MARTISLAB.be: a New ACTRIS Mobile National Facility for Reactive Trace Gas Studies

B. W. D. Verreyken[1,2], N. Schoon[1], C. Amelynck[1,3]

1. Royal Belgian Institute for Space Aeronomy (BIRA-IASB), 1180, Belgium
2. Gembloux Agro-Bio Tech, Biosystems Dynamics and Exchanges, 5030, Belgium
3. Department of Chemistry, Ghent University, 9000, Belgium

1. ACTRIS-ERIC

Pan-European Research Infrastracture	Short-lived Atmospheric Constituents
Quality-assured and Harmonised Observational Datasets	User-based Service Oriented Access to Research Facilities

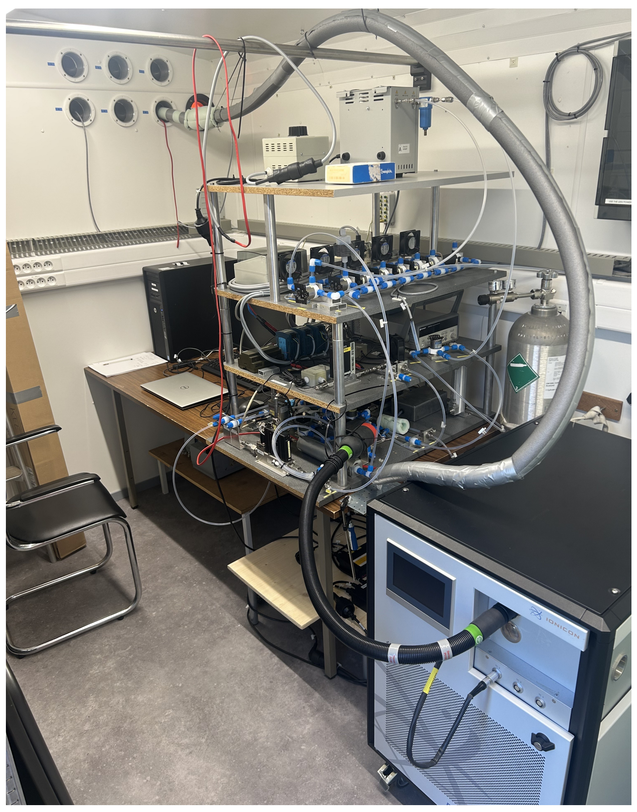
ACTRIS

Aerosol	Cloud	Trace Gas
Remote Sensing	In Situ	
Observational	Exploratory	

2. MARTISLAB.be

Campaign-based deployment	Sources&Sinks of reactive trace gases
Chemical processes in the atmosphere	Biosphere-Atmosphere interactions

3. Mobile laboratory infrastructure





A. Equipment*

Variable	Measurement technique	Instrument type (manufacturer)	Detection limit
(O)VOC concentrations	Proton-Transfer-Reaction Mass-Spectrometry	PTR-TOF-4000 (Ionicon Analytik G.m.b.H)	lower pptv range (1 min integration time)
NO_x (NO, NO_2) concentrations	Chemiluminescence NO2→NO via BLC	T200UP (Teledyne)	<50 pptv
O_3 concentrations	UV absorption spectroscopy	T400 (Teledyne)	<0.4 ppbv
Wind speed and direction, Temp., Pressure, RH		MetConnect One weather station	
Solar radiation	pyranometer	SPN1 (Delta-T Devices)	

*expected to be fully integrated by Fall 2026

B. Features

Nearly Fully Remotely Controllable	**Instrumentation for Calibrations On Site**	**Adaptable for Campaign-specific Interests**

4. Previous deployment of the facility and its components





5. Why MARTISLAB.be at ICOS sites?

Extend **carbon exchange** beyond long-lived greenhouse gases	Impact of **air pollution** on **ecosystem functioning** and BVOC oxidation mechanisms
Eddy-covariance fluxes of BVOCs possible by combining ICOS ecosystem infrastructure with fast VOC measurements	Get insight in **mechanistic processes** governing BVOC exchanges by **driver analysis** using ICOS ecosystem station ancillary measurements
Probe BVOC exchanges in **different environments** to evaluate their representation in **emission inventories**	Evaluate effect of **management practices** on **air quality** at agricultural ICOS ecosystem sites

Respond to the tendency to combine multiple European Research Infrastructures to address **societal challenges** and perform **impactful scientific research**



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Contact: bert.verreyken@aeronomie.be, crist.amelynck@aeronomie.be

MARTISLAB
Mobile Atmospheric Reactive Trace Gas In Situ Laboratory
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