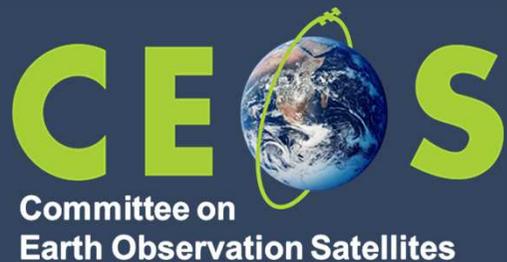


CEOS WG Disasters : an overview for CEOS – CGMS WGClimate



H de Boissezon, CNES
CEOS WG Disasters Chair
Presentation to WG Climate
20th October 2022

- ❖ Overview of WG Disasters objectives and current priorities
- ❖ WG Disasters workplan status and perspectives
 - Overview of pilot and demonstrator successes
 - Challenges for sustainability and current approach to address them
 - Current and prospective user and stakeholder communities

WGDisasters fundamentals



- Earth observations enable identification of natural **hazards**, **exposure** of people, assets and livelihoods, and related **vulnerabilities**
- CEOS WG Disasters Work Plan is aligned with the **Sendai Framework** on Disaster Risk Reduction

- GEO4DRM 

- International Charter Space and Major Disasters



WGDisasters Objectives



- ❖ Support the efforts of **Disaster Risk Management (DRM) authorities** in protecting lives and safeguarding property by means of **satellite-based EO** and **science-based analyses**
- ❖ Support the implementation and monitoring of the **UNDRR Sendai Framework**, (mainly Priority1 “Understanding Risk”, more recently Priority4 “Build Back Better”)
- ❖ Support the work of **international initiatives** such as GEO
- ❖ Raise the **awareness of politicians, decision-makers, and major stakeholders** of the benefits of using satellite EO in all phases of DRM
- ❖ Foster **increased use of EO** in support of **DRM and DRR**, and express **related EO needs**

WGDisasters Priorities 2022-2023



"The path to sustainability - use cases or the operational uptake of satellite EO at the local scale":

Focus on Operational Uptake of WG successes to increase resilience

- **Demonstrators.**
 - Continue to demonstrate potential but begin **building path to sustainable operations** post demonstrator – stronger ties to international stakeholders but also local actors
 - Increase focus on **capacity building** in all demonstrator activities
- Strengthen **ties to GEO WGs** through increased visibility of WG Disasters activities within GEO
- Explore ***linkages to climate related activities***, especially through the impact of CC relating to extreme weather events and local impacts of climate (assessment, mitigation, resilience)
- Exploit ***new technology opportunities***, either through new missions, new activities or new data exploitation techniques

WGDisasters Subgroups



Pilot and Demonstrator projects :

- Wildfire Pilot
- Flood (GEO/LEO/SAR) Pilot
- Landslide Demonstrator
- Volcano Demonstrator
- Seismic Hazards Demonstrator
- Recovery Observatory Demonstrator

- Geohazards lab

Contribution to GEO :

