Lucia Mona and Claudia Di Biagio
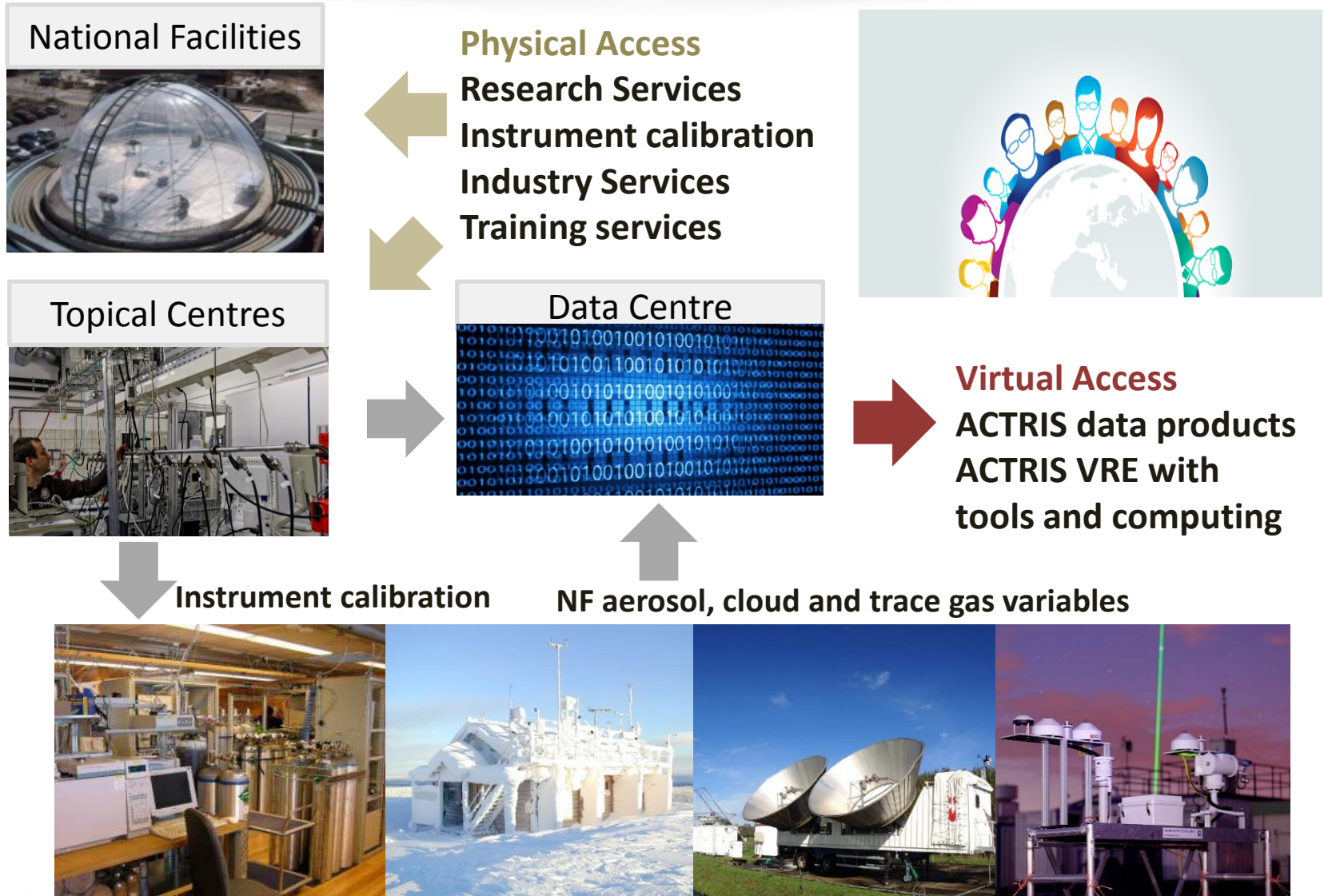**CNR & CNRS**

