

# IDEAS-QA4EO

## Task 2 Cal/Val WS#4 Introduction and Meeting Objectives

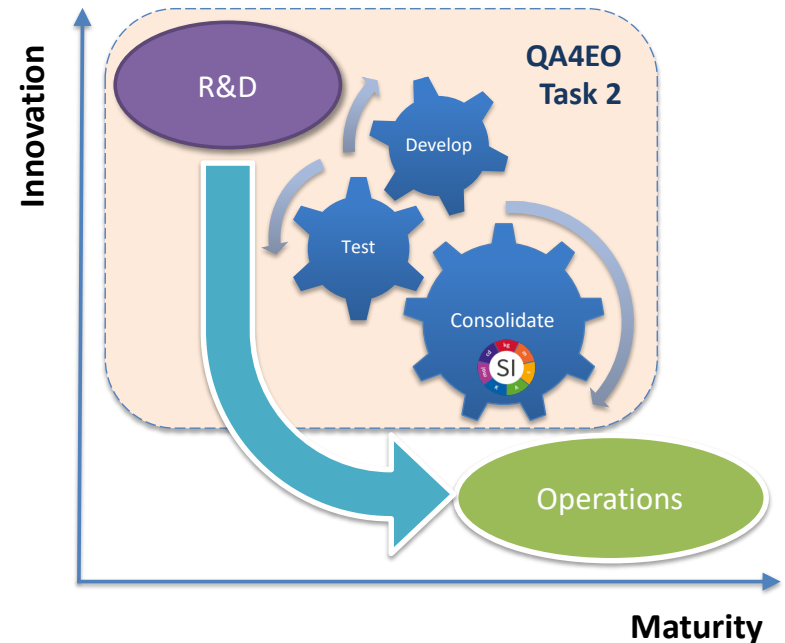
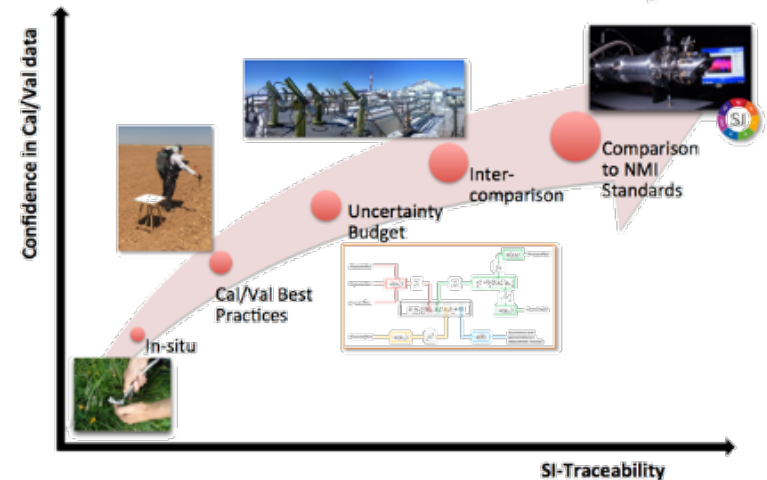
Fabrizio Niro and Gabriele Brizzi