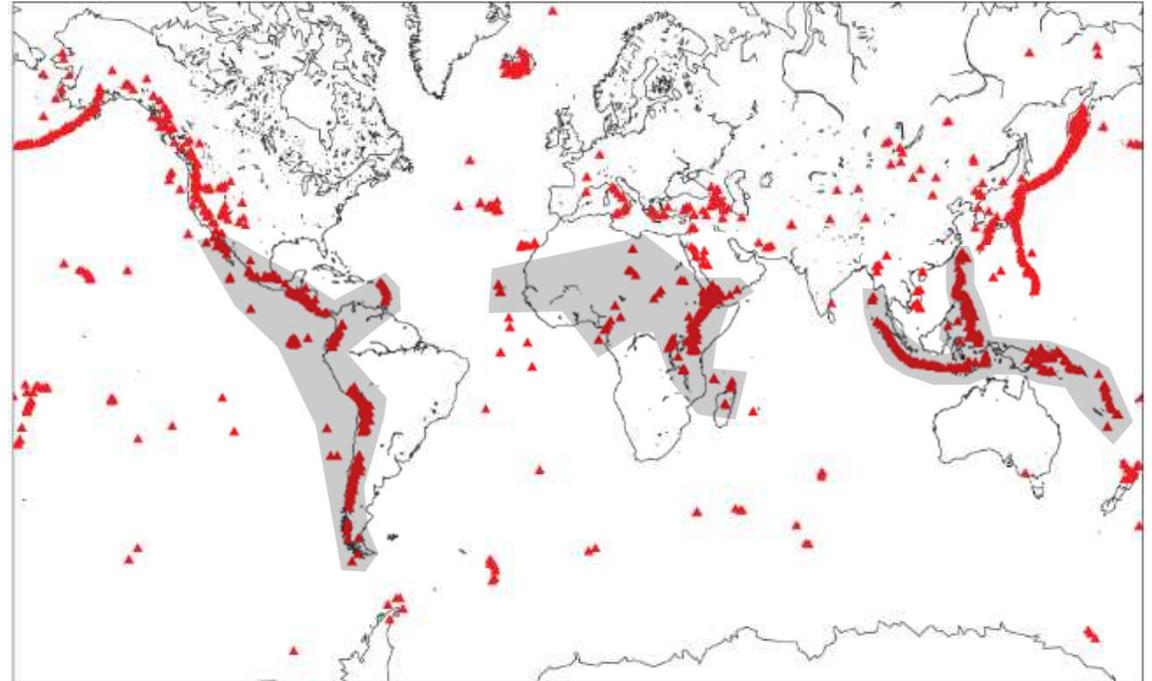
- GEO4DRM
- GSNL
- GEODARMA

- *GFRM*
- *GEO4SENDAI*

Volcano Demonstrator



- ❖ Aims to evaluate the utility of remote sensing data for anticipating, detecting, and tracking volcanic eruptions.
- ❖ Supports EO applications that promote volcanic disaster risk reduction worldwide.
- ❖ Focus on high-risk volcanoes in areas where monitoring is not currently well developed (LAC, Africa, SE Asia).



Demonstrator Leads: Mike Poland, USGS; Simona Zoffoli, ASI; Susi Ebmeier, University of Leeds.

Landslide Demonstrator



Elkhorn city (Kentucky, US) – February 2020 – shallow landslide / mudflow



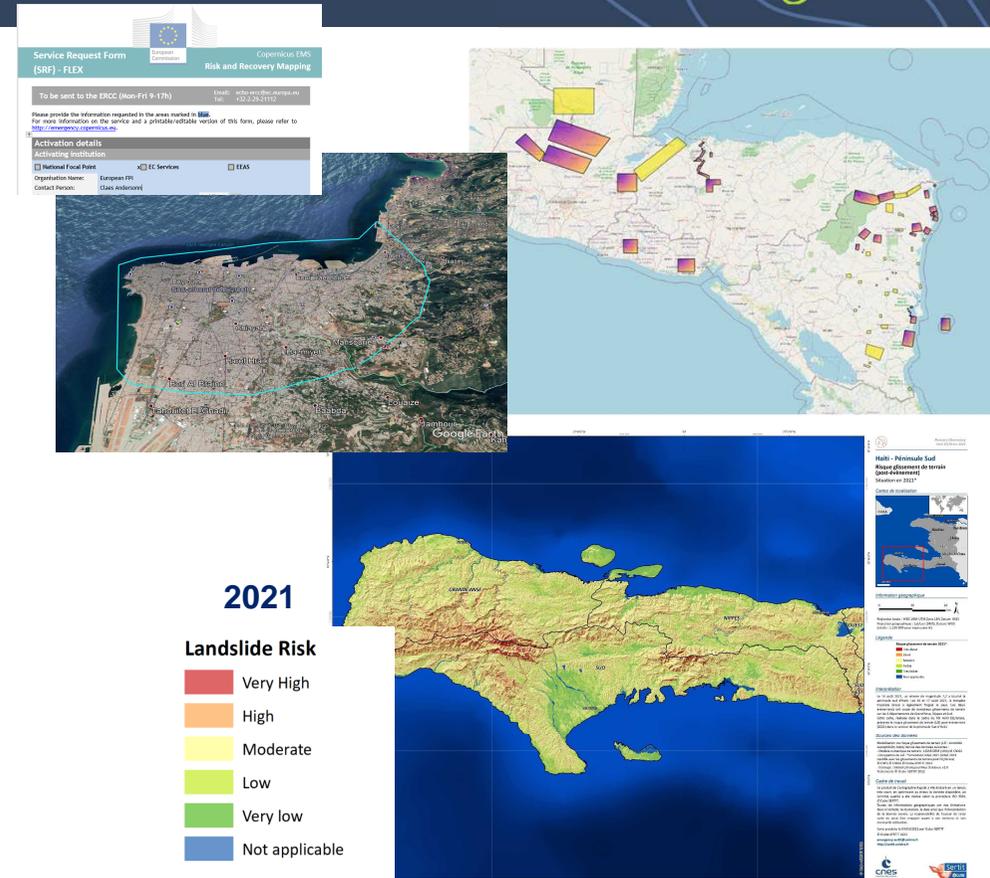
East France – March 2020 – landslide on high speed train TGV

