



PROMETH₂O

20IND06 PROMETH2O

Metrology for trace water in ultra-pure process gases

Management board

Monday 21st of September 2023

EMPIR



The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

WP1
Methods

WP2
Traceability

WP3
Demonstration

WP4
Impact

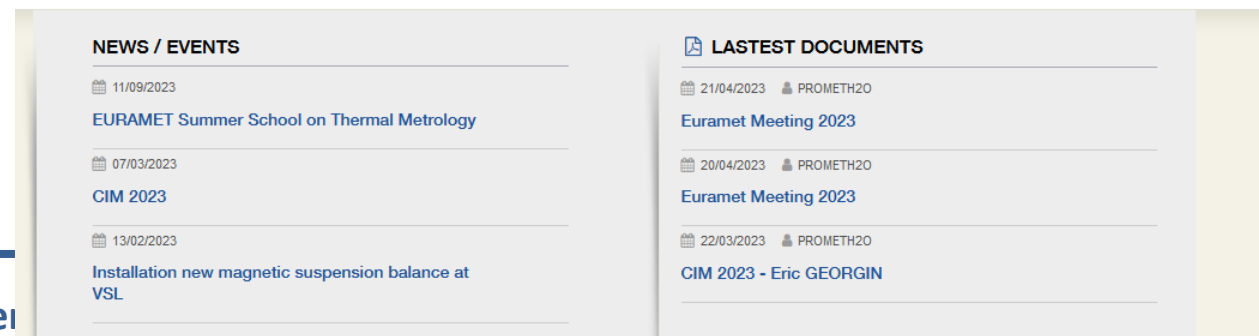
WP5
Management








Univerza v Ljubljani



- A4.1.1 set up, host and maintain the project website (**CETIAT**, all partners) – **M36**
 - The website will have a public and restricted area and it will be set up within 3 months from the start of the project and will be updated at least every 9 months (**M3, M12, M21, M30, M36**)
 - **Website**
 - **Events and updates: inform WP4 leader for the forthcoming events**
 - **Gas analysis conference + workshop (to be announced)**



- A4.1.1 set up, host and maintain the website (partners) – **M36**
 - The website will have a public and restricted access 6 months from the start of the project (**M3, M12, M21, M30, M36**)
 - **Website**
 - **Events and updates: inform WP4 leaders**

<div> <div>11/09/23</div> <div>Meetings</div> </div> <div> <h3>EURAMET Summer School on Thermal Metrology</h3> <p>A second edition of Euramet Summer School on Thermal Metrology is organized at MIRS/UL-FE/LMK, Ljubljana, from 11-15 September 2023.</p> <p>The Summer School will give metrologists new to the field of temperature and humidity measurements an introductory overview of the current international metrology standards, followed by more detailed insight about the thermal metrology disciplines with the aim to prepare them for their future work.</p> <p>The registration is open, register by 21 April 2023. However, the registration may be closed earlier if all available places are filled.</p> <p>Participation will be confirmed by 25 April 2023.</p> <div>Registration</div> </div>	<div> <div>07/03/23</div> <div>News</div> </div> <div> <h3>CIM 2023</h3>  <p>The 21th International Metrology Congress will be held from 7 to 10 March 2023 in Lyon (France), in partnership with Global industrie. The event is composed of 200 presentations sorted by technical topics and 6 round table sessions responding to the world's challenges around 3 key applications: Industry 4.0 ; Health ; Green deal.</p> <p>At this occasion 2 presentations from JRP partners have been done, they are available here :</p> <ul style="list-style-type: none"> • CIM 2023 - Eric GEORGIN : download the presentation • CIM 2023 - Vito FERNICOLA : download the presentation <div>CIM 2023</div> </div>	<div> <div>13/02/23</div> <div>11:54 AM</div> <div>News</div> </div> <div> <h3>Installation new magnetic suspension balance at VSL</h3>  <p>Within the Prometh2O project VSL is developing a method to generate moisture in the range of 50 nmol/mol up to 5 µmol/mol based on permeation (ISO 6145-10) and dynamic dilution with thermal mass-flow controllers (ISO 6145-7).</p> <p>For this goal, a new magnetic suspension balance has been installed in the VSL laboratories (see photo) that will be used to accurately determine the mass loss of the water permeation tube.</p> </div>
<div> <div>06/02/23</div> <div>11:54 AM</div> <div>News</div> </div> <div> <h3>Development of a low-frost point humidity generator at INRIM</h3>  <p>INRIM has developed a low-frost point humidity generator to cover the trace water measurement range. The standard generator has been commissioned and validated in the frost point temperature range from -105 °C to -65 °C up to 0.65 MPa in nitrogen and argon, thus covering the full amount fraction range expected by PROMETH2O project (i.e., from 5 nmol/mol to 5 µmol/mol).</p> </div>	<div> <div>03/04/23</div> <div>Meetings</div> </div> <div> <h3>10th International Temperature Symposium (ITS10)</h3>  <p>The 10th International Temperature Symposium will be held as a 'live', face-to-face Conference at the world-renowned Disney Hotel and Resort in Anaheim, California, USA in April of 2023 featuring a technical program covering topics in all areas related to Temperature Measurement.</p> </div>	<div> <div>22/12/22</div> <div>10:13 AM</div> <div>News</div> </div> <div> <h3>e-newsletter n°1</h3>  <p>First e-newsletter of the project.</p> <p>Summary : Organization of the consortium ; Kick off meeting ; M9 meeting ; First congress attendance.</p> </div>