*28 Feb – 1/2 Mar 2023*

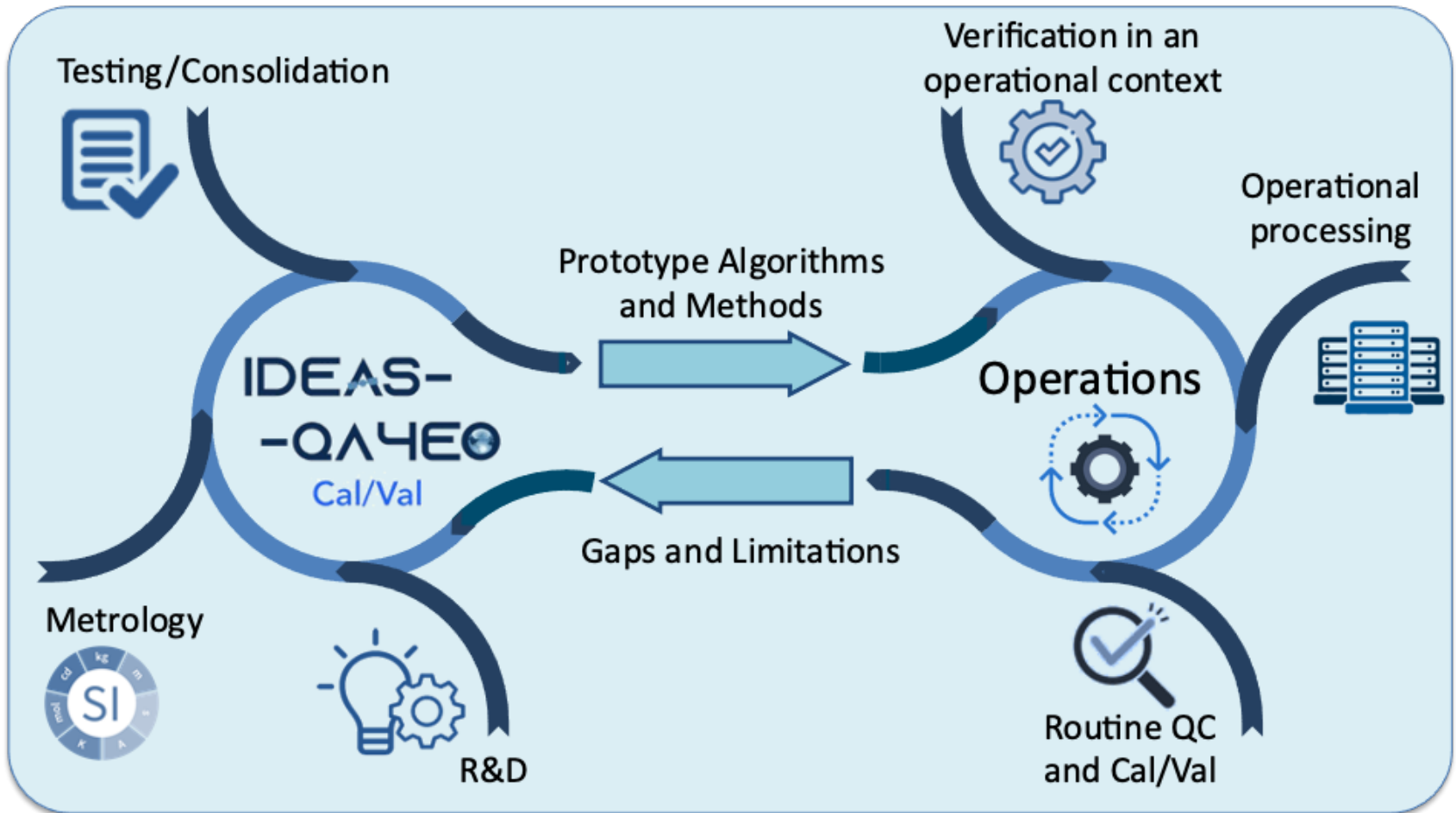
*GFZ, Potsdam*

# Vision

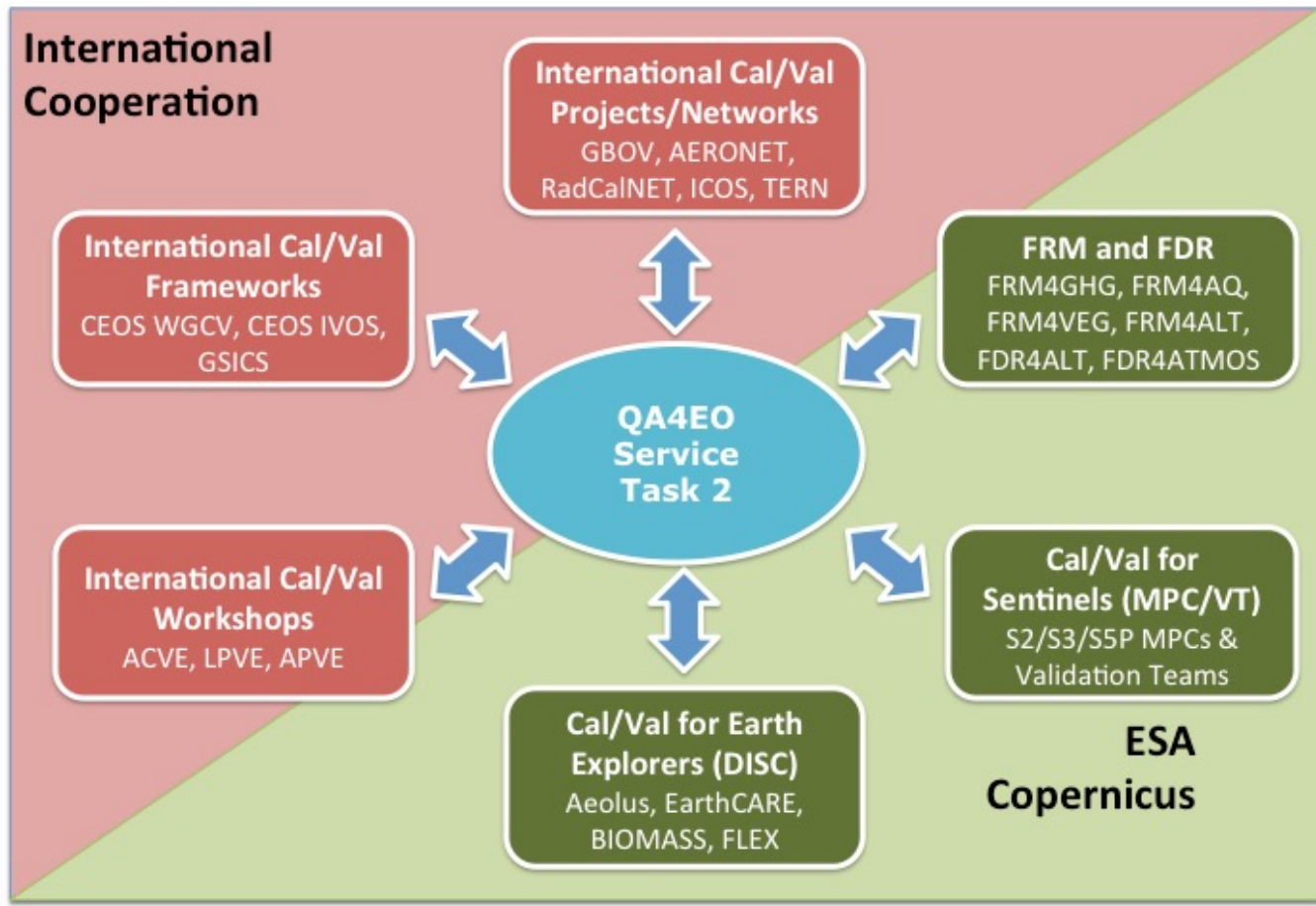
- The IDEAS-QA4EO contract is the follow-on of IDEAS/IDEAS+ sharing the same overarching objectives:
  - To ensure, on behalf of ESA-SPPA section, the best possible **quality** of ESA EO mission currently in operations
  - To develop and **prototype** advanced Cal/Val methods and algorithms
  - To foster adoption of **metrological** practices across Cal/Val community
- Within IDEAS-QA4EO, Task-2 is the place where innovative ideas are developed and their maturity level enhanced to meet operational needs
- The underlying principle: R&D activities of today are potentially the operations of tomorrow