- ❖ Aims to demonstrate the effective exploitation of satellite EO across the full cycle of landslide disaster risk management (i. e. preparedness, response, and recovery at global, regional, and local scales), including the possibility of multi-hazard focus on cascading impacts and risk.

**Demonstrator Leads: Pukar Amatya, NASA;
Jean-Philippe Malet, UNISTRA/EOST;
Jonathan Godt, USGS**

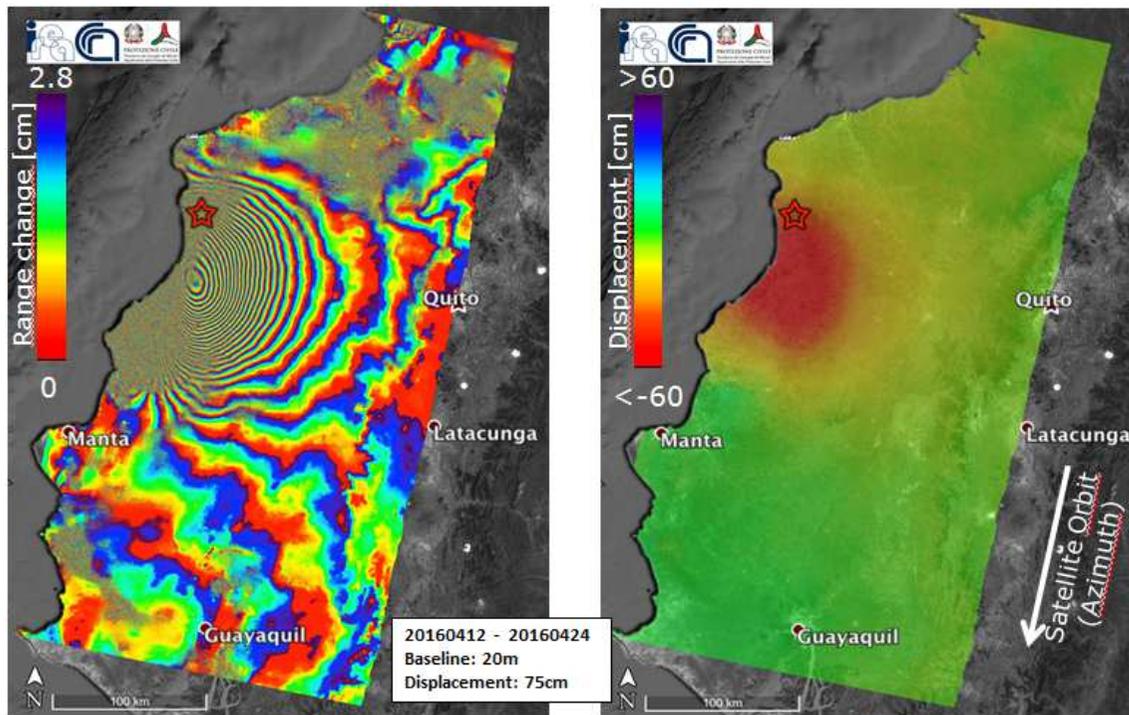
Recovery Observatory (RO) Demonstrator

- ❖ Showcase contribution of satellite data and products to recovery efforts following major disaster events. Direct input to Post Disaster Needs Assessments and long-term contribution to Recovery Framework. Cited in Space Agenda 2030 (UN GA).
- ❖ Haiti (Matthew hurricane) Pilot 2017-2020;
- ❖ Demonstrator objective : 3-5 ROs 2020-2023. To date:
 - Beirut Explosion 2020
 - Eta-Iota Central America 2020-21
 - Haiti Earthquake 2021-22.
 - *Pakistan Floods 22 : ongoing*



