



Topical Centre for Cloud In-Situ Measurements (CIS)

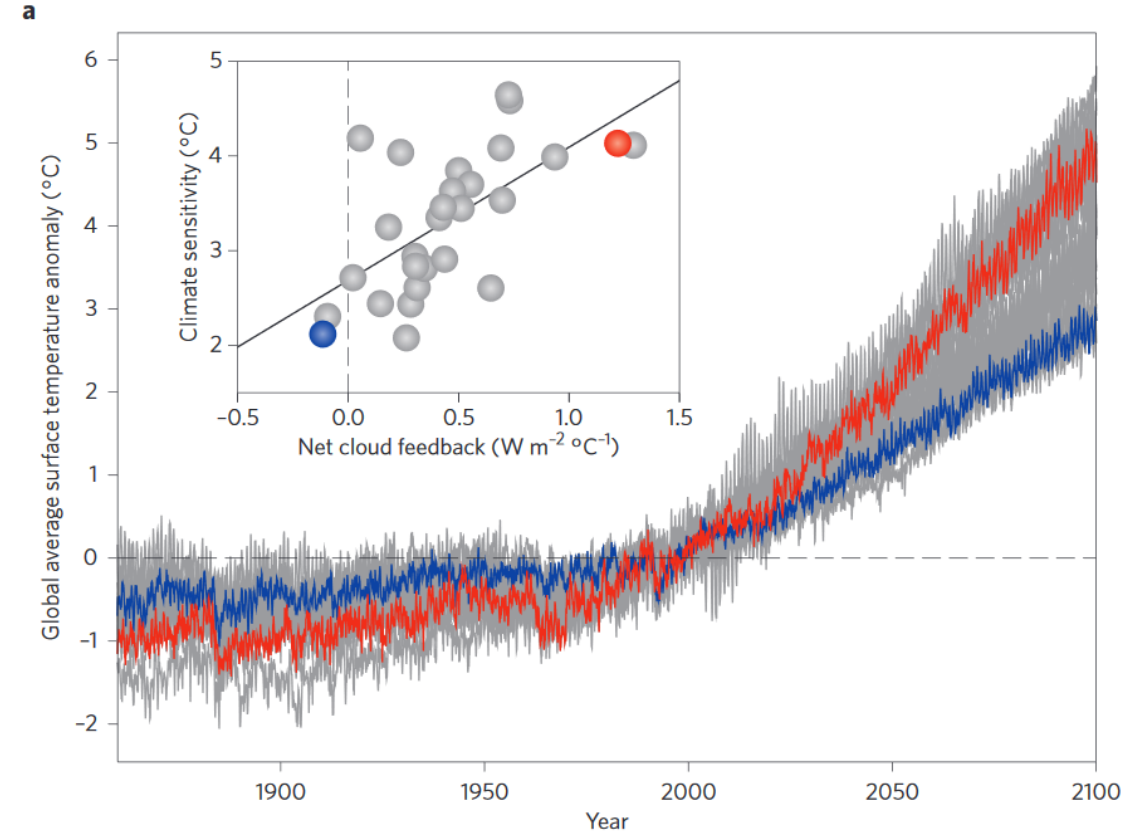
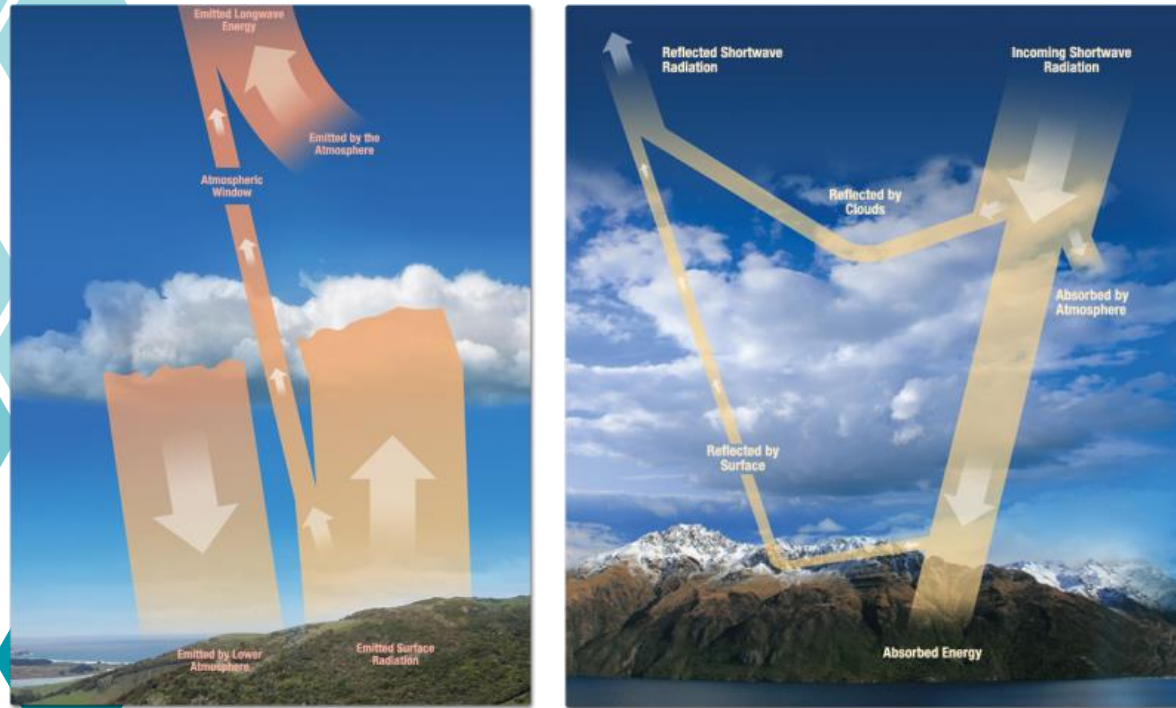
**Information Meeting for potential new CCPar Host
Candidates
07.12.2023**