# Innovation flow



# Context



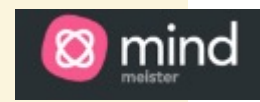
# Task 2



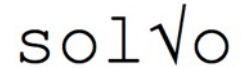
## Structure

<https://bit.ly/3m2KfMI>

## Domains



# IDEAS-QA4EO Task 2 team



Spectral Earth



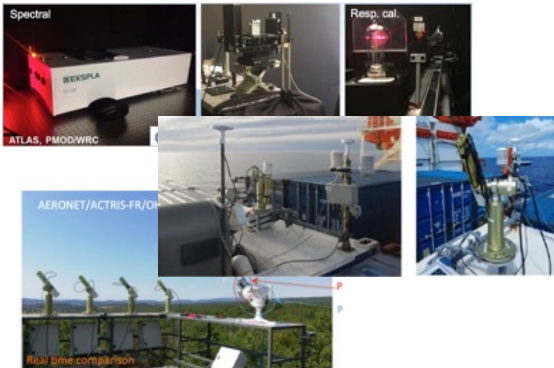
University of Zurich UZH



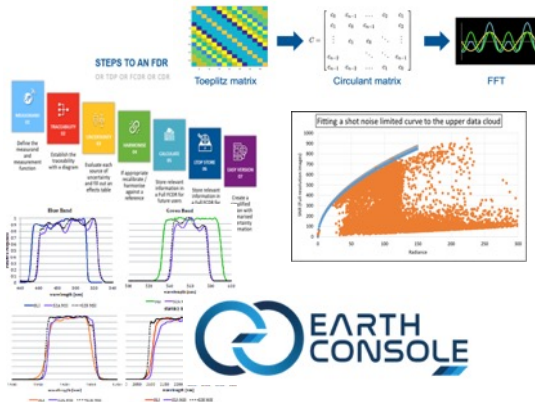
IDEAS-QA4EO







# Metrology and Calibration

## Advanced Cal/Val Systems



## Advanced Protocols & Tools



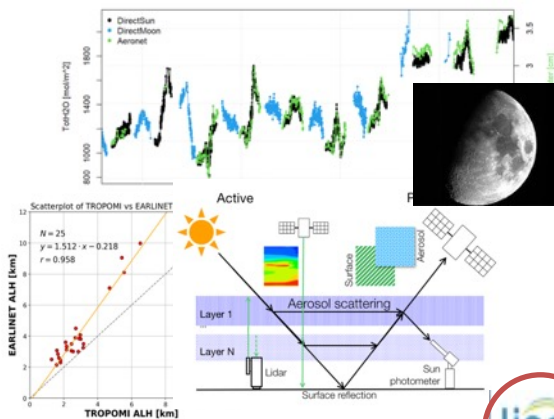
- 
NPL – Metrology toolkit, training, support Cal/Val, Hypernets
- 
PMOD – SI-traceable systems and calibration
- 
LOA – Metrology for Aerosol + Advanced aerosol Cal/Val system + automatic ship-borne photometer
- 
EOSense – Methods for in-flight calibration of optical sensors
- 
TPZ-FR – SBAF advanced methods and tools
- 
Progressive/Serco – Cal/Val interoperability platform