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 - **Website**
 - **Events and updates: inform WP4 leader for the forthcoming events**
 - **Request high resolution/quality pictures, drawings, schematics; typ. resolution 980×335**
 - **Presentations will be uploaded unless otherwise indicated**

Task 4.1: Knowledge transfer

- A4.1.1 set up, host and maintain (partners) – **M36**

- The website will have a public access from 12 months from the start of the project (M3, M12, M21, M30, M36)

- **Website**

- **Events and updates: inform WP**
- **Request high resolution/quality**
- **Presentations will be uploaded**

Search by theme :
Select a theme...
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Search by key words :
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22/03/2023 PROMETH2O
CIM 2023 - Eric GEORGIN

Humidity measurements at LNE-CETIAT low humidity level
Download the report
Add to basket

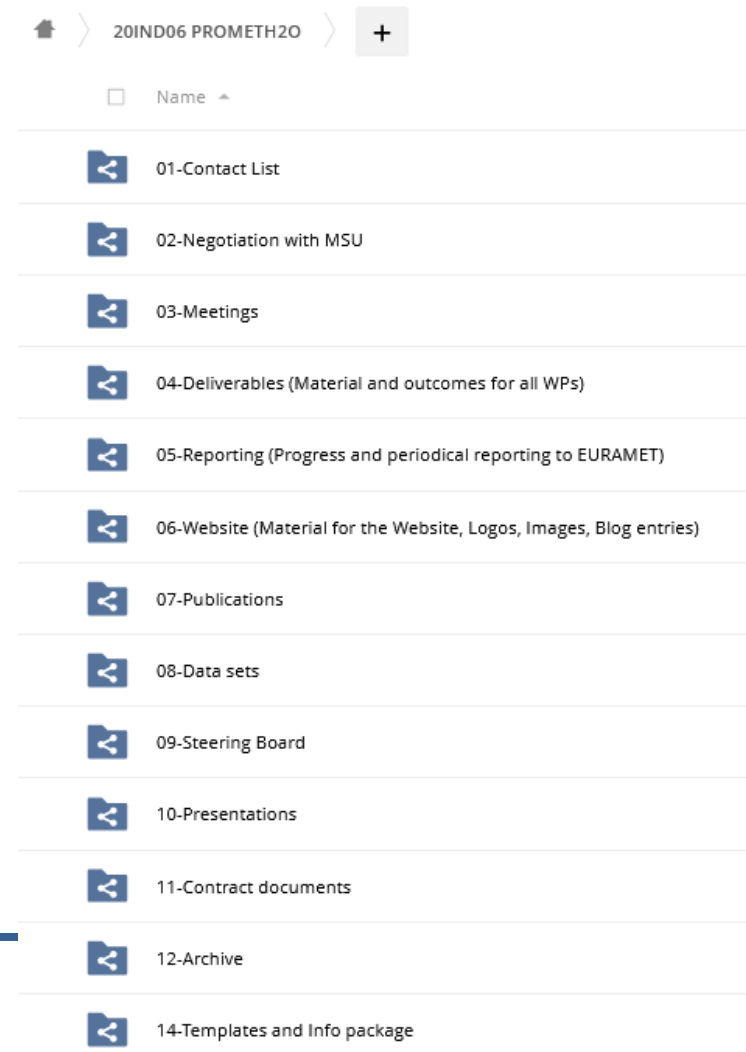
22/03/2023 PROMETH2O
CIM 2023 - Vito FERNICOLA