This project receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreements No 871115

Motivation: Clouds and Climate

Clouds and aerosol-cloud interactions play critical role in earth's radiation budget. Cloud feedback to climate change is not yet well understood.



https://science.nasa.gov/ems/13_radiationbudget

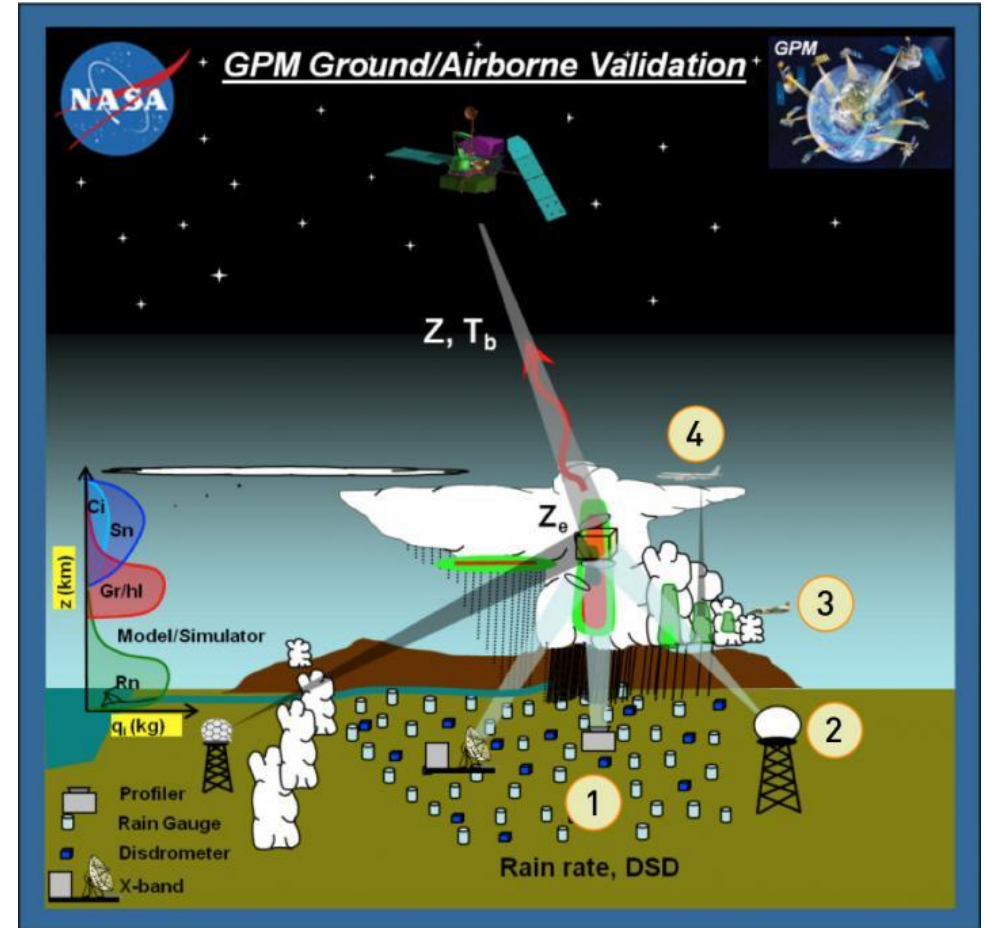
Zelinka et al., Nature Climate Change, 7, 674 (2017).

Motivation: In-Situ Cloud Observation

In-Situ Cloud observations:

- small scale cloud formation processes
- microphysics of cloud droplets and ice crystals
- local cloud water chemistry
- validation of remote and satellite measurements

- scarce long-term data available
- no common QA/QC approach
- variety of data formats and missing metadata