# Atmosphere Cal/Val

## Advanced Cal/Val Systems



## Advanced Products & Methods



BIRA/Serco - AOTF-based NO2 camera for urban pollution imaging



Luftblick – Advances in PGN trace gases uncertainties



SpectralEarth/FUB – Upgrade PGN system and retrievals



GRASP – Joint inversion sat/ground + trace gases retrieval



Uni. Thessaloniki – Aerosol Layer height validation and Umkehr Ozone Profile Analysis and Satellite Validation



ISAC/Serco – FRM4DOAS compliant site in Po Valley



ISAC/NOA/APL/PMOD/Serco - Improved AOD using PGN NO2 correction



ISAC/Serco/APL/ARPA/Luftblick – Nocturnal atmospheric products



LISA - Aerosol Characterisation at Gobabeb

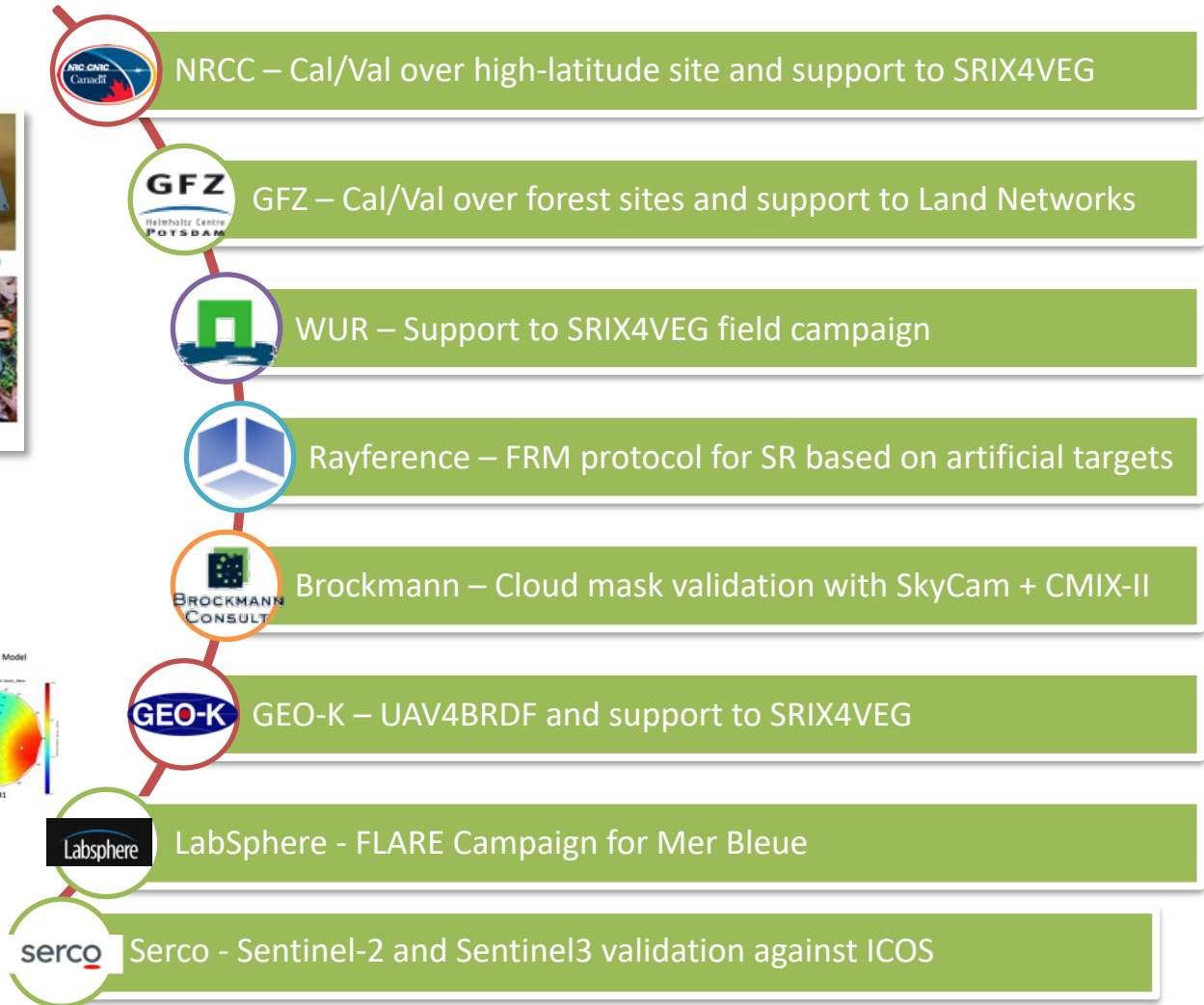
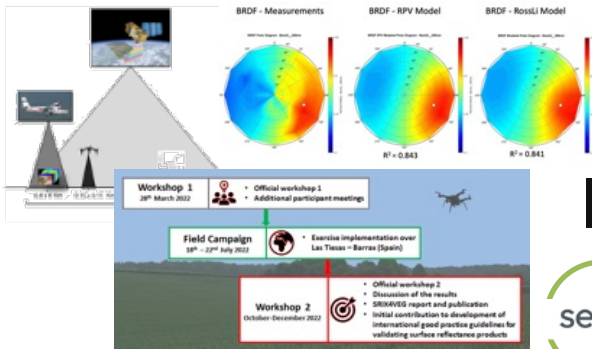