ACTRIS

Aerosols, Clouds and Trace gases Research Infrastructure

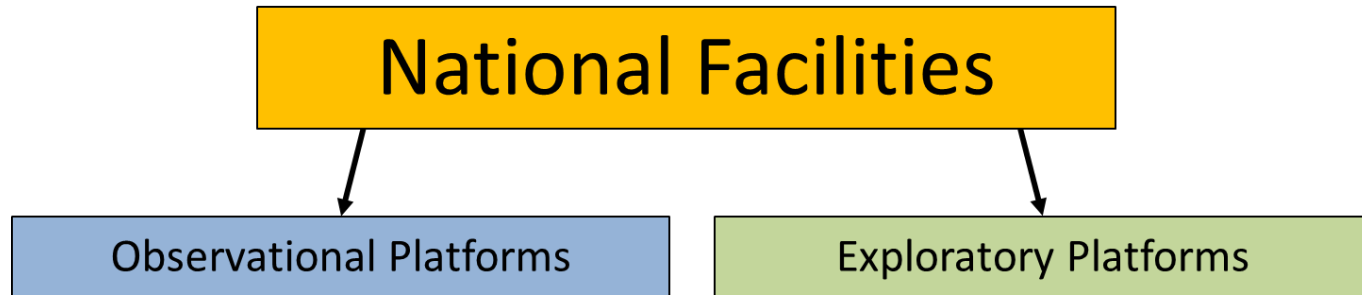**ACTRIS is supporting the scientific community and the society :**

- **continuous, intercomparable and quality assured 4D-data on atmospheric composition.**

- **online data analysis tools for ACTRIS data.**

- **instrument calibrations.**

- **providing access to the best atmospheric research facilities in Europe.**

- **knowledge dissimination and training.**

ACTRIS services

National Facilities

Physical Access
Research Services
Instrument calibration
Industry Services
Training services

