



Hei !

# Assemblée Générale LOA 20/12/2019

ACTRIS

Aerosol, Clouds and Trace Gases  
Research Infrastructure

# Les infrastructures européennes

- La politique Européenne de développement de la **recherche et de l'innovation** s'est appuyée, dès la fin de la seconde guerre mondiale, sur le développement de grands **équipements de recherche** sous la responsabilité de **démarches communes à plusieurs états** ou au travers de centres de recherche de haut niveau scientifique.
- **ESFRI (Forum stratégique européen sur les infrastructures de recherche)** est une démarche stratégique qui soutient une politique d'équipement en **infrastructures de recherche de classe mondiale** (qu'aucun pays-membre ne serait en mesure de financer tout seul).
- L'Europe soutient la mise en place d'infrastructures et élabore et implémente des feuilles de route sur lesquelles des **consortiums de pays** peuvent faire passer des **initiatives communes**, de l'état de **projet** à celui, plus pérenne, **d'infrastructure**.
- C'est ainsi qu'ont été fondés le CERN, l'ESO, l'ESA, ... (Très Grandes IR), ...  
ICOS, IAGOS, ..., ACTRIS

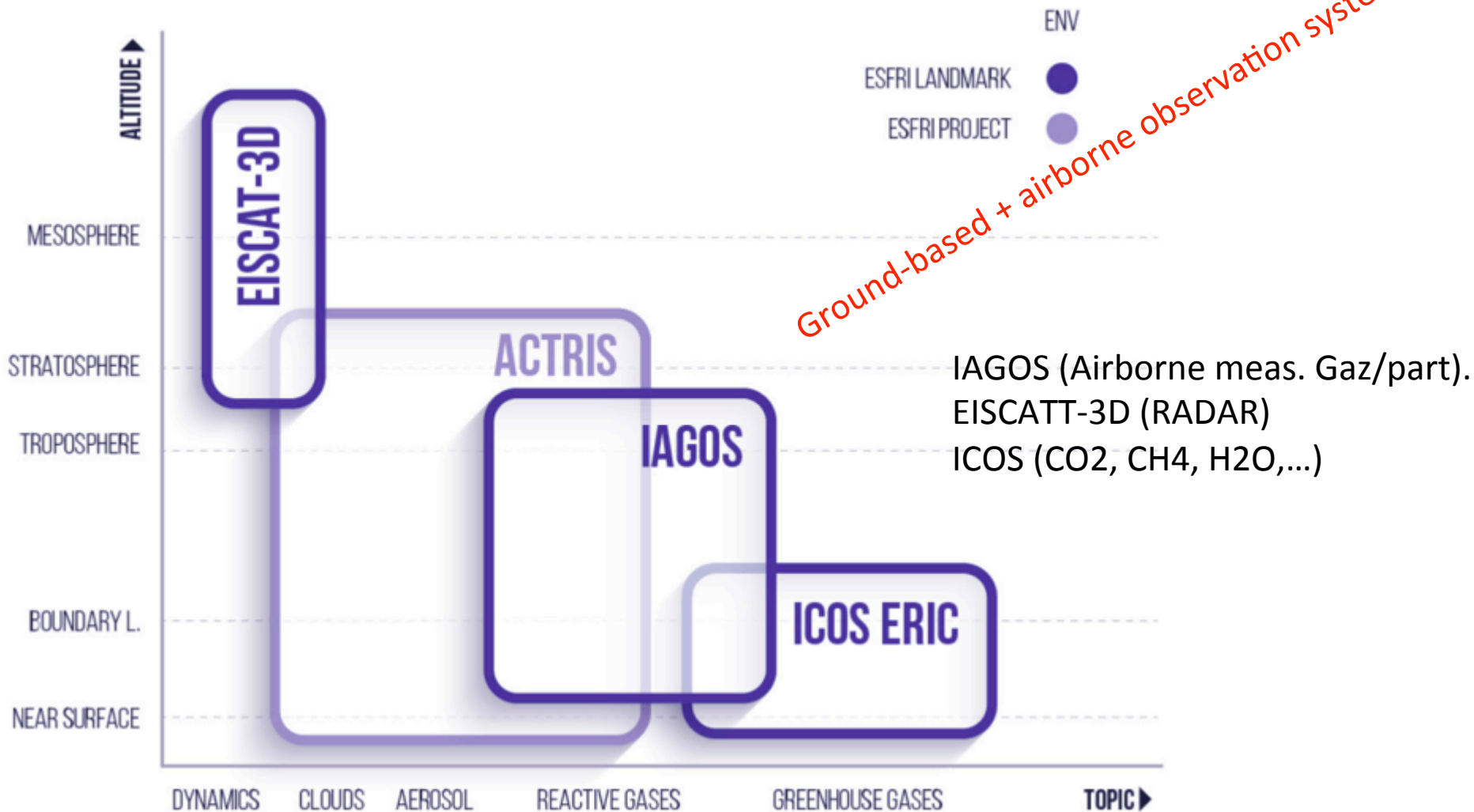
# Science needs observations !

Atmospheric constituents to be measured ? Short and long-lived constituents  
Which **Long-term** Atmospheric Variables to be measured ?  
Which « Measurement » techniques ?