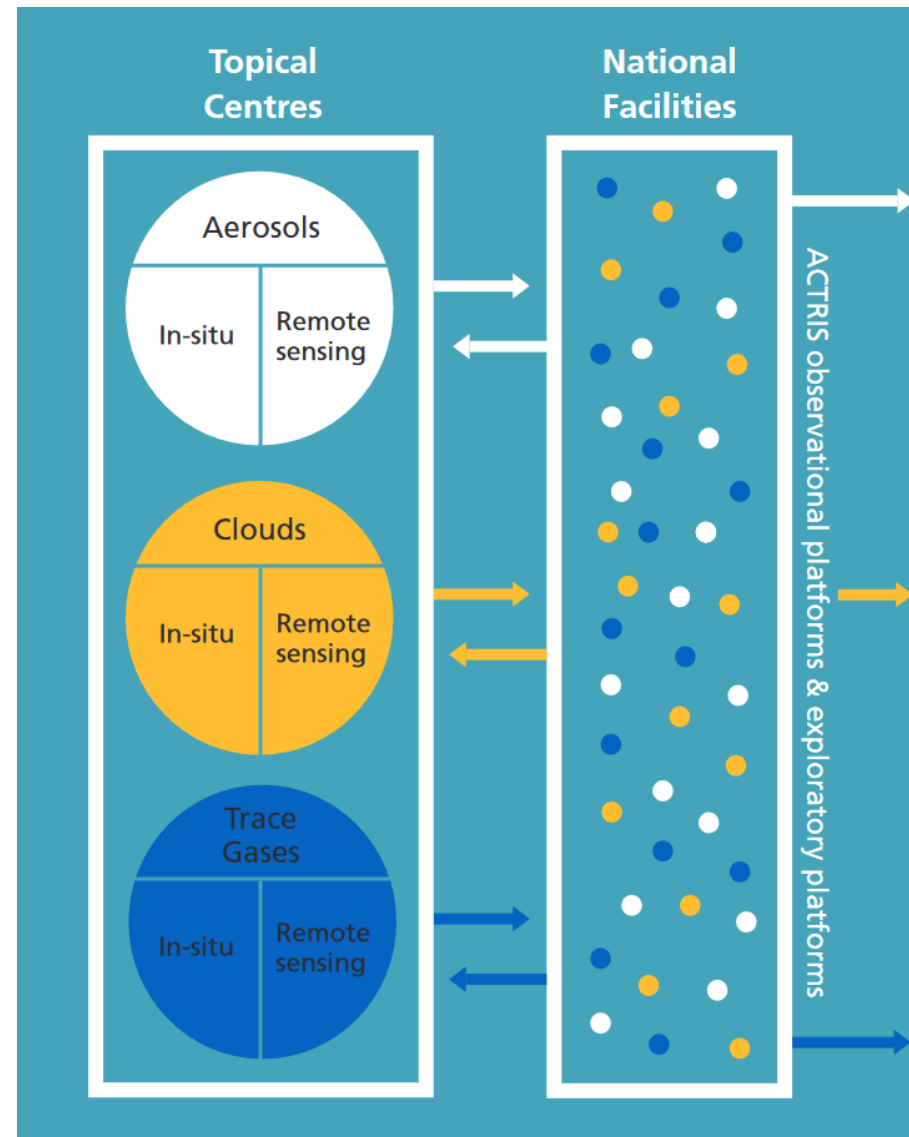


NASA satellite validation within GPM (Global Precipitation Measurement, <https://gpm.nasa.gov/science/ground-validation/validation>).

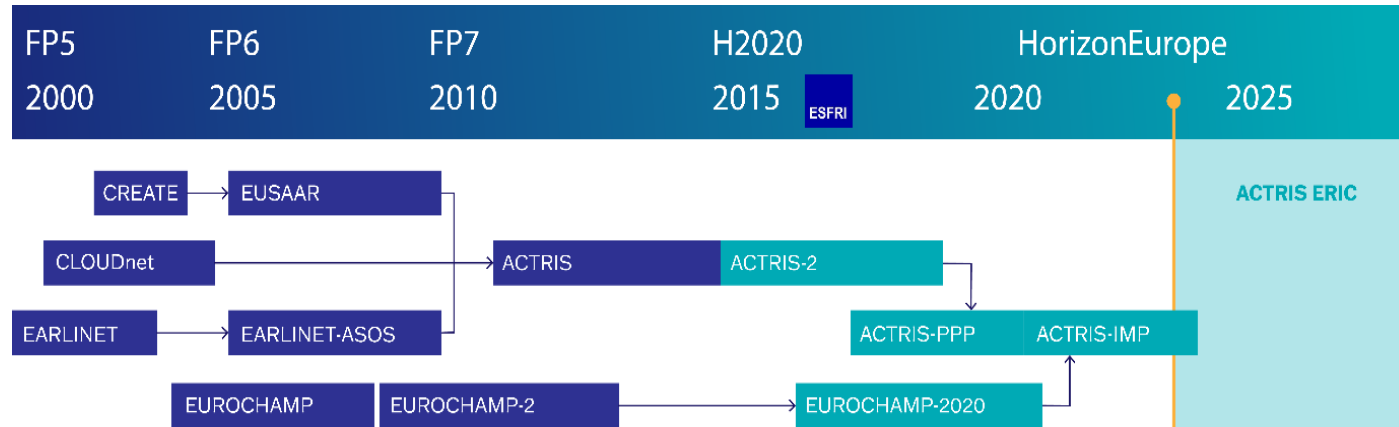
General Tasks of the ACTRIS Topical Centres

ACTRIS Topical Centres (TCs) ensure sustainable and traceable high-quality data by:

- establishing guidelines and defining QA/QC procedures to be applied by National Facilities (NFs)
- developing, testing and implementing advanced measurement technologies and data evaluation algorithms
- training and transfer of knowledge to ACTRIS operators and users
- evaluating the performance of NFs as part of the NF audit and labeling
- acting as link between ACTRIS and the associated scientific communities



Timeline TC for Cloud In Situ Measurements (CIS)



- 2018 - CIS Technical Concept (D5.1, 5.2 ACTRIS PPP)
- CIS host application by KIT, TROPOS, UMan and SBO approved
- 2019 - approval of CIS implementation plan and cost book
- 2020 - successful validation of TC CIS
IAC decides to postpone start of operational activities until 2024
- 2022 - UMan steps out of CIS consortium
- 2023 - CIS and HO contingency planning, strong support by CIS NF community



Central Facility for Cloud In-Situ Measurements (CIS)



Dynamic cloud simulation chamber



TC CIS lead: KIT

Unit 1
Center for Cloud Ice Nucleation
Karlsruhe Institute of Technology
(KIT)

ice nucleating particles (INPs)

Unit 2
Center for Cloud Particle Properties
NN

**cloud droplet and ice particle
number and size distribution**

Unit 3
Center for Cloud Water Chemistry
Leibniz Institute for Tropospheric
Research (TROPOS)

bulk cloud water chemistry

Unit 4
**European Center for Cloud
Ambient Intercomparison**
GeoSphere Austria Sonnblick
Observatory (SBO)
**liquid water content
droplet effective diameter**



Mt. Schmücke Observatory



Sonnblick Observatory

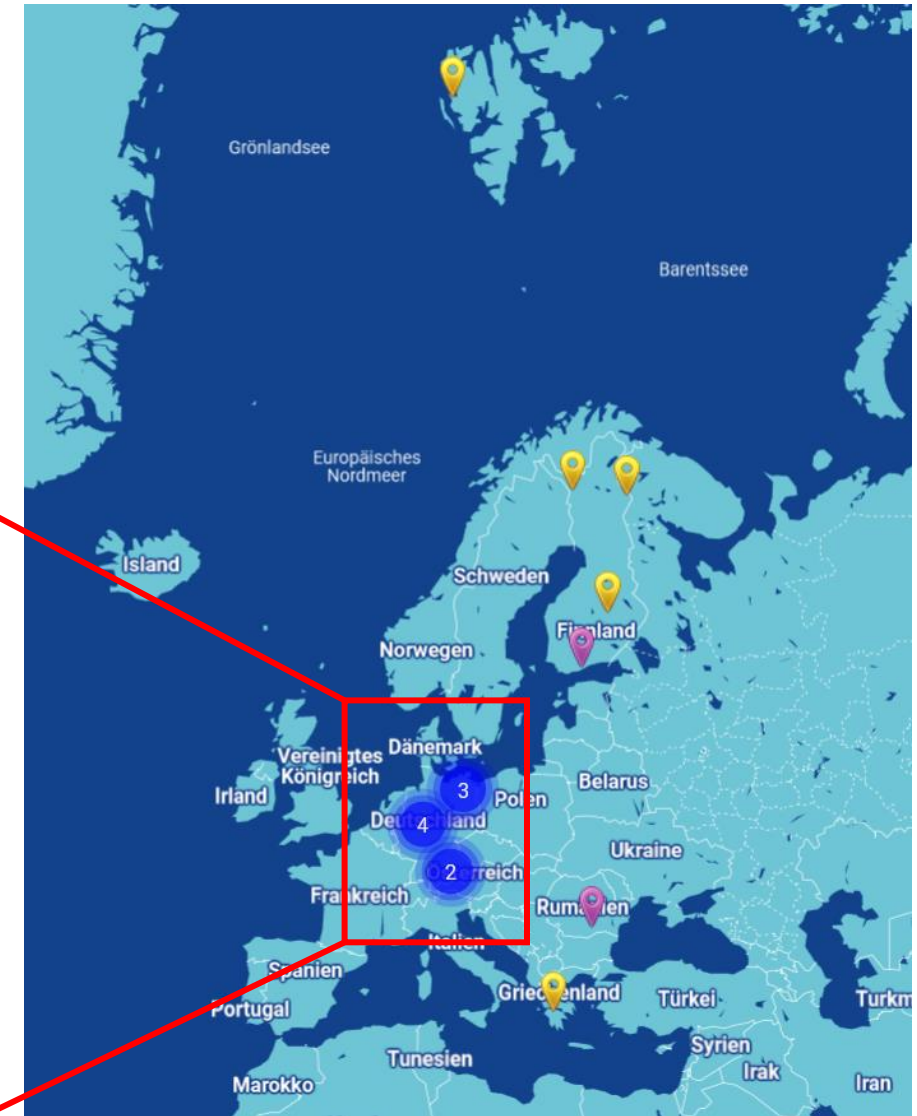
CIS National Facilities

10 Observational Platforms

Country	Facility name
Italy	CMN-PV
Greece	HELMOS Mt
Switzerland	Jungfrauoch
Czechia	Milešovka
Finland	Pallas Atmosphere-Ecosystem Supersite
Germany	Schmücke
Finland	SMEAR I (Värriö)
Finland	SMEAR IV (Kuopio)
Austria	Sonnblick Observatory (SBO)
Sweden	Zeppelin