# Land Cal/Val

## Advanced Cal/Val Systems

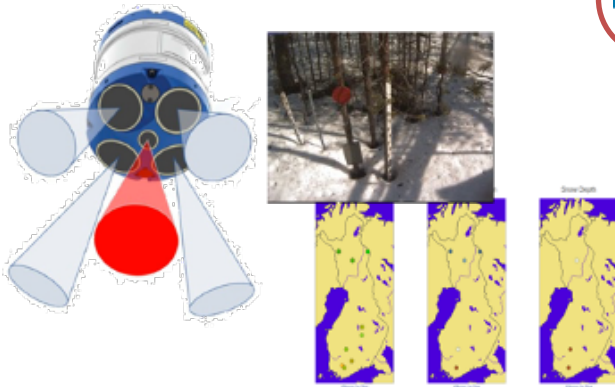


## Advanced Cal/Val Protocols

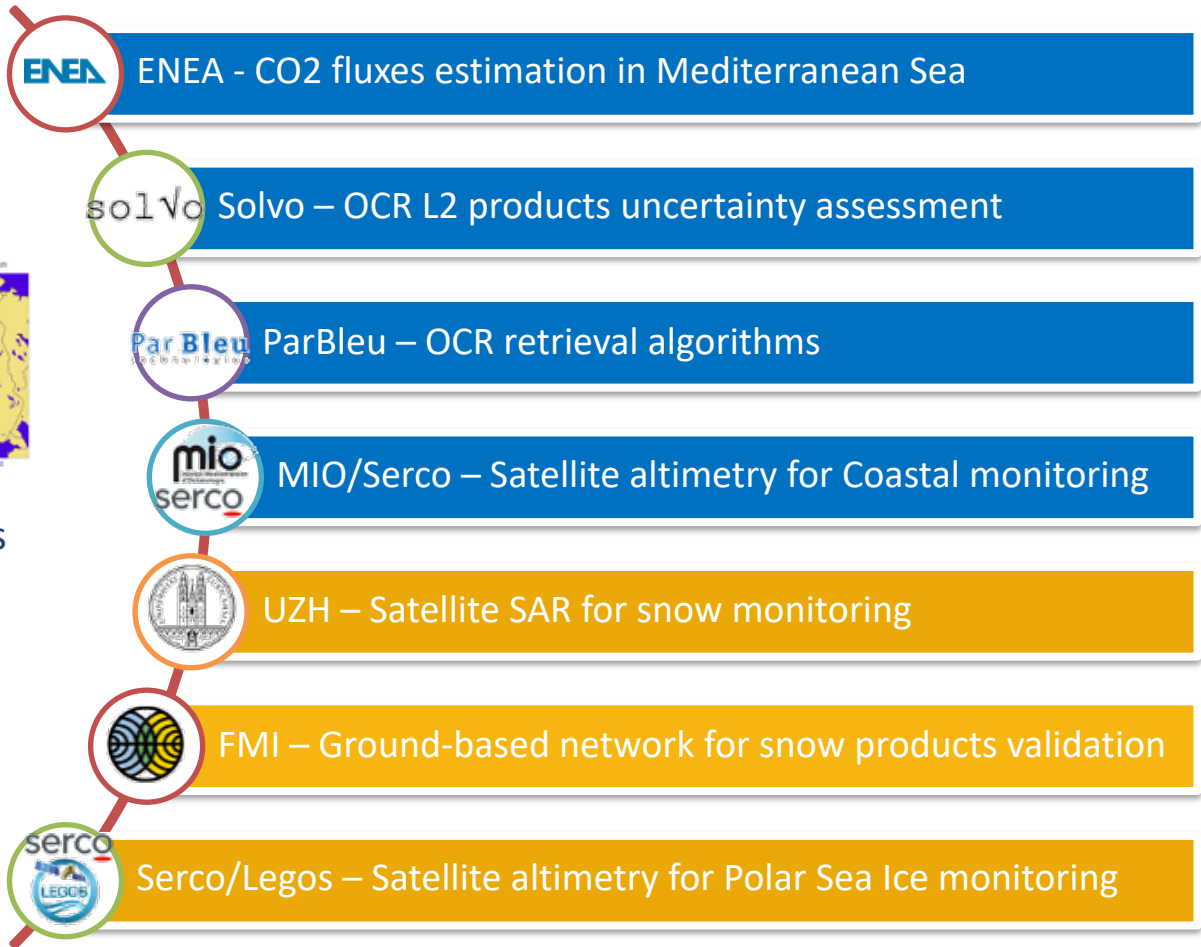
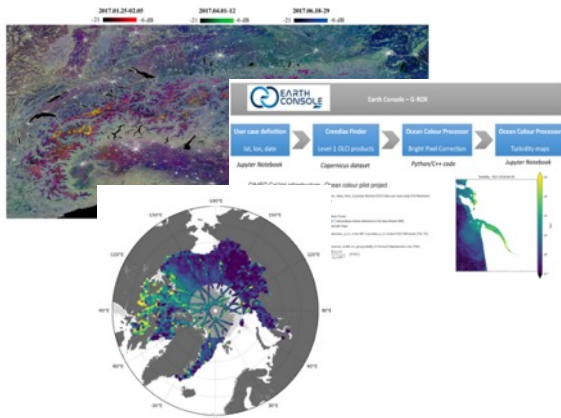