Demonstrator leads : H el ene de Boissezon, CNES; Rashmin Gunasekera; World Bank

Seismic Hazards Demonstrator

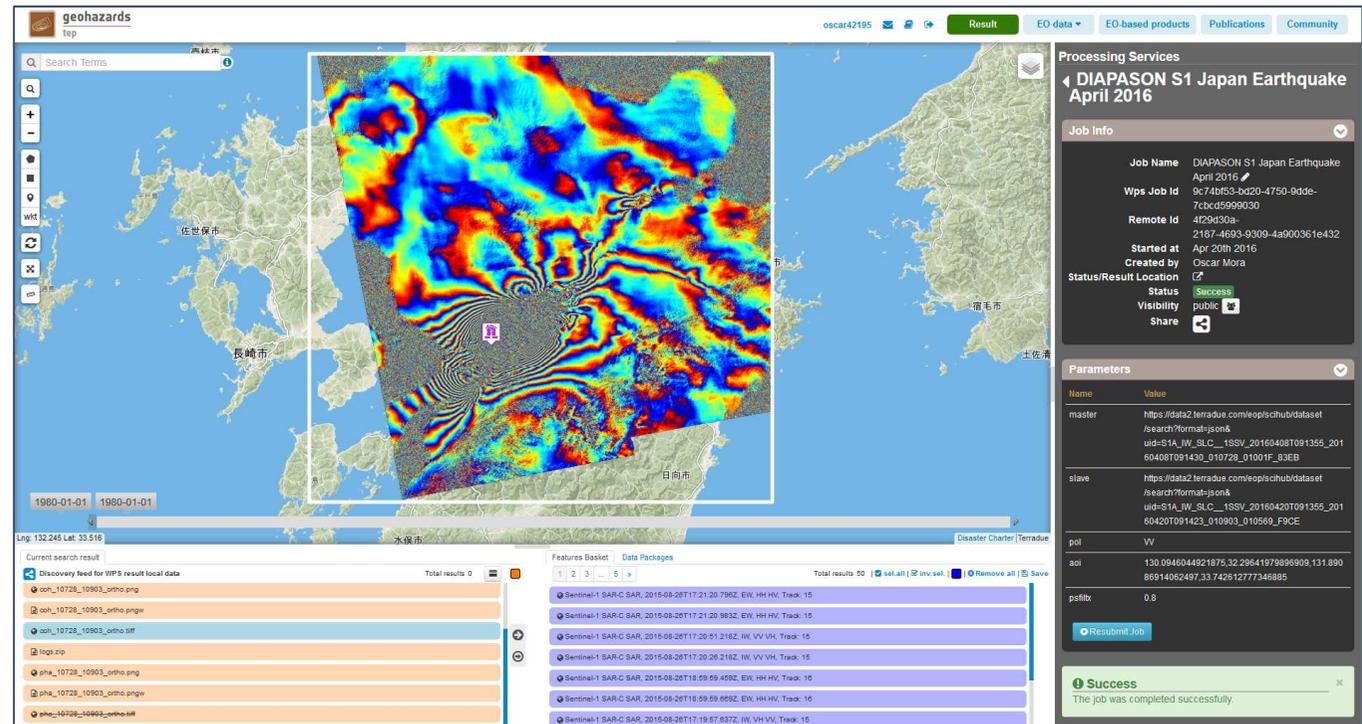


- ❖ Develops and demonstrates advanced science products for rapid earthquake response and better understanding of risk and exposure.
- ❖ Supports the uptake of these products and methodologies through co-design and development with WG stakeholders and users.

- Demonstrator ending in Oct 2022 -

Demonstrator leads : Philippe Bally, ESA; Stefano Salvi, INGV

- ❖ Enable greater use of EO data and derived products to assess geohazards and their impact.
- ❖ Optimizes use of existing and new technologies with a focus on hosted tools and services to exploit satellite data in Cloud environments.



The screenshot displays the GeoHazards Lab web interface. The main map shows a SAR interferogram of a coastal region in Japan, with a color scale from blue (low deformation) to red (high deformation). The map is overlaid on a satellite image. The interface includes a search bar, a map navigation panel, and a processing services panel on the right. The processing services panel shows details for a job titled "DIAPASON S1 Japan Earthquake April 2016".