6 Exploratory Platforms

Country	Facility name
Germany	Aerosol Interaction and Dynamics in the Atmosphere (AIDA and AIDA-dynamic)
Germany	Turbulent Leipzig Aerosol Cloud Interaction Simulator (LACIS-T)
Germany	Aerosol from Ground to Cloud Mobile Experiment (ACME)
Romania	ATMOSLAB
Germany	Karlsruhe Low-Cloud Exploratory (KLOCX)
Finland	Unmanned Aerial vehicle (UAV)



CIS variables and instruments

ACTRIS cloud in-situ variable	mandatory or specializing	CIS Unit	Measurement techniques					
			Integrating Cloud Probe	Cloud Droplet Probe	Cloud Ice Probe	Aerosol Particle Sampler	Bulk collectors	INP instrument
Liquid droplet mass concentration ("liquid water content")	m	ECCINT	x	x				
Liquid droplet effective radius	m	ECCINT	x	x				
Liquid droplet number concentration	s	CCPar		x				
Liquid droplet number size distribution	s	CCPar		x				
Ice particle number concentration	s	CCPar			x			
Ice particle number size distribution	s	CCPar			x			
Ice nucleating particle number concentration	s	CCIce				x		x
Ice nucleating particle temperature spectrum	s	CCIce				x		x
Liquid droplet inorganic ions mass concentration	s	CCWaC					x	
Liquid droplet carboxylic acids mass concentration	s	CCWaC					x	
Liquid droplet dissolved organic carbon mass concentration	s	CCWaC					x	

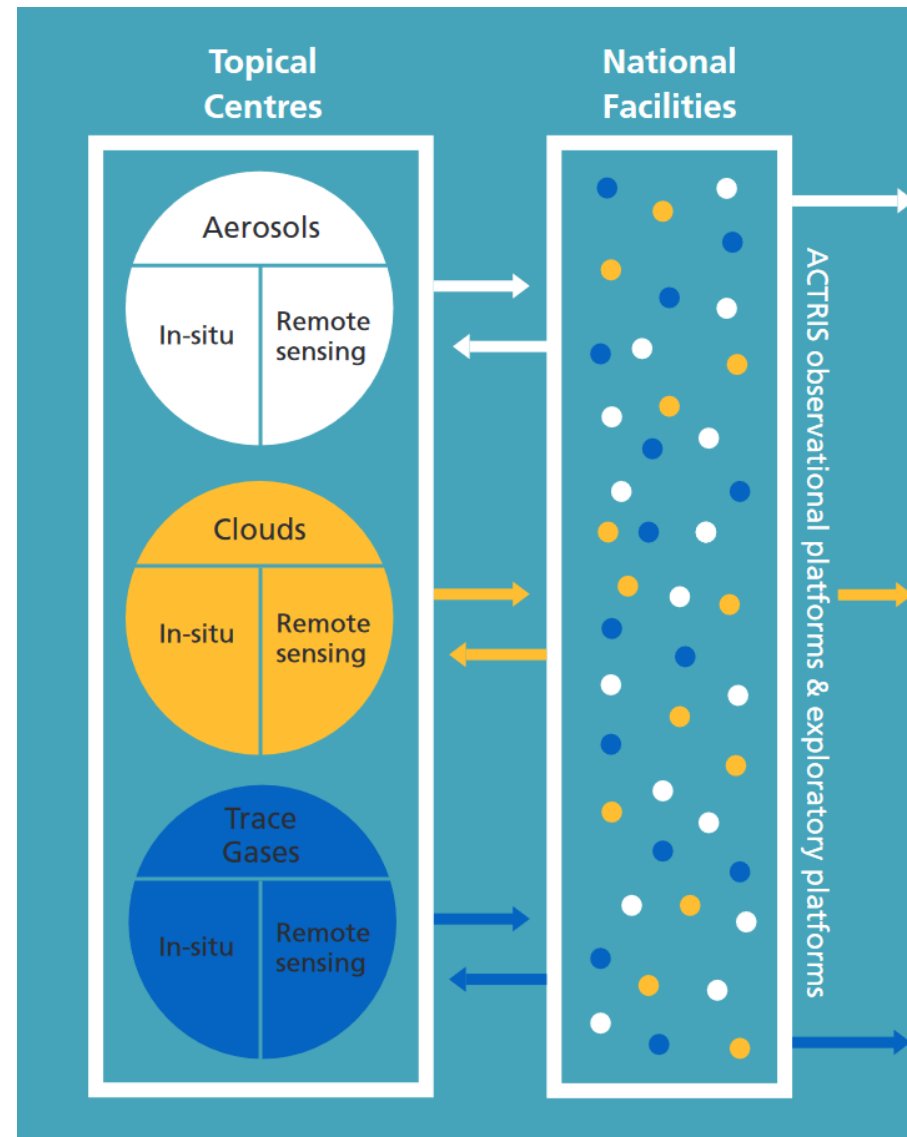
CIS National Facilities are required to measure cloud liquid water content (LWC), cloud droplet effective radius and at least two specializing variables.