Topical Centres

Data Centre

Virtual Access
ACTRIS data products
ACTRIS VRE with
tools and computing

Instrument calibration

NF aerosol, cloud and trace gas variables

National Facilities

Observational Platforms

Exploratory Platforms
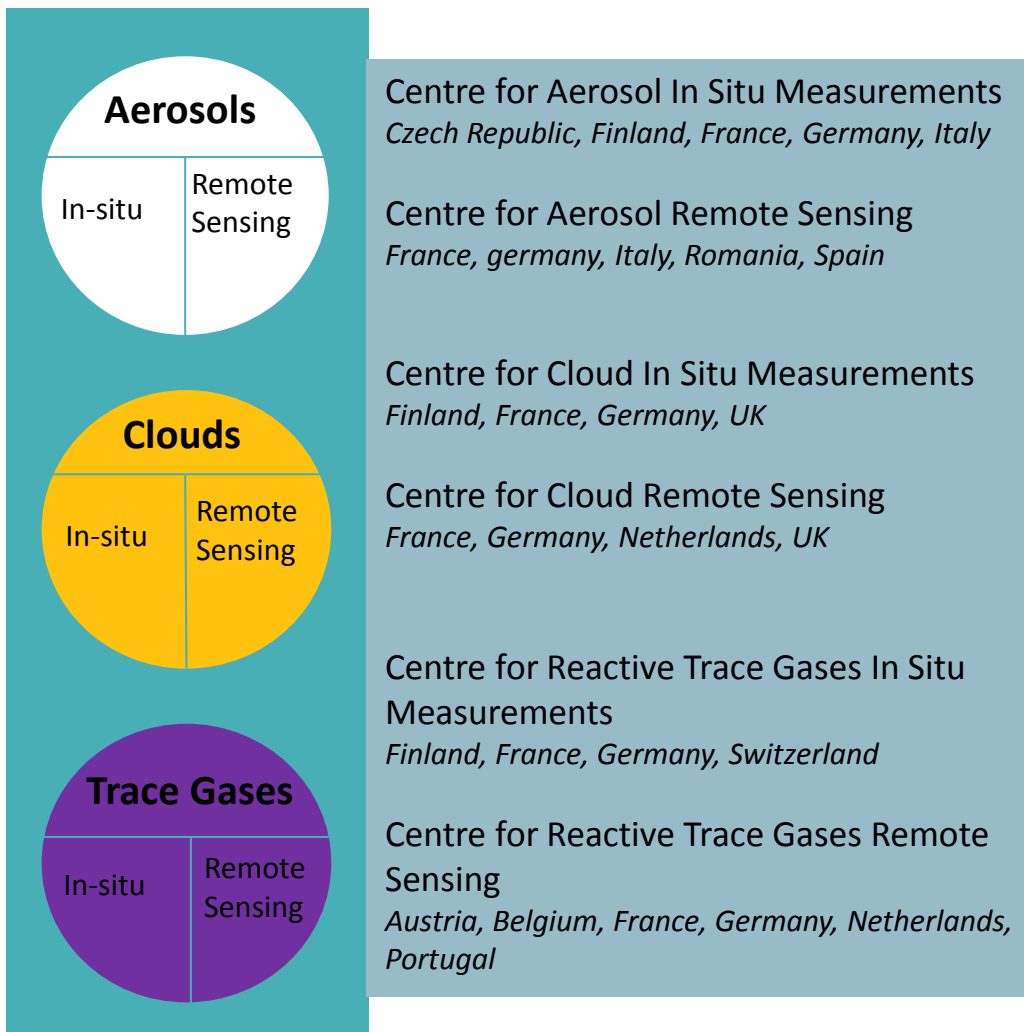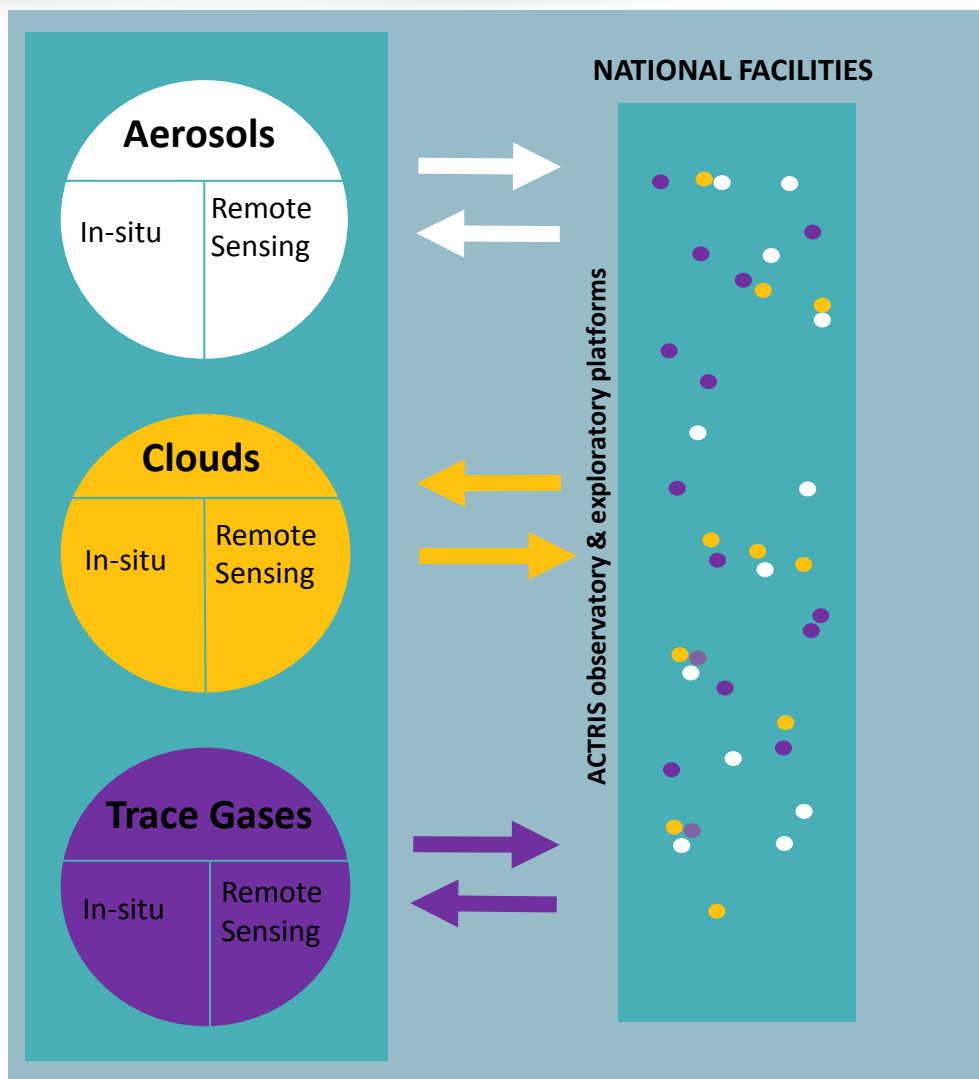
© AWI