Processing Services
DIAPASON S1 Japan Earthquake April 2016

Job Info

Job Name	DIAPASON S1 Japan Earthquake April 2016
Wps Job Id	9c74b53-bd20-4750-9dde-7bcd5999030
Remote Id	4f29d30a-2187-4693-9309-4a900361e432
Started at	Apr 20th 2016
Created by	Oscar Mora
Status/Result Location	CF
Status	Success
Visibility	public
Share	

Parameters

Name	Value
master	https://data2.terradue.com/eoips/schub/dataset/#search?format=json&uid=S1A_IW_SLC_1SSV_20160408T091355_20160408T091430_010728_01001F_83EB
slave	https://data2.terradue.com/eoips/schub/dataset/#search?format=json&uid=S1A_IW_SLC_1SSV_20160420T091355_20160420T091423_010903_010569_F9CE
pol	VV
aoi	130.0946044921875,32.29641979896809,131.89089914062497,33.742612777346895
pathfix	0.8

Success
The job was completed successfully.

Lead : Mickael Foumelis BRGM; Philippe Bally, ESA

(Geohazards Supersites & Natural Laboratories-GSNL)



Lead : Stefano Salvi, INGV

- ❖ Aims to improve geophysical scientific and geohazard assessment, promoting rapid and effective uptake of new science results for enhanced societal benefits in DRR
- ❖ Voluntary international partnership.

Volcanoes : Hawaii ; Iceland; Etna; Campi Flegrei/Vesuvius; Taupo Ecuador; Southern Andes; Virunga; Kamchatka Kuriles

Faults / Earthquakes : Marmara Western North Anatolian fault ; San Andreas Fault NL; China Earthquakes; Nicaragua

(GEO Data Access for Risk Management-DARMA)



- ❖ Aims to support practical implementation of critical elements of the UN Sendai Framework by making satellite data more accessible to risk related initiatives.
- ❖ Open initiative undertaken with partners from both satellite and non-satellite organizations.

Lead : Ivan Petiteville, ESA

Flood Pilot



- ❖ Explores and demonstrates best practices for combining diverse optical and radar data sources to improve current abilities to map flood extent and depth and improve understanding of how hazard science can be better integrated with vulnerability and exposure information.

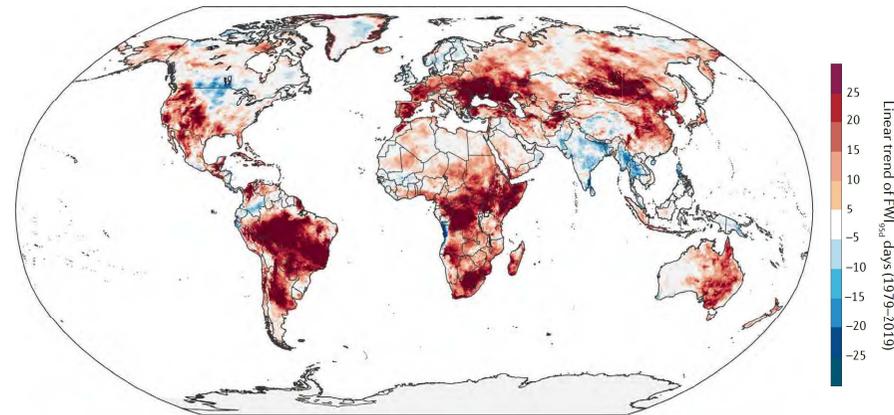


Pilot leads : Marcelo Uriburu Quirno, CONAE; Mitch Goldberg, NOAA; Guy Schumann, RSS Hydro

Wildfire Pilot



- ❖ Aims to provide a fundamental basis for defining global priorities for active-fire monitoring and characterization.
- ❖ Explores the existing gaps in wildfire EO capabilities (existing and proposed).
- ❖ Articulates global stakeholders and user requirements for active-fire remote sensing.



