Deliverable 4.1: International memorandums of understanding signed

Authors: Lucia Mona, Ewan O'Connor, Martine De Maziere, Eija Juurola, Doina Nicolae, Judd Welton, Cathrine Lund Myhre, Markus Fiebig, Olga Mayol-Bracero, Martial Haeffelin

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Contents

1   Introduction

The main objective of CARGO-ACT is to pave the way for global interoperability that will ultimately lead to better harmonized global datasets of key atmospheric parameters, specifically for short-lived components such as aerosol particles, trace gases, and clouds. Collaboration among observational networks and initiatives is key for converging towards a global observation system. Different types of agreements are possible (e.g. Letter of Intent, Cooperation Agreement, etc.). The actual type is determined by the legal departments of the organizations. In this document, we will use the generic term of Memorandum of Understanding (MoU) among partners because, in these initiatives, MoU can be the basis for starting and in some cases consolidating collaborations in a framework for reciprocal understanding and common ground. Obtaining a MoU between two international networks or initiatives is usually a long process; starting with agreeing on the main goal, defining the details, drafting the MoU and getting it signed in accordance with the respective administrative and legislation rules can take 2-3 years or more. As a 3-year project, CARGO-ACT is only able to initiate this MoU process, which will begin harnessing the collaborative power to demonstrate improvements and scientific progress.

The first step in such a process is the identification of networks and initiatives of potential interest. Then a prioritization will be made by CARGO-ACT partners depending on specific needs.

This deliverable will be updated annually, reporting on the status of drafting and signing MoUs of interest which will enable advancements in the global convergence of the scientific investigation of aerosol, clouds and trace gases.

2   Mapping relevant networks/programs

Networks and programs in USA and Europe relevant to the research of short-lived atmospheric constituents have been listed in Table 1. This mapping exercise has been extended beyond the CARGO-ACT partners themselves, bearing in mind that the wider the scope of techniques, methods and variables considered, the more synergies in measuring the atmospheric state may be enabled, as well as increasing the global coverage.

Table 1 provides a list of networks and programs of interest for CARGO-ACT. This list is not exhaustive but reflects the priorities envisaged by the CARGO-ACT partners at the present time.

Coloured cells indicate the parameters measured and the techniques used for each network or program. Cells with a lighter shade indicate cases where the network or program measures parameters which may not fully belong in the specific category of interest but provide added value or are impacted by the category of interest (e.g. BSRN does not measure aerosol but provides information about radiation and therefore a quantity affected by aerosol load).
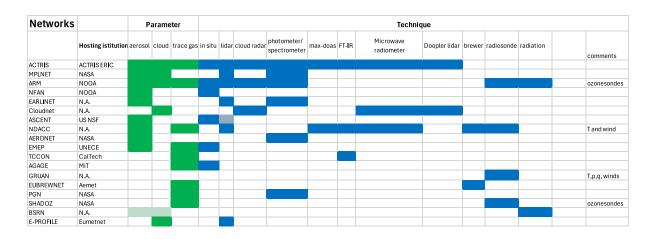
Table 1: Networks of interest for CARGO-ACT (includes CARGO-ACT partners)

Networks	Hosting istitution	aerosol	cloud	trace gas	in situ	lidar	cloud radar	photometer/spectrometer	max-doas	FT-IR	Microwave radiometer	Doopler lidar	brewer	radiosonde	radiation	comments
		Parameter			**Technique**											
ACTRIS	ACTRIS ERIC	X			X	X	X	X	X	X	X					
MPLNET	NASA	X			X		X	X								
ARM	NOOA	X			X									X	X	ozonesondes
NFAN	NOOA	X			X											
EARLINET	N.A.	X				X		X								
Cloudnet	N.A.		X			X	X				X					
ASCENT	US NSF	X			X											
NDACC	N.A.			X		X		X	X	X	X		X			T and wind
AERONET	NASA	X						X								
EMEP	UNECE	X			X											
TCCON	CalTech			X						X						
AGAGE	MiT			X	X											
GRUAN	N.A.													X		T,p,q, winds
EUBREWNET	Aemet			X									X			
PGN	NASA			X				X	X							
SHADOZ	NASA			X										X		ozonesondes
BSRN	N.A.	X													X	
E-PROFILE	Eumetnet		X			X										

Up to 18 networks/initiatives and 11 different techniques are mapped, providing a wide observational framework for atmospheric research.