ACTRIS Topical Centres

- The TC are organised around the main scientific themes of ACTRIS

- Focusing on either in-situ or remote sensing techniques

Aerosols

In-situ | Remote Sensing

Clouds

In-situ | Remote Sensing

Trace Gases

In-situ | Remote Sensing

Centre for Aerosol In Situ Measurements
Czech Republic, Finland, France, Germany, Italy

Centre for Aerosol Remote Sensing
France, germany, Italy, Romania, Spain

Centre for Cloud In Situ Measurements
Finland, France, Germany, UK

Centre for Cloud Remote Sensing
France, Germany, Netherlands, UK

Centre for Reactive Trace Gases In Situ Measurements
Finland, France, Germany, Switzerland

Centre for Reactive Trace Gases Remote Sensing
Austria, Belgium, France, Germany, Netherlands, Portugal

ACTRIS Topical Centres

The Topical Centres support the National Facilities by :

- providing procedure and tools for quality assurance and quality control

- promoting the transfer of knowledge and trainings

- fostering improvements of measurements methodologies and validation techniques

NATIONAL FACILITIES

Aerosols

In-situ | Remote Sensing

Clouds

In-situ | Remote Sensing

Trace Gases

In-situ | Remote Sensing

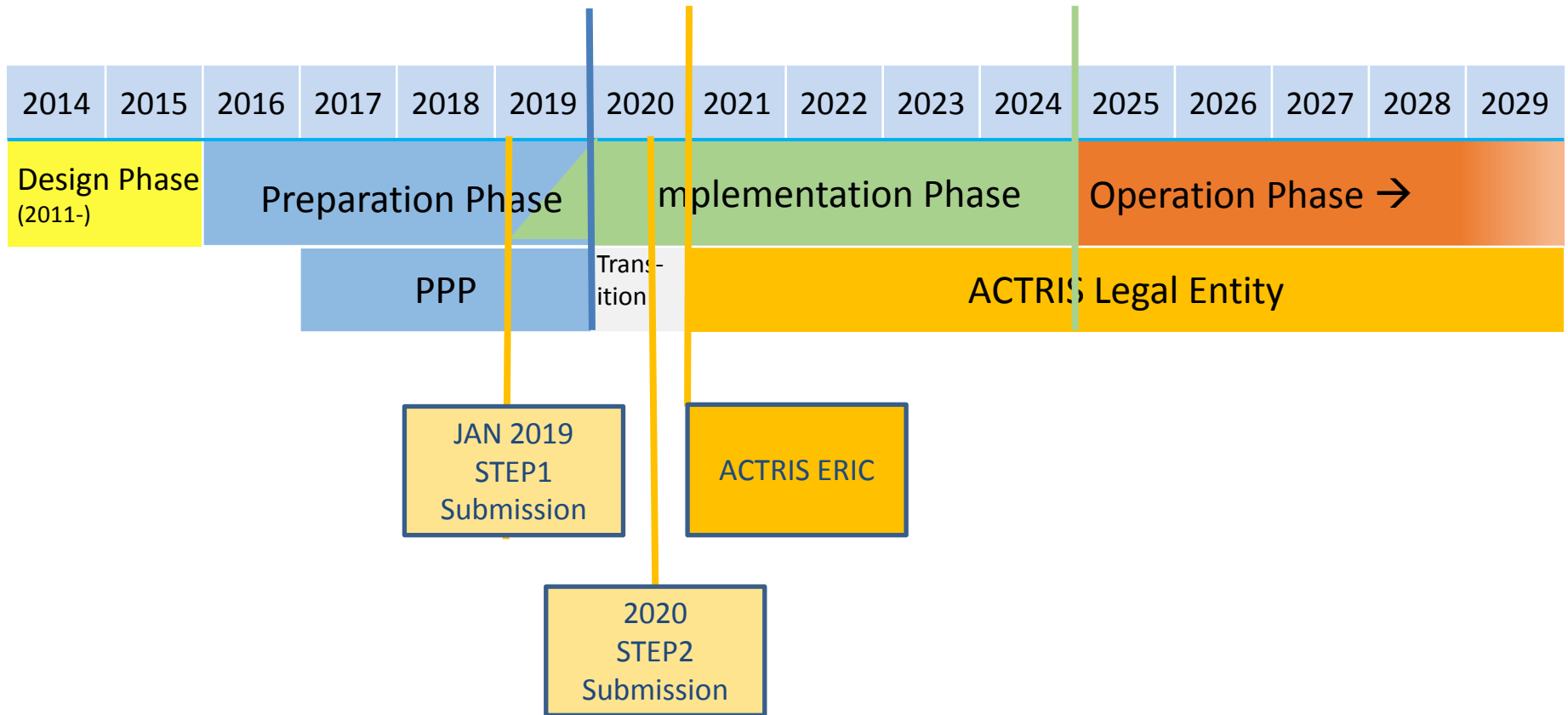ACTRIS observatory & exploratory platforms