Satellite & **Surface**

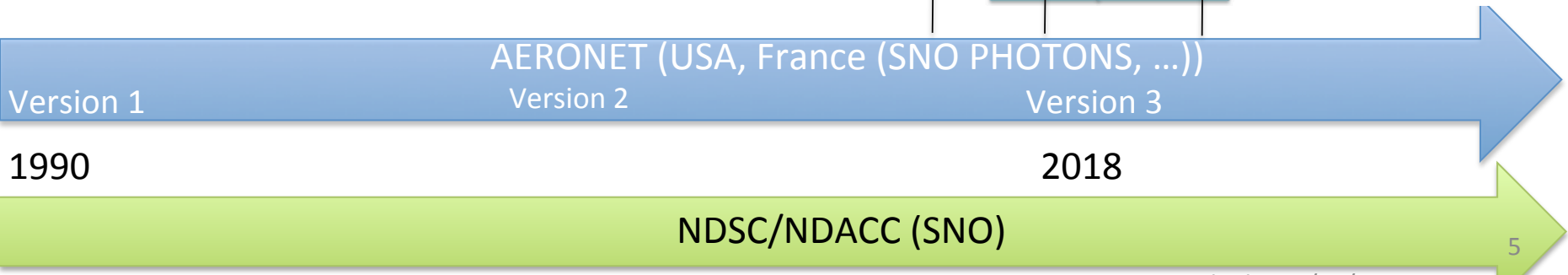
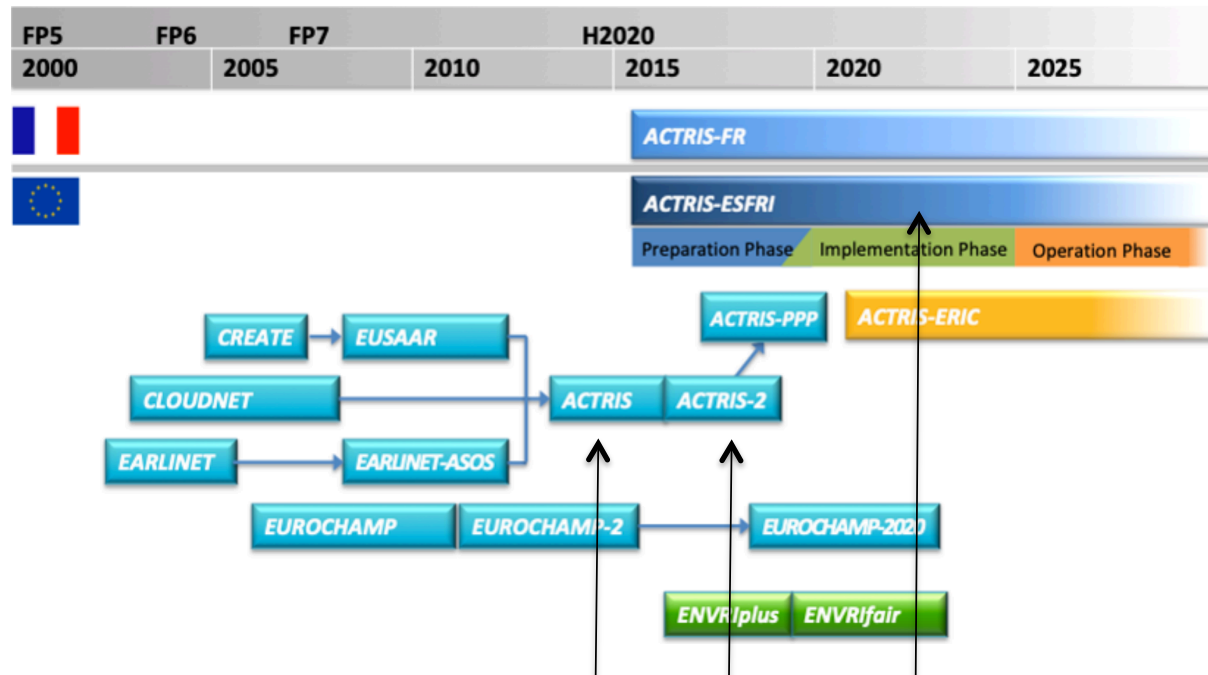
# Landscape in Europe

(for the atmosphere)



# History / Heritage

ACTRIS results from more than 15 years of consistent development funded from national sources, the European Commission Research Infrastructure programmes and International contributions



# Science needs observation !

- Deeper understanding of the driving forces of climate change and air pollution requires knowledge on the short-lived atmospheric constituents (quantification, emissions, sinks, atmospheric spatial and temporal variability).
- Residence time in the atmosphere from hours to few weeks.
- concentrations highly variable in time and space and involve processes occurring on very short timescales.
- No long-lived greenhouse gases considered in ACTRIS
- Science needs a 4 dimensional distributed observatory (WMO, 2012).

⇒ Need of secured access to long-term observational data with high precision and with sufficient density.

## Challenge for ACTRIS for ground-based observation

« ACTRIS observatory system » =  
different observational and exploratory platforms in and outside Europe (called **National Facilities**),  
+  
a number of **Central Facilities** fundamental for the provision of harmonized high-precision data and a variety of services required by the scientific community.