General Tasks of the ACTRIS Topical Centres

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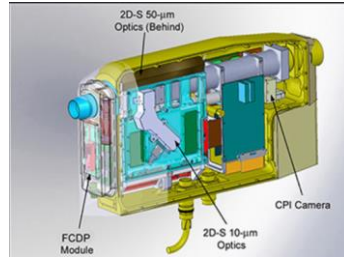


Task: Technologies, Guidelines and QA/QC Procedures

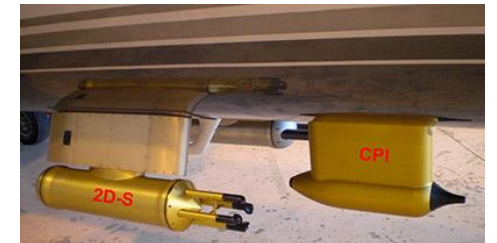
- Evaluation of (new) instruments for use at ACTRIS NFs.
- Description of technical requirements for NFs.
- Development of measurement guidelines and standard operation procedures.
- Implementation of calibration/validation procedures.



Cloud Droplet Probe CDP

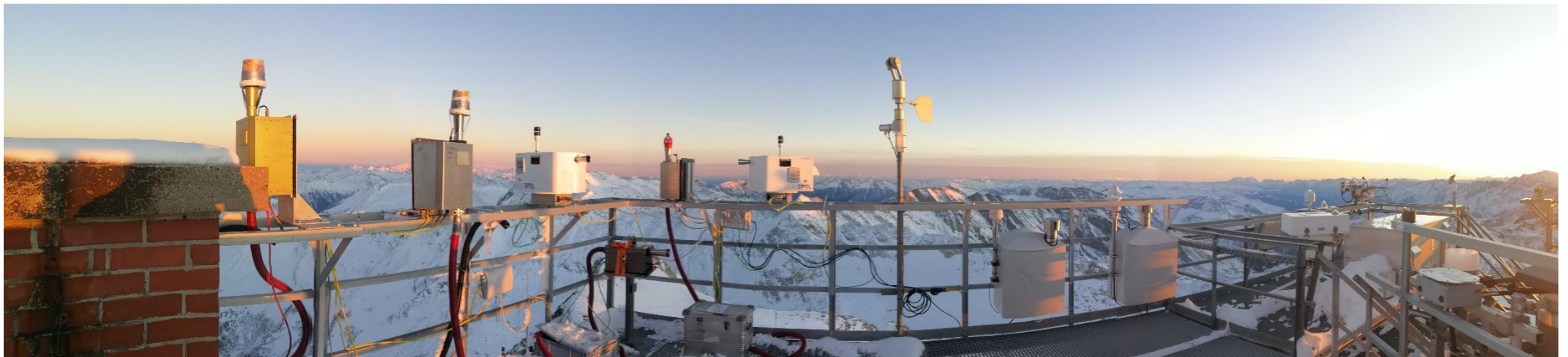


SPEC Hawkeye



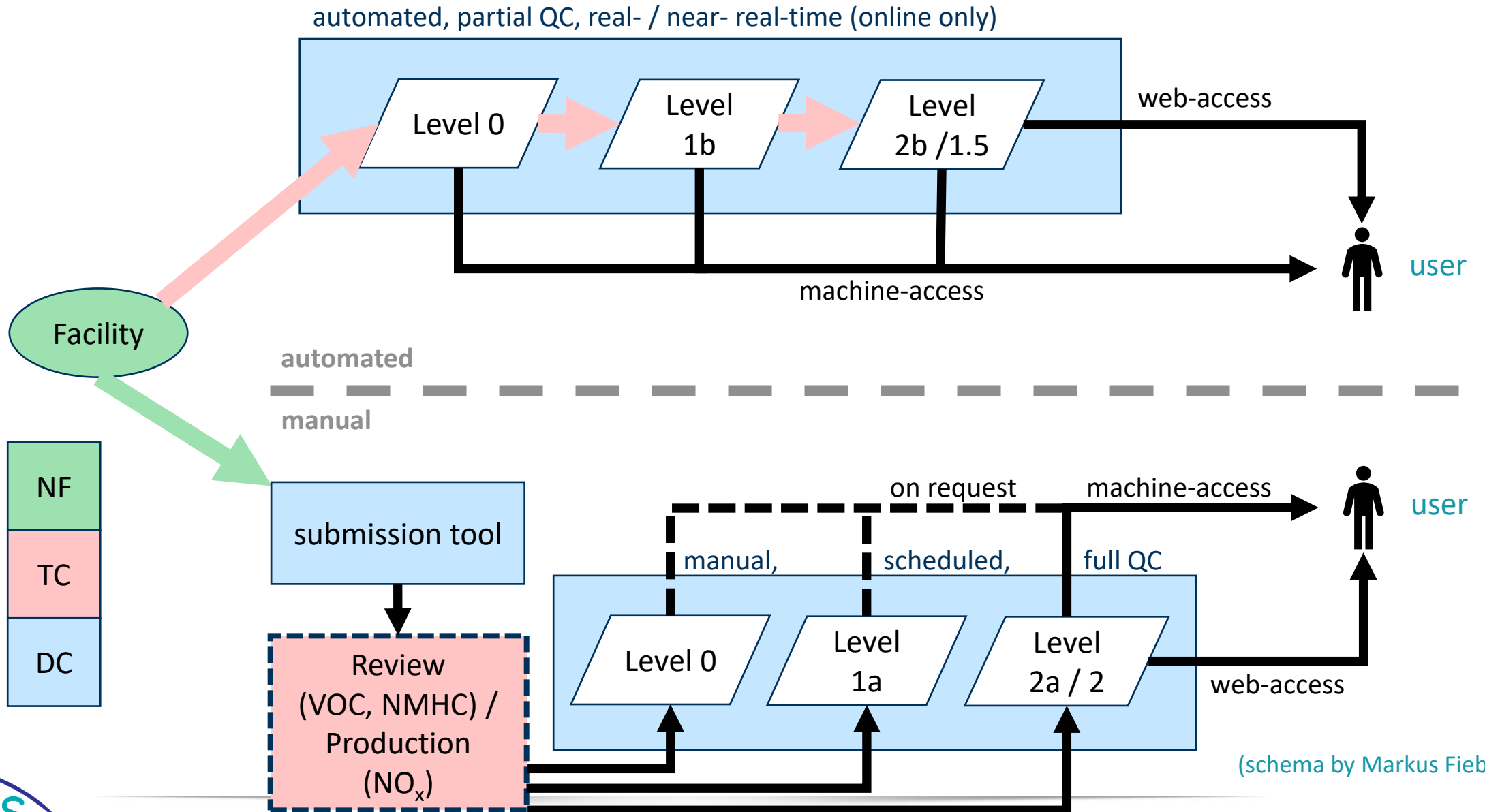
2D-S Probe installed on the SPEC Learjet