**Pilot leads : Joshua Johnston and Mark de Jong, NRCan; Peter Moore, FAO;
Denis Dufour CSA; Douglas Morton, NASA**

Pilot and Demonstrator Successes



- ❖ Demonstration of **technical feasibility** as applied to each thematic area or phase of disaster cycle
- ❖ **Working-level, proto-operational uptake of EO-based products** from practitioners and end users (e.g. volcano observatories, civil protection agencies, specialized research bodies....)
- ❖ Exploration of **new partnerships** and **bridging gaps** between **different types of partners**, including international organizations, governments, research institutes, companies, non-governmental organizations... solution-focused work to improve Disaster Risk Management using EO
- ❖ Demonstration of **best practices** for **combining diverse satellite data** to improve understanding and management of risk
- ❖ **New activities envisaged** –
 - CC impact / extreme events : synergy with SCO (Space for Climate Observatory);
 - Improving Disaster Risk Reduction
 - Geodesy for Disasters / GEO4Sendai

Sustainability Challenges



Two sub teams for addressing this issue :

❖ Recovery Observatory sustainability sub team :

WB, EU, UNDP, UNOOSA, UNOSAT, ASI, CNES, ESA@WB, Copernicus EMS

❖ WG Disasters sustainability sub team :

Demonstrators and Pilot leads, GEO activities lead

On going Sustainability Survey :

Community of Practice ? Vision for sustainable use of EO ? Key partners ?
Main barriers ? Cost drivers ? Donor / Investor communities ?

Sustainability Challenges — and approaches to address them



- ❖ Many solutions rely on marriage of free and open data with commercial data sets – **data cost** remains a hurdle for long-term solutions, especially for risk reduction (as opposed to response and -to a lesser extent, recovery)
 - Demonstrators work with hotspots to showcase smaller scale projects that are more **affordable**, but in the long-term **scalable**
- ❖ **Awareness** of specific benefit tied to each thematic area or disaster phase still low in most communities, especially those financing risk reduction
 - Demonstrators to place more emphasis on identifying benefits from **stakeholder viewpoint**
- ❖ Understanding of **differences in satellite data** solutions still low (e.g. free and open data vs commercial datasets)
 - Focus on **integrated solutions** but bring **clear cost-benefit** to show how using commercial data sets augments overall benefit of satellite EO usage
- ❖ In many cases organizations with mandate to manage risk **do not have budgets** to invest in EO
 - Identify cost savings; identify **cost-benefit wins**; identify **new stakeholders** with more financing and forge partnerships
- ❖ Continuous effort to be put on **Capacity Building** (not only technical, decision makers too) and **co-construction**
 - Strengthen **links WG CapD / WG Disasters**, for a synergistic action ; Develop **“peer awaneress”**

User Communities – a few representative examples of WG Disasters outreach



Pilot or Demo	User Community	Objective
Recovery Observatory Demo CC	International recovery stakeholder community (World Bank/GFDRR, UNDP, EU – but also regional DRM stakeholders (e.g. CEPREDENAC) or national governments (e.g. Haiti))	Create strong consensus around use of satellites for recovery (support to PDNAs and longer-term recovery framework planning and monitoring)
Volcano Demo	Volcano Observatories in developing world	Showcase benefit of EO for risk reduction and improved response; develop local capacity to use EO; facilitate EO access and uptake of EO for advanced volcano products
Landslide Demo CC	National and regional authorities International stakeholder community Insurance	Demonstrate value of using EO to understand risk and reduce risk to critical infrastructure; improve global landslide inventory used by national and local authorities
Wildfire Pilot CC	National Forestry agencies	Better coordinate use of satellites for fire monitoring; increase use of satellites, especially new missions or different missions than those currently used
Flood Pilot CC	National governments, civil protection agencies, watershed authorities	Showcase value of using a wide range of sensors (optical, SAR, LEO, GEO) for comprehensive flood monitoring in a few key basins

Input Sought



- ❖ WG Disasters seeks to serve as a **catalyst for uptake of EO-based DRM solutions** by real actors with strong mandates for DRM, but ***WG Disasters does not have an operational role to play***, even in the Demonstrators... Potential role in “Observatories” ?
- ❖ Increasing linkages with **other CEOS Working Groups** : **CapD** and others ? **WG Climate, WGISS, ...**
- ❖ Increasing interactions with **GEO** community (**GEO DRR WG**, EO Risk Toolkit + **GEO CC WG ?**) should encourage partnerships with a new range of stakeholders
- ❖ **Partnership** is the key to sustainability, and to achieve strong partnerships, increased **awareness** of the **value of EO** is necessary (cost-benefit of advanced EO-based solutions)