Science needs **high quality observation** and services

# ACTRIS Consortium

## Several Countries (22)

Country	National ACTRIS Coordinator	Contact information		
Austria	Jochen Wagner Division for Biomedical Physics Medical University Innsbruck	jochen.wagner@i-med.ac.at	Italy	Gelsomina Pappalardo National Research Council of Italy - Institute of Methodologies for Environmental Analysis (CNR-IMAA)
Belgium	Martine De Mazière Royal Belgian Institute for Space Aeronomy (BIRA-IASB)	Martine.DeMaziere@bira-iasb.oma.be	The Netherlands	Arnoud Apituley Royal Netherlands Meteorological Institute (KNMI)
Bulgaria	Dimitar Tonev Institute for Nuclear Research and Nuclear Energy (INRNE)	dimitar.tonev@inrne.bas.bg	Norway	Cathrine Lund Myhre NILU – Norwegian Institute for Air Research
Cyprus	Jean Sciare The Cyprus Institute	j.sciare@cyl.ac.cy	Poland	Aleksander Pietruczuk Institute of Geophysics Polish Academy of Sciences
Czech Republic	Milan Váňa Czech Hydrometeorological Institute	vanam@chmi.cz	Portugal	Daniele Bortoli Institute of Earth Sciences - University of Evora (ICT-UE)
Denmark	Henrik Skov Aarhus University	hsk@envs.au.dk	Romania	Doina Nicolae National Institute of R&D for Optoelectronics
Estonia	Steffen M. Noe Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences	steffen.noe@emu.ee	Spain	Adolfo Comerón Universitat Politècnica de Catalunya Amalia Muñoz CEAM
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France	Paolo Laj Université Grenoble Alpes (UGA)/ Centre National de Recherche Scientifique (CNRS)	paolo.laj@univ-grenoble-alpes.fr	Switzerland	Urs Baltensperger Paul Scherrer Institute
Germany	Ulla Wandinger Leibniz Institute for Tropospheric Research (TROPOS)	ulla@tropos.de	United Kingdom	Geraint Vaughan National Centre for Atmospheric Science (NCAS) and School of Earth and Environmental Science, University of Manchester
Greece	Nikolaos Mihalopoulos University of Crete and National Observatory of Athens	nmihalo@noa.gr	European Commission - Joint Research Centre	Jean-Philippe Putaud
Ireland	John Wenger University College Cork (UCC)	j.wenger@ucc.ie		

**Several types of short-lived atmospheric objects:** Aerosols, Clouds, Trace Gas

**Several communities :** Remote Sensing, in situ, laboratories

**Different history and practices**

**ACTRIS-1/2 projects aimed at developing integration of these communities.**

Primary goal of ACTRIS is to produce **high quality ground-based integrated datasets** in the area of atmospheric sciences and provide **services**, including **access to instrumented platforms**, tailored for scientific and technological usage.

### The main objectives are

To provide

- information on the **compositon** and **variability** and of the physical, optical and chemical properties of short-lived atmospheric constituents (surface to the stratosphere, with the required level of precision, coherence and integration);
- information and understanding on the **atmospheric processes** (formation, transformation and removal of short-lived atmospheric constituents);
- **open access** to ACTRIS **data and services** and the means to effectively use the of ACTRIS products;
- **training of operators and users** and enhance linkage between research, education and innovation in the field of atmospheric science

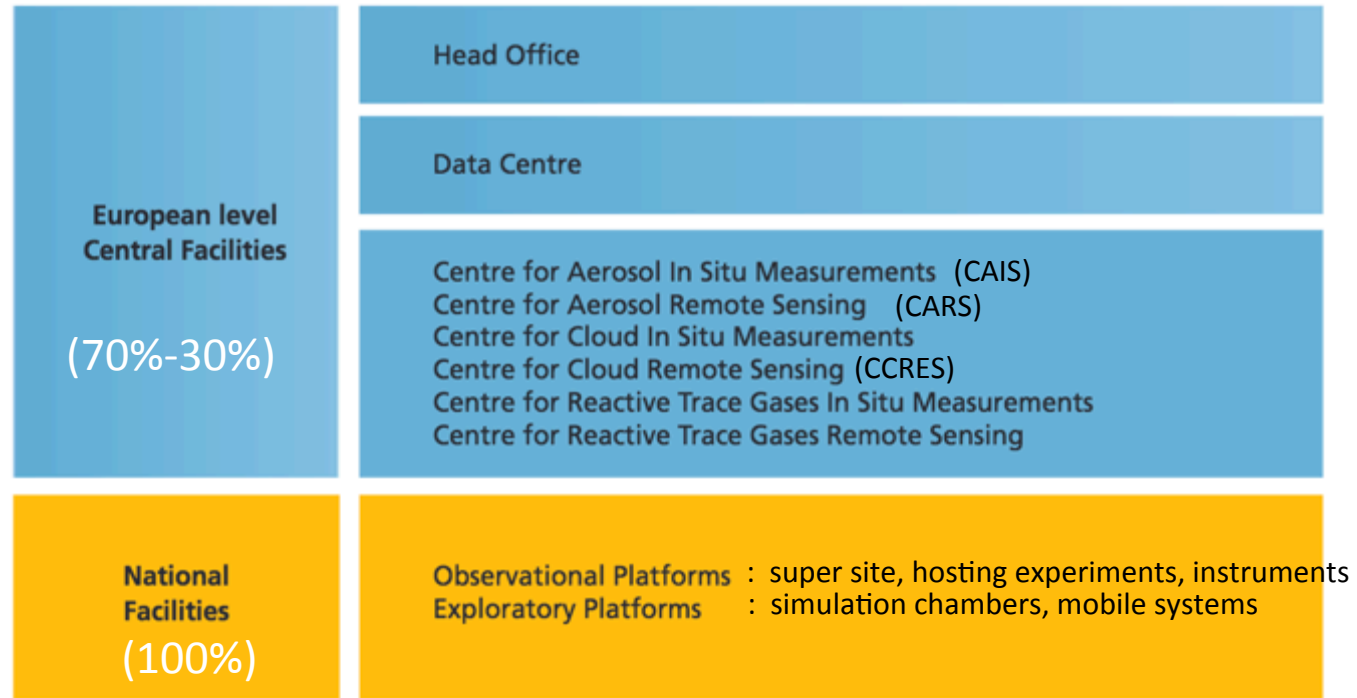
To **ensure** and **raise the quality of data** and use of up-to-date technology used in the RI and the quality of services offered to the community of users, involving partners from the private sector;