# Water and Cryosphere Cal/Val

## Advanced Cal/Val Systems



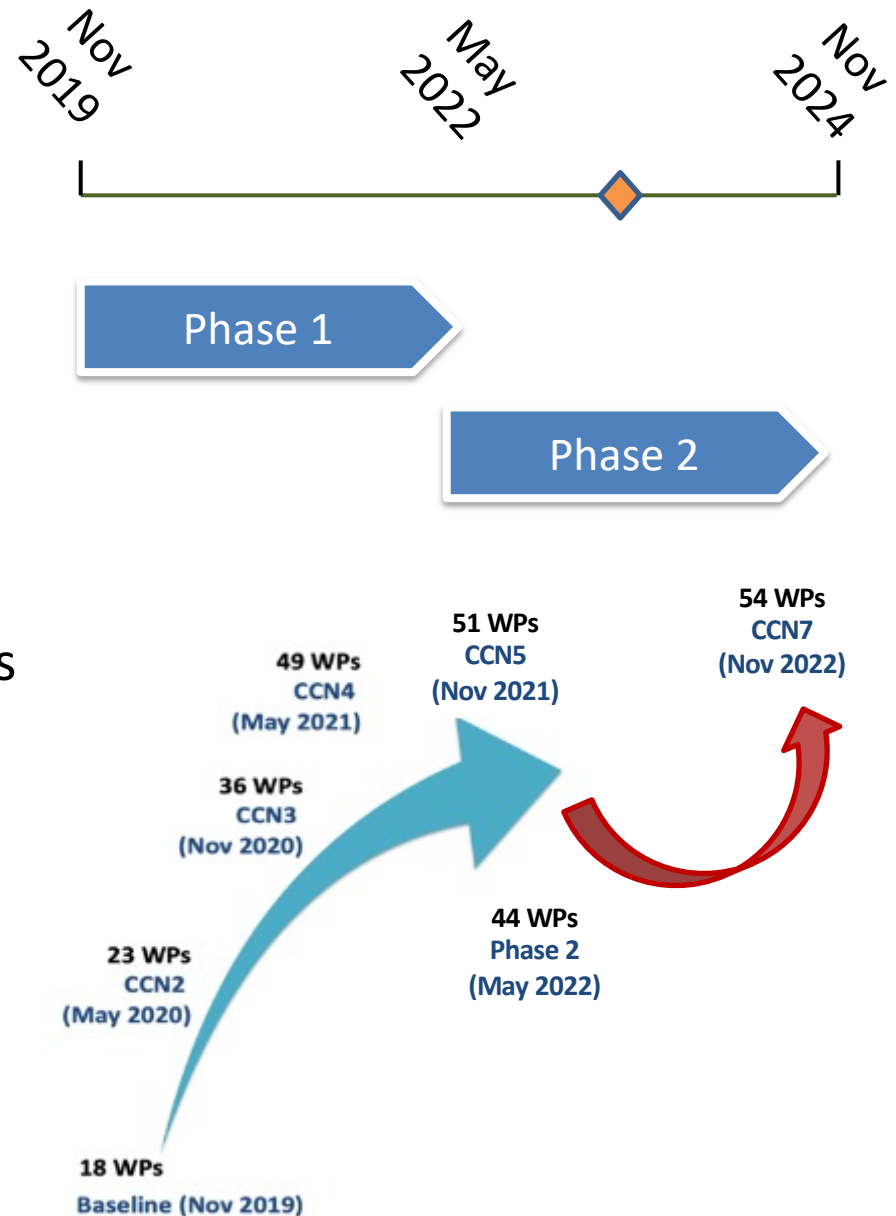
## Advanced Algorithms & Products



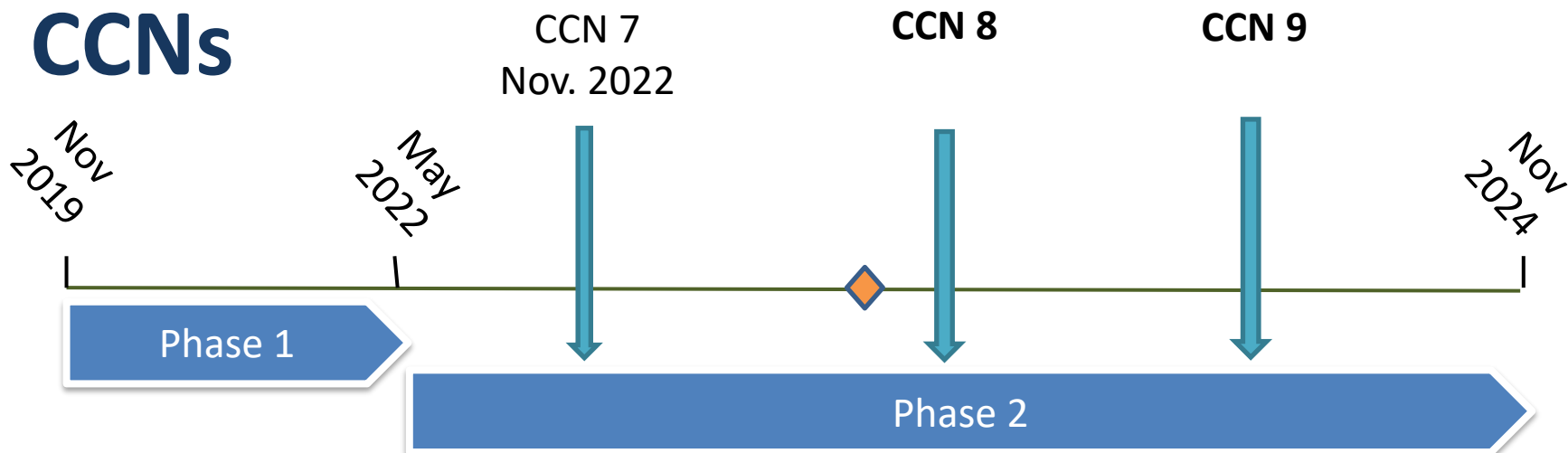
# Where we are?

- Phase 1 successful in demonstrating added value of **metrology** in Cal/Val
- Phase 2 started May 2022: fostering synergies and collaborations
- Number of partners and activities growing fast

→ 20 months left



# CCNs



- *CMIX-II support extension*
- *Improved AOD@440nm continuation*
- *O3 validation from Umkehr Brewer and Dobson reprise*
- *Purchase & integration of 2nd ship-borne CIMEL extension*
- *AOTF-based NO2 camera for urban pollution imaging*
- *Aerosol Characterisation at Gobabeb*
- *FLARE Campaign for Mer Bleue*
- *Validation of S2 and S3 against ICOS*
- *CO2 fluxes estimation*
- *Added value of CRYO2ICE extension*



Ensure **continuity** of current activities, **new synergies** and partnerships, shape action-oriented ideas to **fill gaps** in Cal/Val strategy

