT and WRF, Wind Energ. Sci., 5, 375–390, https://doi.org/10.5194/wes-5-375-2020, 2020.

Questions

1. Could you detail a **potential use case** for this information: for which use? **Added-value** of this information? What would be the **constraints** of using it?
2. Same questions for **other actors** (wind farm developers, large utility companies, investors, foundation designers/fabricators, wind turbine manufacturers, others…)
3. If you forget the current technological/resource constraints, what Earth observation services would you/other actors **dream of?**

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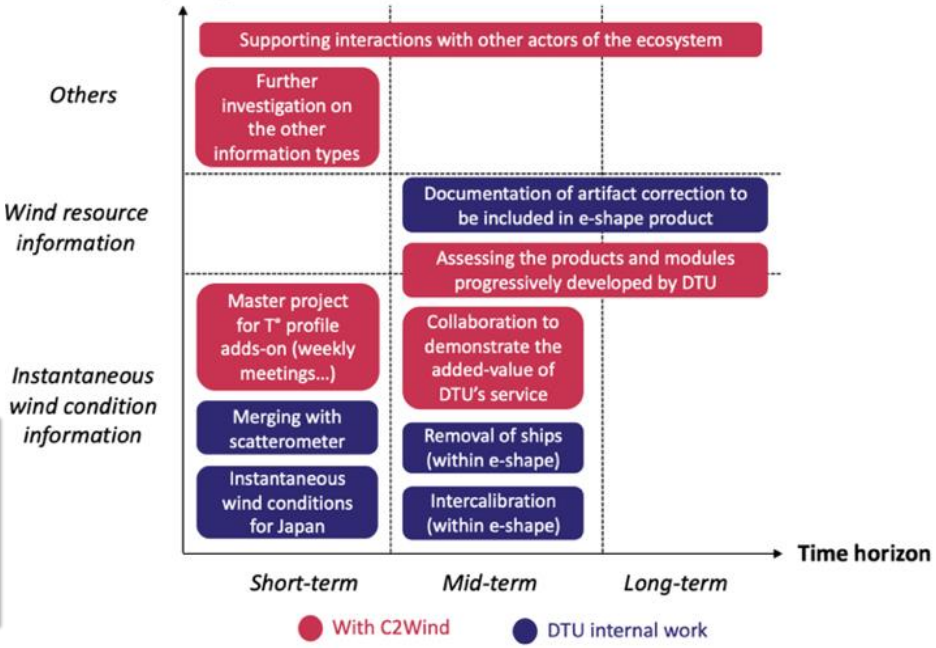
Elements composing DTU's service



- **Rigorous process** for each co-design type: sequence of preparatory phase and workshop(s)
- Outcomes: formalizing a **range of cooperation forms at different time horizons**
  - **Designing the 'co'**: explicitly building the relationship between actors
  - **Designing resilience**: not converging on one list of requirements but eliciting a range of alternative development paths at different time horizons

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Perspectives

Research perspectives : a **trans-ecosystems co-design** to transform EO data into a resource to accelerate the sustainable transitions of multiple socio-economic ecosystems *(growing streams of works in innovation management and information systems research)*

Operational perspectives:

- Establishing the **mechanisms towards sustainable EO and Copernicus based applications** (public and private) based on e-shape's experience and on Copernicus downstream sector (e.g. possibly towards an European Digital Infrastructure Consortium)
- Exploring ways of **enhancing co-design expertise in the EO community**
  - *Autonomous co-design* → guidebooks + trainings
  - *Co-design helpdesk* for more complicated cases → Europe / GEO supporting the establishment of a community of experts (teams, networks, labels, experience sharing, devices & interactive platforms)?

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Thanks for your attention!

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