<http://www.specinc.com/2d-s-stereo-probe-operation>



Intercomparison at Sonnblick Observatory during ECCINT-INT-01 (picture by Christian Maier)

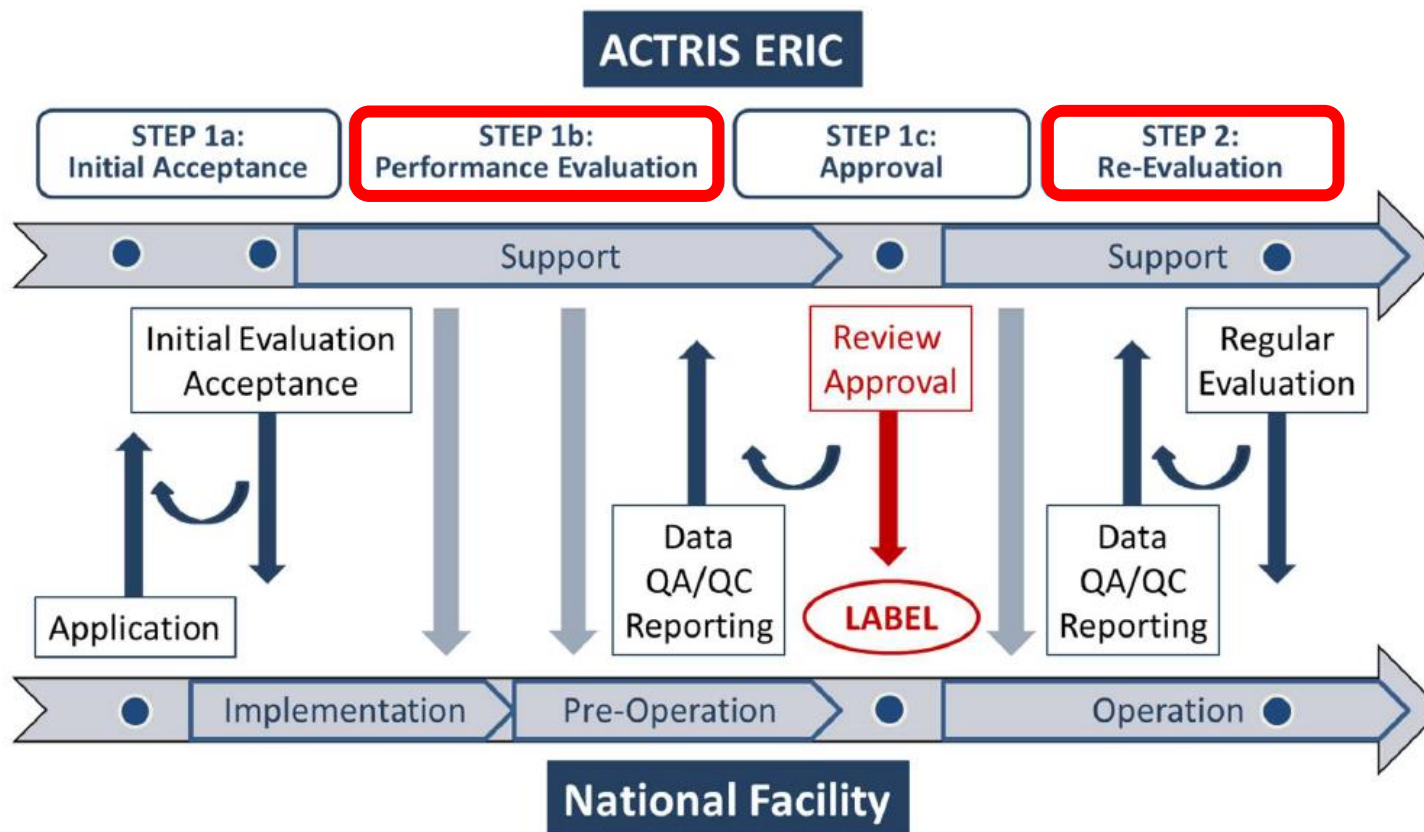
Task: data submission tools and evaluation algorithms