# Structuration

ACTRIS is composed of several connected elements (« facilities »):

- HO (Head Office)
- DC
- CF
- NF

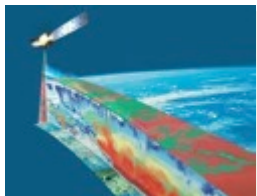


**Access** to its facilities, **open-access data**, measurement **support**, instrument **calibration** and **development**, and **training** to various user groups

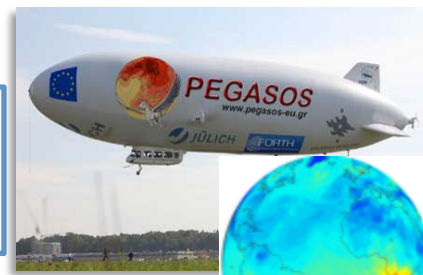
- ⇒ ACTRIS enhances science
- ⇒ ACTRIS generates and disseminates knowledge, boosts technological development, and creates jobs.



# ACTRIS for Users



Synergies Spatial observation (ESA, EUMETSAT)



Knowledge building (AQ/Climate) community

RTD H2020

MODEL VALIDATION AND TRED ASSESMENT

Support to Policy-making Regional scale air quality



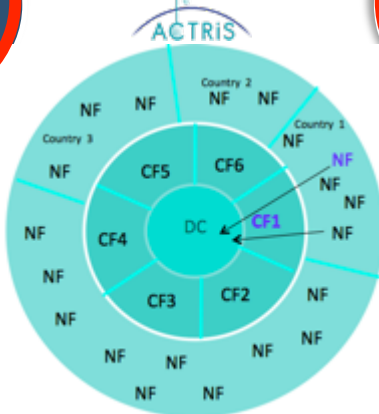
New technologies for Earth Observation

NEW TECHNOLOGIES

ATMOSPHERIC AND CLIMATE SERVICES

Support to Copernicus implementation

**CIMEL**  
**LEOSPHERE**  
**METEK**  
**AEROSOL D.O.O**  
....



STANDARDS ISO / CEN

GEO/GEOS

Support to European component of GAW, AERONET, NDACC



Fixing standards and norms for atmospheric observations



# ACTRIS en France ?

Les activités d'ACTRIS-FR ont pour but d'organiser les Actions Spécifiques, les Actions Transverses à travers des groupes de travail (GT) scientifiques qui sont définis par thématique et par ensemble d'instruments

- **Consortium français** : CNRS, MF, CNES, IMT, IPEV, CEA, IRD INERIS, Universités (Lille, La Réunion, Toulouse, Clermont, Grenoble, Aix-Marseille, Paris Est, UVSQ, Sorbonne, Orléans), Ecole Polytechnique, ENS

- <https://www.actris.fr/>

- **Groupes de Travail** : 9

- **Éléments constitutifs**:

- Plateformes d'Observation (dont SI),
- SNO (PHOTONS-AERONET/EARLINET, NDACC, CLAP)

- **Liens étroits avec DC & Services** : AERIS

- **Financements** :

- Local, régional (CPER, U. Lille)
- National (CNRS, Université, CNES, ANR, ..., AllEnvi)
- Européen (H2020, ESA, autres projets)

- **Appel d'Offre Annuel** ACTRIS-France pour soutenir l'activité (vie des GTs, workshop annuel (Aussois en 2020), et investissement pour construire, mettre à niveau les équipements)

GT1: Aerosol Remote Sensing ( Coord.: **P. Goloub**)  
GT2: Aerosol in-situ ( Coord.: E. Freney)  
GT3: Profile nuage et précipitation ( Coord.: J-C. Dupont)  
GT4: Profile thermodynamique ( Coord. : V. Duflot, J.L. Baray)  
GT5: Flux surface ( Coord.: F. Lohou)  
GT6: Gaz Trace ( Coord.: **S. Sauvage**, A. Colomb)  
GT7: Dépôt ( Coord.: C. Galy-Lacaux, B. Marticorena)  
GTD: Données ( Coord.: C. Boitel)  
GT9: Liens avec les utilisateurs ( Coord.: S. Bastin)

## Plateformes d'observation

SIRTA SI Palaiseau

CO-PDD SI Puy-de-Dôme

MAÏDO SI La Réunion

P20A Midi-Pyrénées

OHP SI Haute Provence

Plateforme d'Observation Hauts-de-France  
Lilloise LOA

MétéoPole Toulouse(MF)