A one-to-one MoU is envisaged for initiatives having a direct and specific mutual connection, whereas multi-initiative MoUs could be considered for linking different networks working with similar techniques.

3   MoU – Status and plans – December 2024

All networks reported in Table 1 are part of a general collaborative plan. Table 2 provides the status at the end of December 2024 of the MoU of interest for CARGO-ACT pushing forward the collaboration between EU and US programs. Other agreements are planned and taken into consideration among the networks in table 1, while only those which the work has been at least initiated are reported in Table 2.

The work has already started for 10 agreements. Out of these, the **ACTRIS-NDACC MoU** has been already signed by both parties.

The NDACC-ACTRIS MoU concerns the measurements and related data of ozone, NO_2, formaldehyde, NH_3 and C_2H_6 performed within NDACC and the services provided by the Topical Centre for Reactive Trace Gases Remote Sensing (CREGARS) and the Trace Gases Remote Sensing data unit (GRES) of the ACTRIS Data Centre to the ACTRIS National Facilities (NFs) that provide data to NDACC, and any other facility serviced by CREGARS through the ACTRIS Service and Access Management Unit (SAMU). The MoU regulates the interactions between NDACC and ACTRIS, their respective roles and responsibilities, and defines how the correct recognition should be provided to each party.

Table 2: Status of relevant CARGO-ACT MoU

		Initiated	Draft Available	Signed
ACTRIS	AERONET	🟩	🟩	
ACTRIS	Cloudnet	🟩		
ACTRIS	EARLINET	🟩	🟩	
ACTRIS	EMEP	🟩		
ACTRIS	EMN	🟩		
ACTRIS	E-PROFILE	🟩		
ACTRIS	GAW	🟩		
ACTRIS	NDACC	🟩	🟩	🟩
ACTRIS	PGN	🟩	🟩	
BNL	WCCAP-TROPOS	🟩		

4 List of acronyms

ACTRIS = Aerosol Clouds Trace gases Research InfraStructure; https://www.actris.eu

AERONET = AErosol RObotic NETwork; https://aeronet.gsfc.nasa.gov

AGAGE = Advanced Global Atmospheric Gases Experiment; https://cgcs.mit.edu/research/agage

ARM = Atmospheric Radiation Measurement; https://www.arm.gov

ASCENT = Atmospheric Science and Chemistry mEasurement NeTwork; https://ascent.research.gatech.edu

BNL = Brookhaven National Laboratory; https://www.bnl.gov/world/

BSRN = Baseline Surface Radiation Network; https://bsrn.awi.de

CARGO-ACT= Cooperation and AgReements enhancing Global interOperability for Aerosol, Cloud and Trace gas research infrastructures; https://www.cargo-act.eu

EARLINET = European Aerosol research LIdar NETwork; www.earlinet.eu

EMEP = European Monitoring and Evaluation Programme; https://www.emep.int

EMN = European Metrology Networks; https://www.euramet.org/european-metrology-networks

EUBREWNET = EUropean BREWer NETwork; https://eubrewnet.aemet.es/eubrewnet

GAW = Global Atmosphere Watch programme; https://community.wmo.int/en/activity-areas/gaw

GRUAN = Global Climate Observing System (GCOS) Reference Upper-Air Network; https://www.gruan.org

MPLNET = Micro-Pulse Lidar NETwork; https://mplnet.gsfc.nasa.gov

NDACC = Network for the Detection of Atmospheric Composition Change; https://ndacc.larc.nasa.gov

NFAN = NOAA Federated Aerosol Network; https://gml.noaa.gov/aero/net/

PGN = Pandonia Global Network; https://www.pandonia-global-network.org

SHADOZ = Southern Hemisphere ADditional OZonesondes; https://tropo.gsfc.nasa.gov/shadoz/

TCCON = Total Carbon Column Observing Network; https://www.tccon.caltech.edu

WCCAP = World Calibration Centre for Aerosol Physics; https://www.wmo-gaw-wcc-aerosol-physics.org