A new measurement infrastructure for trace water in ultra-pure process gases
Download the report
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02/03/2023 PROMETH2O
Comb-assisted cavity ring-down spectroscopy for ultra-sensitive traceable measurements of water vapour in ultra-high purity gases

Comb-assisted cavity ring-down spectroscopy for ultra-sensitive traceable measurements of water vapour in ultra-high purity gases E Fasci, V D'Agostino, M A Khan, S Gravina, G Porzio, L Gianfrani and A Castrillo E-mail: antonio.castrillo@unicampania.it
Download the report
Add to basket

- A4.1.1 set up, host and maintain the project website (**CETIAT**, all partners) – **M36**
 - A protected cloud storage for the exchange of information and documents has been already set up by INRIM and will be maintained for the lifetime of the project
 - <https://gbox.garr.it/>



- A4.1.2 set up a stakeholder's **Steering Board (SB)** (**INRIM**, all partners) – **M6, M36**
 - The SB will be established within 6 months from the start of the project (**M6**)
 - The aim of SB is to clarify the needs, to feed these into the different activities (e.g. A1.3.1, A2.3.2 and A3.1.1) and to keep the project aligned with the needs to maximise impact
 - SB members will be regularly invited to attend the public part of the project meetings



20IND06 - PROMETH2O

Steering Board members

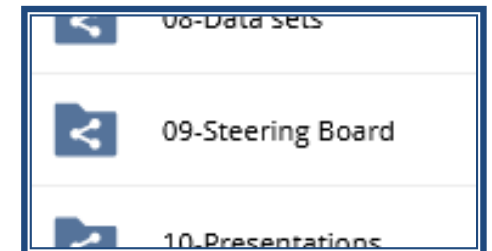
- A4.1.2 set up a
M6, M36
 - The SB will be
 - The aim of SB
(e.g. A1.3.1, A
maximise imp
 - SB members \
meetings

Name	Person to be contacted	Alternate	Email
International Organisations			
CIPM CCT WG-Hu	Stephanie Bell	Chairperson Jan Hruby	Stephanie.Bell@npl.co.uk
IAPWS	Karsten Meier		meierk@hsu-hh.de
JCS	Olaf Hellmuth		olaf@tropos.de
KRISS	Byung Il Choi		cbi@kriss.re.kr
NMIJ	Hisashi Abe		abe.h@aist.go.jp
ISO/TC 158 WG3	Adriaan van der Veen		avdveen@vsl.nl
CIPM CCQM GAWG	Paul Brewer (NPL)		paul.brewer@npl.co.uk
UNI CIG	Paola Comotti		paola.comotti@mi.camcom.it
ACCREDIA	Rosalba Mugno		r.mugno@accredia.it

Name	Person to be contacted	Alternate	Email
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Ball Wave	Yusuke Tsukahara		tsukahara@ballwave.jp
Meeco	Rutger Oudwater		roudwater@meeco.com
Li-Cor	Graham Leggett		graham.leggett@licor.com
Baker Hughes	Gerard McKeogh		gerard.mckeogh@bakerhughes.com
PST/Rotronic	Richard Gee		Richard.Gee@processsensing.com
EffecTech Ltd.	Paul Holland		paul.holland@effectech.co.uk