# Contribution de la France à 6 Central Facilities

Central Facility	CF Unit name	CF Unit description	CF Unit hosting institution / country (for Head Office)
Centre for Aerosol In Situ Measurements - CAIS	ACMCC	Provision of services related to intercomparison, calibration, and QA/QC of ACSM instruments, and training of users	French National Institute for Industrial Environment and Risks (INERIS), National Center for Scientific Research (CNRS), French Alternative Energies and Atomic Energy Commission (CEA)
Centre for Aerosol Remote Sensing - CARS	CARS-ASP-LOA	Provision of services related to characterization, calibration, maintenance of automatic sun/sky/lunar photometers and training of users	National Center for Scientific Research (CNRS), Université de Lille, Centre National d'Etudes Spatiales (CNES), Aix-Marseille Université (AMU)
Centre for Cloud Remote Sensing - CCRES	CCRES-FR	Provision of target-based calibration procedures for cloud radars and of reference equipment for on-site calibration, instrument testing training of users	National Center for Scientific Research (CNRS), Ecole Polytechnique, Université de Versailles Saint-Quentin-en-Yvelines (UVSQ), Centre National d'Etudes Spatiales (CNES)
Centre for Reactive Trace Gases In Situ Measurements - CiGas	CiGas-IMT	Provision of services related to calibration, intercomparison, and QA/QC of VOC and NOx instruments, and training of users	Institution Mines Telecom Lille Douai (IMT/LD)
Centre for Reactive Trace Gases Remote Sensing - CREGARS	1) CREGARS-UVVIS-FR 2) CREGARS-O3-DIAL-FR	1) Provision of QA/QC tools for SAOZ instruments and processing, and training of users  2) Provision of QA/QC tools for LIDAR instruments and processing, and training of users	National Center for Scientific Research (CNRS), Université de Versailles Saint-Quentin-en-Yvelines (UVSQ), Aix-Marseille Université (AMU)

Central Facility	CF Unit name	CF Unit description	CF Unit hosting institution / country (for Head Office)
ACTRIS Data Centre	1) ACTRIS data and services access unit-France (ACCESS-FR)  2) ACTRIS Aerosol remote sensing data centre unit (ARES)  3) ACTRIS Atmospheric simulation chamber data centre unit (ASC)  4) ACTRIS trace gases remote sensing data centre unit (GRES)	1) Access to ACTRIS data and data products: remote sensing aerosol and reactive trace gases data, simulation chamber data  2) Aerosol remote sensing data processing and curation, including RRT and NRT delivery.  3) Atmospheric simulation chamber data services curation, provision, standardized process for data submission  4) Data curation service for reactive trace gases remote sensing data, added values products, standardized process for data submission and QC	AERIS (National Center for Scientific Research (CNRS), Centre National d'Etudes Spatiales (CNES), Institut de Recherche pour le Développement (IRD), Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA), Météo France (MF), Université de Lille, Université de Toulouse

**CARS** (aérosol-RS); **CCRES** (nuage, RS);  
**CAIS** (aérosols-in situ); **CiGAs** (T. Gaz, in situ);  
**GREGARS** (T. Gaz,- RS), **Data Center** (ICARE)

## Related CF / variables

Site	Description	Coordinates & altitude	Aerosol IS	Cloud IS	RTG IS	Aerosol RS	Cloud RS	RTG RS
Site Instrumental de Recherche par Télédétection Atmosphérique (SIRTA)	Observational platform, peri-urban site in Paris, suburban background	48.7097°N 2.1486°E 160 m a.s.l.	ready		planned	ready	ready	
Site d'observation atmosphériques Puy de Dôme/ Opme/ Cézeaux (COPDD)	Observational platform, peri-urban + mountain site in natural background, central France	45.772°N 2.966°E 1465 m / 394 m a.s.l.	ready	planned	ready	ready		

(source: Stakeholder handbook, 2018)

## Related CF / Variables

Site	Description	Coordinates & altitude	Aerosol IS	Cloud IS	RTG IS	Aerosol RS	Cloud RS	RTG RS
OPAR Observatoire de Physique de l'Atmosphère à La Réunion	Observational platform, urban/coastal + mountain site in natural background, tropical climate	21.0796°S 55.3841°E 10m a.s.l. - 2160 m a.s.l.	planned		planned	ready	planned	ready*
Plateforme Pyrénéenne d'Observations Atmosphériques (P2OA)	Observational platform, rural + mountain site in natural background, French Pyrenees	42.9372°N 0.1411°E 588 m a.s.l.- 2877 m a.s.l.	planned		planned			
Observatoire de Haute Provence (OHP)	Observational platform, rural site in natural background, French Southern Alps	43.9237°N 5.7183°E 650 m a.s.l.				planned		planned
Plateforme d'Observation Lilloise (LOA)	Observational platform, peri-urban site in North-Eastern France, suburban background	50.6117°N 3.1417°E 32 m a.s.l.				ready		
Site METEOPOLE	Observational platform, peri-urban site in South-Western France, suburban background	43.573°N 1.374°E 115 m a.s.l.					planned	
Atmospheric Simulation Chamber (CESAM)	Exploratory platform	48.7891°N 2.4436°E	ready		ready			
Chambre de simulation atmosphérique à irradiation naturelle d'Orléans (HELIOS)	Exploratory platform	47.8384°N 1.9444°E	ready		ready			

## Potential National Facilities in France

Quelques critères pour la labellisation NF:

- NF « for Synergy » and « Specialized NF »
- Ecosystème spécifique
- Series de données existantes et QC
- Valorisation scientifiques des données
- Données soumises aux DC
- Accueil physique ou remote
- Training
- Engagement du Labo / OSU / ...