ACTRIS Data Centre

Mission

- To compile, archive and provide access to well documented and traceble ACTRIS measurement data and data products, including digital tools for visualisations, data analysis and research

- To offer services related to ACTRIS data, data products, and digital tools

Core services

Data Curation	Access to level 0 – level 3 data	Documentation	Data products & digital tools	User community support & services
• Repositories and long-term archive • Preservation of ACTRIS data and data products	• Control on data access • Data products and digital tools through a single-entry point • Access to ACTRIS DC web interface	• Metadata • Data flow • Citation services • Data attribuition	• Produce advanced data products • Implementation ofdata production tools	• Training, help desks, tutorials for data products and users • Supports the monitoring of networks and initiatives

ACTRIS Lifecycle phases

| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |

Design Phase (2011-)

Preparation Phase

Implementation Phase

Operation Phase →

PPP

Trans-ition

ACTRIS Legal Entity

JAN 2019
STEP1
Submission

ACTRIS ERIC

2020
STEP2
Submission

The ACTRIS dimension

Provision of 83 atmospheric variables in the natural atmosphere
Provision of 24 atmospheric data products
Provision of Simulation Chamber Experiment data

- Cloud in-situ (15 Variables)

- Cloud Remote Sensing (25 Variables)

- Aerosol in-situ (12 Variables)

- Aerosol remote sensing (16 Variables)

- Trace Gases in Situ (5 Variables)

- Trace gases Remote Sensing (10 Variables)

ACTRIS will control the whole processing chain from production to dissemination

- **A common specification in ACTRIS :** *high quality*

ACTRIS aerosol in-situ

Variable	Uncertainty
Particle light scattering and backscattering coefficients	max. of 0.5 Mm^{-1}, 5%
Particle number size distribution - mobility diameter	10%
Particle number size distribution - optical and aerodynamic diameter	50%
Particle light absorption coefficient and equivalent black carbon concentration	$\Delta\sigma_{ap}$=6%, ΔeBC=100%
Particle number concentration	5%
Cloud condensation nuclei number concentration	20%
Mass concentration of particulate organic and elemental carbon	ΔTC=12-21%, ΔEC=10%, ΔOC=25%
Mass concentration of non-refractory particulate organics and inorganics	1-50%
Mass concentration of particulate elements	2-20%

ACTRIS aerosol remote sensing

Variable	Precision (STD)	Accuracy (System)
Volume depolarization profile	<10% if b>5 10-7 m-1 sr-1	<5%
Particle backscatter coefficient profile	<10% if b>5 10-7 m-1 sr-1	<5%
Particle extinction coefficient profile	<15% if e>2.5 10-5 m-1 sr-1	<10%
Lidar ratio profile	<20% in layers	<10%
Ångström exponent profile	<20% in layers	<15%
Backscatter-related Ångström exponent profile	<15% in layers	<7%
Particle depolarization ratio profile	<20% if dep>0.1	0.015
Particle layer geometrical properties (height and thickness)	n.a.	60m