# Perspective

## Moving from IDEAS-QA4EO playground

- R&D
- Proof of concept
- ...

## To action

- Operationalize science & ideas
- New applications & services
- New dedicated contracts
- ...

## Proof impact & return



**PDGS**



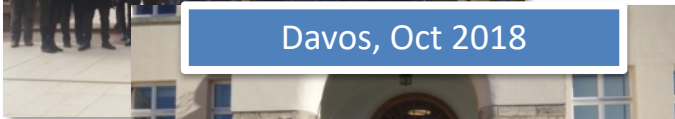
# Workshops



Lille, Mar 2017



ESRIN, Dec 2017



Davos, Oct 2018



Wageningen, Jun 2019

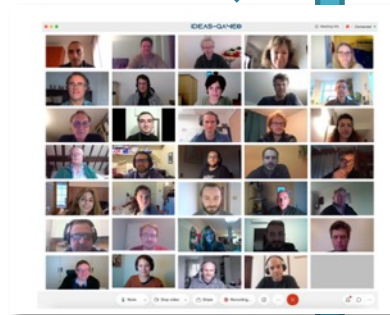


Phase 1

Phase 2



WS#1 Feb 2020  
(Uni. Sapienza)





WS#2 Dec 2020  
(Virtual)

WS#3 Apr 2022  
(ESRIN)



# Task 2 essentials

- **You** execute your activities (tasks/WPs)
- **We** monitor them for timing and deliverables  *Check your due dates*
- Regular **reporting to ESA**: monthly (bullet points) / quarterly (with text/images)  *Due March 7<sup>th</sup>*
- Contributions for ESA SRM (one slide)
- Presentation at QA4EO Cal/Val workshops
  
- For **open science** upload deliverables on Zenodo
- Follow and support **@qa4eoCalVal Twitter account** with ideas, likes, retweets
  