# Variables and Measurement Techniques

## Aerosol Remote Sensing (CARS)

ACTRIS variables	Measurement techniques
<ul style="list-style-type: none"> <li>• Attenuated backscatter profile</li> <li>• Volume depolarization profile</li> <li>• Particle backscatter coefficient profile</li> <li>• Particle extinction coefficient profile</li> <li>• Lidar ratio profile</li> <li>• Ångström exponent profile</li> <li>• Backscatter-related Ångström exponent profile</li> <li>• Particle depolarization ratio profile</li> <li>• Particle layer geometrical properties (height and thickness)</li> <li>• Particle layer optical properties (extinction, backscatter, lidar ratio, Ångström exponent, depolarization ratio, optical depth)</li> <li>• Column integrated extinction</li> <li>• Planetary boundary layer height</li> <li>• Spectral Downward Sky Radiances</li> <li>• Direct Sun/Moon Extinction Aerosol Optical Depth (column)</li> </ul>	<ul style="list-style-type: none"> <li>• Aerosol high-power aerosol lidar</li> <li>• Automatic low-power aerosol lidar and ceilometers</li> <li>• Automatic sun/sky/lunar photometer</li> </ul> <p style="text-align: center;"><b>READY For LOA</b></p>

## Aerosol in situ (CAIS)

ACTRIS variables	Measurement techniques
<ul style="list-style-type: none"> <li>• Particle number size distribution – mobility diameter (10 - 800 nm)</li> <li>• Multi-wavelengths particle light scattering &amp; backscattering coefficient</li> <li>• Particle light absorption coefficient &amp; equivalent black carbon</li> <li>• Mass concentration of particulate organic and elemental carbon</li> <li>• Particle number size distribution – optical and aerodynamic diameter (0.7 - 10 µm)</li> <li>• Particle number concentration (&gt; 10 nm)</li> <li>• Mass concentration of particulate elements</li> <li>• Mass concentration of particulate organic tracers</li> <li>• Cloud condensation nuclei number concentration</li> <li>• Mass concentration of non-refractory particulate organics and inorganics</li> <li>• Nanoparticle number concentration (&lt; 10 nm)</li> <li>• Nanoparticle number size distribution (1 - 20 nm)</li> </ul>	<ul style="list-style-type: none"> <li>• Mobility Particle Size Spectrometers</li> <li>• Integrating Nephelometer</li> <li>• Absorption Photometers</li> <li>• Thermo-optical method on quartz filters</li> <li>• Aerodynamic &amp; Optical Particle Size Spectrometers</li> <li>• Condensation Particle Counters</li> <li>• Filter-based X-ray Fluorescence or Particle Induced X-ray Emission</li> <li>• Filter-based IC, GC-MS, HPLC-MS, or LC-MS</li> <li>• Cloud Condensation Nucleus Counter</li> <li>• Aerosol Mass Spectrometers</li> <li>• Particle Size Magnifier</li> <li>• Scanning Particle Size Magnifier, Neutral cluster and Air Ion Spectrometer, Nano Mobility Particle Size Spectrometer</li> </ul> <p style="text-align: center;"><b>Potential for LOA</b></p>

## Cloud Remote Sensing (CCRES)

ACTRIS variables	Measurement techniques
<ul style="list-style-type: none"> <li>• Cloud/aerosol target classification</li> <li>• Drizzle drop size distribution</li> <li>• Drizzle water content</li> <li>• Drizzle water flux</li> <li>• Ice water content</li> <li>• Liquid water content</li> <li>• Liquid water path</li> <li>• Temperature profile</li> <li>• Relative humidity profile</li> <li>• Integrated water vapor path</li> </ul>	<ul style="list-style-type: none"> <li>• Cloud radar</li> <li>• Doppler cloud radar</li> <li>• Microwave radiometer</li> <li>• Automatic low power Lidars and Ceilometers (in collaboration with the Centre for Aerosol Remote Sensing).</li> </ul> <p style="text-align: center;"><b>Potential for LOA</b></p>

# ACTRIS en Hauts-de-France

- **Partenaires en HDF**
  - ✓ LOA : CF Aerosol Remote Sensing (P+L) + NF(potentielle) + Bur. ACTRIS-FR
  - ✓ SAGE: CF Gaz Trace in situ + NF potentielle avec LOA (in situ)
  - ✓ ICARE: DC (Données + filières de traitement (BASIC/GARRLIC/GRASP-AOD/...))
- **Soutiens aux activités ACTRIS-FR/Europe (LOA)**
  - ✓ CaPPA (LILAS), CLIMIBIO (LILAS, METIS, AERONET, in situ, nuage)
  - ✓ en préparation : CLIMENSE (LILAS, AERONET, in situ, nuage)

## References

- Aerosols Clouds and Trace gases Research InfraStructure (ACTRIS) - Une infrastructure de recherche atmosphérique européenne multi-sites Dimensions européenne, nationale et régionale, P. Goloub, S. Sauvage, V. Riffault, J. Riedi
- Documentation on technical concepts and requirements for ACTRIS Observational Platforms (ACTRIS PPP, public)
- Concepts of Central Facility (ACTRIS PPP, public)
- ACTRIS Stakeholder handbook, 2018 (ACTRIS PPP, public)