- NF
- TC
- DC

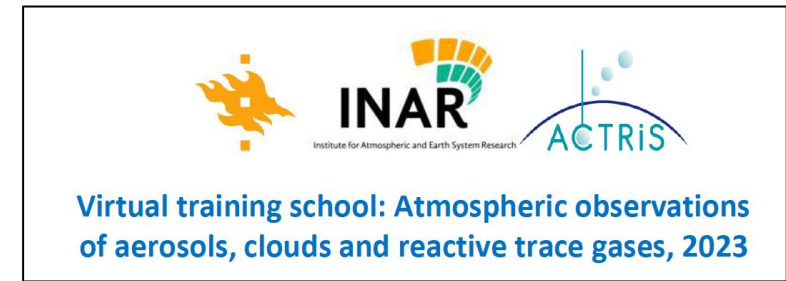
Task: NF audit and labeling

- Developing audit checklists and perform audits during NF labelling.
- Evaluation of and reporting on NF QA/QC during labelling and re-evaluation.

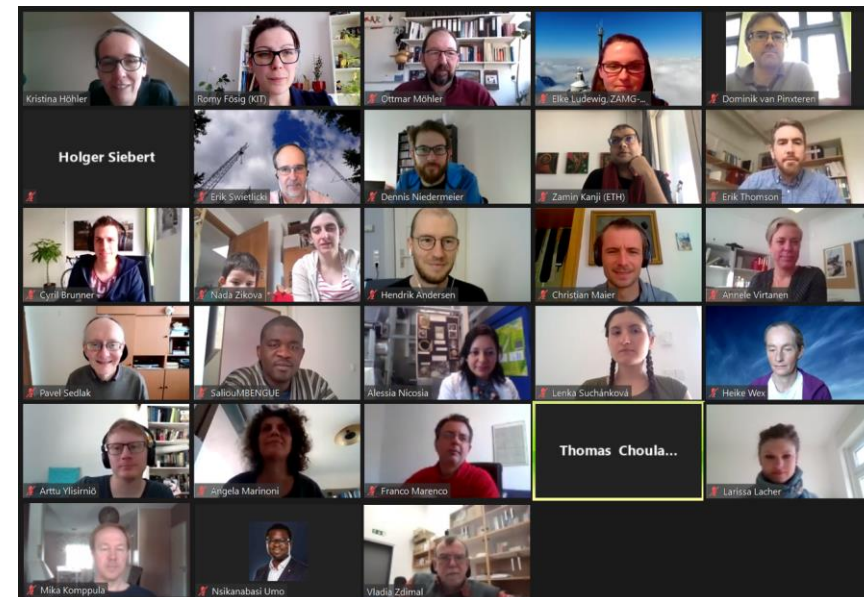


Task: training and community building

- NF and user community building
- Consultation of NF candidates
- Organization of workshops and trainings
- Lecture at ACTRIS tutorial



Participants of ECCINT-INT-01 at Sonnblick Observatory



Participants of CIS Networking event 03/2021

Contact and Links:

Please contact us, if you have questions:

- Kristina Höhler, CIS and CCIce unit leader: Kristina.Hoehler@kit.edu
- Elke Ludewig, ECCINT unit leader: Elke.Ludewig@geosphere.at
- Dominik van Pinxteren, CCWaC Unit leader: dominik@tropos.de

Important documents:

CF implementation plans

https://www.actris.eu/sites/default/files/Documents/ACTRIS%20IMP/Deliverables/ACTRIS%20IMP_WP4_D4.3_Revised%20CF%20Implementation%20plans.pdf

ACTRIS Cost Book

https://www.actris.eu/sites/default/files/Documents/ACTRIS%20PPP/Deliverables/ACTRIS%20PPP_WP3_D3.1_ACTRIS%20Cost%20Book.pdf

Data Management Plan

https://www.actris.eu/sites/default/files/Documents/ACTRIS%20IMP/Deliverables/ACTRIS_IMP_WP4_D4.4_Revised%20ACTRIS%20Data%20Management%20Plan.pdf

NF Labelling Plan

https://www.actris.eu/sites/default/files/Documents/ACTRIS%20IMP/Deliverables/ACTRIS%20IMP_WP5_D5.1_ACTRIS%20NF%20Labelling%20Plan.pdf

Questions?