- New ideas ? -> drop us a line for the future CCN

# Outreach



Tweets = 246

Followers = 163

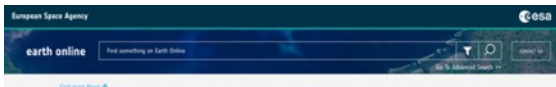
IDEAS-QA4EO cal/val  
2 Tweets

IDEAS-QA4EO cal/val  
@qa4eoCalVal

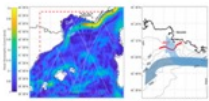
#CalVal activities in support to #ESA #EarthObservation missions 🌍

qa4eocalval.wordpress.com

12 Following 6 Followers



A new study entitled "Local ocean intrusions from satellite altimetry" has just been published in the journal Remote Sensing. This study comes from an international collaboration between the European Space Agency (ESA), MED (P6, OM (D) and Seno (D) with the goal of monitoring coastal intrusions into the Gulf of Lion by analyzing multi-mission Satellite Altimetry Data with Machine Learning methods.



The Gulf of Lion is open to the Mediterranean Sea and bordered by the North Current, which runs along its continental slope. The North Current can enter the plateau of the Gulf of Lion during so-called "invasion events", which can have a strong impact on marine life, and important consequences on regional fishing.

Satellite altimetry measures the time a radar pulse takes to travel from the satellite antenna to the ocean surface and back. Several applications have been developed from these measurements. One of



## Monitoring aerosol properties in the Indian Ocean

05 Mar 2021

A ship-borne photometer of CIMEL CE318-T type was permanently installed in early January 2021 aboard the French research vessel Marion Dufresne in the frame of the MAP-IO (Marion Dufresne Atmospheric Program - Indian Ocean) research programme [1].



The ship-borne instrument was developed at Laboratoire d'Optique Atmosphérique (LOA), Lille (France) to enable measurement of atmospheric aerosols from mobile platforms, and to expand and automate the Aerosol Robotic Network (AERONET) coverage to the vast ocean [2], an area which is currently manually operated within the Maritime Aerosol Network (MAN) branch of AERONET [3].



The instrument will be engaged mainly in the Southern Hemisphere/Indian Ocean to measure Aerosol Optical Depth (AOD) and column-mean Angstrom coefficient. The campaign that just started is the result of the following preparatory activities, where the system was tested, improved and validated [4]:



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IDEAS QA4EO Cal/Val

### Recent uploads

Search IDEAS-QA4EO Cal/Val

#### UAV for BRDF characterization: Validation report and scientific roadmap

Daniela Latini, Iaria Petrosca, Fabio del Frate

This is the final report of WP21715 "UAV for BRDF characterization" of the ESA project "Quality Assurance for Earth Observation" (QA4EO). This document focuses on the BRDF validation results obtained by an advanced system of measurement based on a UAV multicopter eq.

Updated on March 9, 2022

#### Report on the inter-comparison campaign within the BAQUININ super-site in Roma

Carrolli, Elisa; Petrucci, Paolo; Piparedda, Enzo; Cristofarioli, Paolo; Buerato, Maurizio; Di Liberto, Luca; Vanni, Massimo

This document is the report of the activities performed in the frame of WP 2251-3 of the IDEAS-QA4EO WPs 2250-2251 "QA4EO: Towards a new FRM4QA4EO-compliant UAV". The WP 2251-3 is centered on the inter-comparison campaign performed at a "Reference" super-site in Rome: east of the

New upload

IDEAS-QA4EO Cal/Val

IDEAS QA4EO Cal/Val

The IDEAS-QA4EO service contract, follow-on of the former IDEAS+ service, was awarded by ESA to a large consortium of international partners led by TRVK and Serco. The IDEAS-QA4EO service acts on

<https://zenodo.org/communities/qa4eocalval>

Type

- Dataset (33)
  - Publication (14)
    - Report (7)
    - Deliverable (6)
    - Technicalnote (1)
  - Poster (3)
  - Presentation (2)

52 Documents/Datasets



# Summary and Objectives

- The objectives of the current meeting are:
  - To meet and showcase results and achievements
  - To gather recommendations on how to further improve ESA Cal/Val strategy for the years to come
  - To discuss the future plans (Phase 2 and beyond)
  - *CCN#8 and CCN#9*
  - *Next Workshops (#5 #6): Any candidate to host us?*

# Workshop #4 - Agenda

- 42 attendees on site
- 33 presentations
- 2 full days for discussions
- Hybrid format

<b>Day 1: Tuesday 28 February</b>	<b>Day 2: Wednesday 1 March</b>	<b>Day 3: Thursday 2 March</b>
<b>13:00 – 17:30 [CET]</b>	<b>9:00 – 17:30 [CET]</b>	<b>9:00 – 12:30 [CET]</b>
<b>GFZ campus - Telegrafenberg</b>		<b>WIS (city centre)</b>

# Workshop #4