# Phase d'implémentation : 2020-2024

Janvier 2025 -> 2050 : Phase d'Opération

- **Projet H2020/ACTRIS-IMP accepté (KOM, début 2020, pour 4 ans) :**
  - Construire l'IR, trouver des financements, obtenir des postes, des équipements
  - Construction juridique (l'IR aura un statut légal, conventions inter-partenaires, un compte bancaire, des salariés)
  - AERONET : BAU activities + Nouveau Service Pilote pour la photométrie Mobile
- **Labellisation du SNO PHOTONS-AERONET** avec extension aux Lidar
- **Filière de traitement algorithmique** : par exemple, mise en mode production de GARRLIC et BASIC Evolution à ICARE/AERIS, un des nœuds du Data Center d'ACTRIS.
- **Consolidation de la plateforme d'observation lilloise (CaPPA/CLIMIBIO/CLIMENSE)**, soumission des données QC aux DC et leurs valorisations scientifiques (publications, thèses, stage Master, ...)
- **2020 Labellisation des NF (décision nationale)**
- **Laboratoire Commun AGORA** : renforcement du partenariat avec CIMEL (concept de système intégré P+L).
- **Rapprochement avec les organismes de métrologie européenne**, en particulier sur les aspects photométriques (projet H2020/MAPP accepté (Metrology for Aerosol optical Properties), KOM, juin 2020
- **Contributions aux projets Cal/Val des agences spatiales (CNES/ESA/EUMETSAT)**

**=> Investissements (Personnels, Equipements) pour les 25 ans à venir**



# Merci à tous les Acteurs !

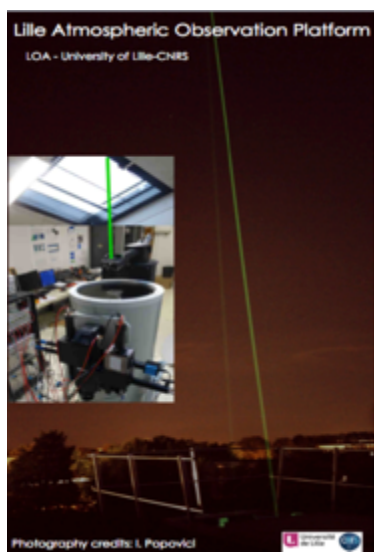


Kiitos !



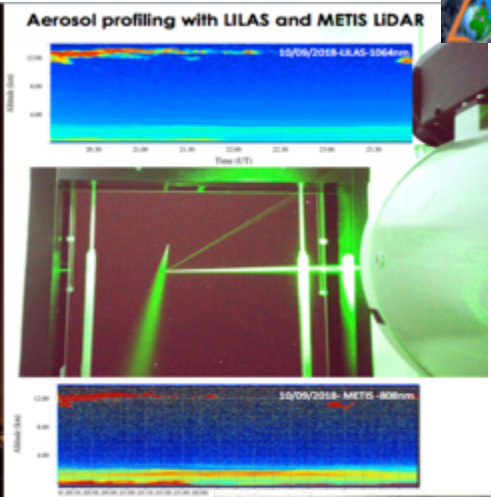
CARS-LOA

Univ. Lille - CNRS

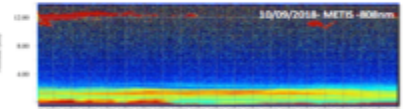
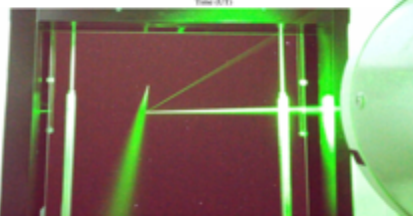
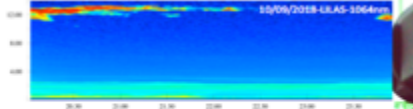


Lille Atmospheric Observation Platform  
LOA - University of Lille-CNRS

Photography credits: I. Popovici



Aerosol profiling with LILAS and METIS LIDAR



Centre de Données et Services ICARE

Hyvää joulua !!



CIGAS-IMT

# Documentations + additionnal slides

## Links:

- ACTRIS Handbook for stakeholders

[https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP1\\_D1.5\\_24.pdf?ver=2019-02-28-123215-593](https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP1_D1.5_24.pdf?ver=2019-02-28-123215-593)

- Documentation on technical concepts and requirements for ACTRIS Observational Platforms

[https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP5\\_D5.1\\_M18.pdf?ver=2018-06-28-125343-273](https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP5_D5.1_M18.pdf?ver=2018-06-28-125343-273)

- Concept document on ACTRIS Central Facilities structure and services

[https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP4\\_D4.1\\_M12.pdf?ver=2018-02-28-131240-023](https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP4_D4.1_M12.pdf?ver=2018-02-28-131240-023)

- Documentation on ACTRIS National Facility labelling principles

[https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP5\\_D5.3\\_M30.pdf?ver=2018-11-02-105518-763](https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP5_D5.3_M30.pdf?ver=2018-11-02-105518-763)

- ACTRIS-France : <https://www.actris.fr>

# Organizational and strategic concepts for ACTRIS Observational Platforms

- Experience from ACTRIS heritage shows that typically 2 kinds of Observational Platforms evolve in the research infrastructure:
  - a) **Advanced, well-equipped Observational Platforms**, which contribute to the observational strategy with optimized and combined observations leading to substantial synergistic effects
  - b) **Specialized Observational Platforms**, which deliver a limited number of variables with focus on regional coverage and specific topics.

## 5.1 ACTRIS Observational Platforms focussing on synergy

### 5.1.1 Observational requirements

Advanced ACTRIS Observational Platforms apply sophisticated and optimized instrumentation in a synergistic manner in order to deliver a comprehensive set of aerosol, cloud and/or reactive-trace-gas data, together with auxiliary parameters. It is expected that several of the observational components described in Sec. 4.1–4.6 are joined at such stations or that ACTRIS observational components are deployed together with an extensive set of non-ACTRIS instrumentation, e.g., at existing national observatories or at sites shared with another RI. Instruments at these advanced ACTRIS Observational Platforms should run continuously (24 hours/7 days a week if applicable; otherwise whenever measurement conditions are suitable) and data should be delivered in RRT or NRT in order to allow for data assimilation, on-line validation of model or satellite products and immediate information of the public.

### 5.1.2 Geographical requirements

Advanced ACTRIS Observational Platforms require substantial implementation and operation efforts, i.e. it is expected that only a limited number of such stations can be realized. Most probably, they will be set up at already existing national observatories, often also called “supersites” (a term that is however not adopted by ACTRIS). Thus, the geographical location of these sites, in many cases, has been already chosen in the past. It may be supposed that major general requirements have been considered in the selection, e.g., representativeness for a larger area or homogeneity of the surrounding in terms of orography, vegetation, cultivation, population density, etc. The sites should usually not be located in an isolated micro-environment with very specific conditions, except if the performed research is specifically dedicated to such an environment, which could be the case, e.g., for high-mountain sites. When new synergistic Observational Platforms are planned the locations should be chosen accordingly.

Moreover, synergistic Observational Platforms should be well distributed across Europe, covering the major climatic conditions and all typical air masses present over the continent. Due to the limited number of the sites, typical distances between them will be of the order of several hundred to thousand kilometres. Consequently, each advanced Observation Platform will be of major importance as key location and anchor point for observations in a larger region.

Details of requirements and procedures that will be used in the respective labelling of ACTRIS Observational Platforms are discussed in D5.3 (*Documentation on ACTRIS National Facility labelling principles*).

## 5.2 ACTRIS Observational Platforms focussing on regional coverage

### 5.2.1 Observational requirements

Specialized ACTRIS Observational Platforms contribute to at least one observational component described in Sec. 4.1–4.6 following at least the minimum ACTRIS requirements discussed above. Specific operation procedures may be applied at such stations, if they are in line with the ACTRIS standards.

### 5.2.2 Geographical requirements

Specialized ACTRIS Observational Platforms require less implementation and operation efforts. Therefore, a larger number of sites, involving also a larger number of national institutions, are expected. These Observational Platforms may be dedicated to the observation of distinct short-lived species under certain conditions. For instance, aerosols and short-lived trace gases relevant for human health need to be observed in and around industrialized urban regions, whereas for cloud observations rural mountainous sites are of much higher interest. Specialized ACTRIS Observational Platforms are important for geographical coverage and the investigation of the variability of different ACTRIS species in between the bigger observatories.

## 5.3 Access requirements

The major task of Observational Platforms is the collection and delivery of quality-controlled data for provision to users via the ACTRIS Data Centre. In addition, selected ACTRIS Observational Platforms, in particular large observatories, may offer physical access to users. Adequate personnel, equipment, logistics and resources at the respective sites are required, e.g.:

- Capabilities to run large scientific experiments,
- Possibilities to run instruments on user request for specific investigations, in specific modes, etc.
- Possibilities to set up and run instruments of the user, including supply of power, water, technical gases, internet connection, etc.
- Logistics to perform specific campaigns, e.g., with mobile ground-based or airborne platforms,
- Resources to host users, including working and storage space and all necessary facilities and supplies,
- Capabilities to train and support users by experienced staff,
- Resources to support users in administrative and logistic issues, e.g., customs, shipping, travel, transport, accommodation, etc.
- Capabilities to ensure the ACTRIS observational requirements during physical access provision.

Physical access to Observational Platforms will be managed via the SAMU. The selection of Observational Platforms that will provide physical access will be part of the labelling process. Details are specified in D5.3, D2.6 and D6.3.

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## 2 ACTRIS labelling principles

The ACTRIS label is granted if all of the following conditions are fulfilled:

1. The member country or the responsible RPO(s) has (have) signed a commitment of the resources for long-term operation of the NF (RI operations are envisaged to run over >20 years, a commitment at least for the next 5 years is expected).
2. All contractual agreements required by the ERIC for NFs are signed by all parties.
3. The NF has demonstrated, according to the assessment report (see Chapter 5), to comply with the ACTRIS NF general principles (see D5.1, Chapter 3 and D5.2, Chapter 3).
4. The NF has demonstrated, according to the assessment report (see Chapter 5), to comply with the ACTRIS technical concepts and requirements for at least one type of ACTRIS platforms (see D5.1, Chapter 4 and D5.2, Chapter 4).
5. The NF has contributed to all required QA/QC measures and submitted the required amount of high-quality data to the ACTRIS DC for at least two preceding years, according to the assessment report (see Chapter 5).

The ACTRIS label may be withdrawn if one of the above conditions is not achieved anymore. The decision on granting and withdrawal of the ACTRIS label is made by the General Assembly.