Name	Person to be contacted	Alternate	Email
Gas Providers			
Air Liquide	Jean-Luc Blanc		jean-luc.blanc@airliquide.com
Air Liquide	Antonio Carreira		antonio.carreira@airliquide.com
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SOL	Riccardo Nava		r.nava@sol.it
SIAD	Pierluigi Bissoletti		ricerca@siad.it
SAPIO	Pierluigi Radaelli		lpmr@sapio.it
FHa	Laura Abadía Albás	Guillermo Figueroa	labadia@hidrogenoaragon.org

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 - The SB will be established within 6 months from the start of the project (**M6**)
 - The aim of SB is to clarify the needs, to feed these into the different activities (e.g. A1.3.1, A2.3.2 and A3.1.1) and to keep the project aligned with the needs to maximise impact
 - SB members will be regularly invited to attend the public part of the project meetings
 - Was there any recent meeting or is there any planned meeting ?
 - Steering board chair will be invited during the final workshop
 - IAPWS conference (held at Torino) / discussion with WG dealing with enhancement factor



- A4.1.3 dissemination to key standards bodies and committees (**INRIM**, all partners) – **M36**

Standards Committee / Technical Committee / Working Group	Partners involved	Likely area of impact / activities undertaken by partners related to standard / committee
ISO/TC 158 WG3	VSL, CEM	VSL and CEM will disseminate to ISO/TC 158/WG3 the outputs of the project in order to update ISO 19229: 2019 ' <i>Gas analysis - Purity analysis and the treatment of purity data</i> ' with the project results that are metrological traceable. This ISO group holds meetings twice per year.
SEMI, Gases Global Technical Committee.	CETIAT	CETIAT will liaise with SEMI, Gases Global Technical Committee to disseminate the outputs of the project from WP2 and contribute to a future update of SEMI F112-0613 - <i>Test Method for Determination of Moisture Dry-Down Characteristics of Surface-Mounted and Conventional Gas Delivery Systems by Cavity Ring Down Spectroscopy</i> (CRDS) This SEMI, group holds meetings once per year.
DIN NA 062-05-73 AA	PTB	PTB will disseminate to the DIN NA 062-05-73 AA committee the outputs of the project from WP2 to contribute to the discussion on gas supplier industry. This DIN group holds meetings twice per year.

CIPM CCT WG-Hu CCT	INRIM, CETIAT, INTA, PTB, VTT	INRIM, CETIAT, INTA, PTB, and VTT will disseminate to CIPM CCT WG-Hu the outputs of the project from WP1 to contribute on the consultations for the protocol for CIPM inter-comparison. This WG-Hu holds meetings in conjunction with CCT plenary, in general every 3 years.
CIPM CCQM GAWG	PTB	PTB will disseminate to CIPM CCQM GAWG the outputs of the project from WP1 and WP2 to contribute on the consultations for the protocol for CIPM CCT inter-comparison and liaise with such committee This WG holds meetings generally once per year.
IAPWS WG TPWS	INRIM, PTB, VTT	INRIM, PTB, and VTT will disseminate to IAPWS WG TPWS the outputs of the project from WP2 to contribute on the consultation on non-ideal humid gas mixtures and water vapour enhancement data and correlation. This WG holds meetings generally once per year.
JCS	INRIM, PTB, VTT	INRIM, PTB, and VTT will disseminate to JCS the outputs of the project from WP2 to contribute on the consultation on non-ideal humid gas mixtures and water vapour enhancement data and correlation equations. This JCS group holds meetings once per year.
EURAMET TC-T	INRIM, CETIAT, INTA, PTB, VTT	INRIM, CETIAT, INTA, PTB, and VTT will disseminate to EURAMET TC-T the outputs of the project from WP1 and WP2 to inform the metrology community. The EURAMET TC-T holds meetings once per year.
EURAMET TC-MC SCGA	PTB	PTB will disseminate WP1 and WP2 output to EURAMET SCGA and will liaise with this gas metrology committee. The EURAMET TC-T holds meetings once per year.

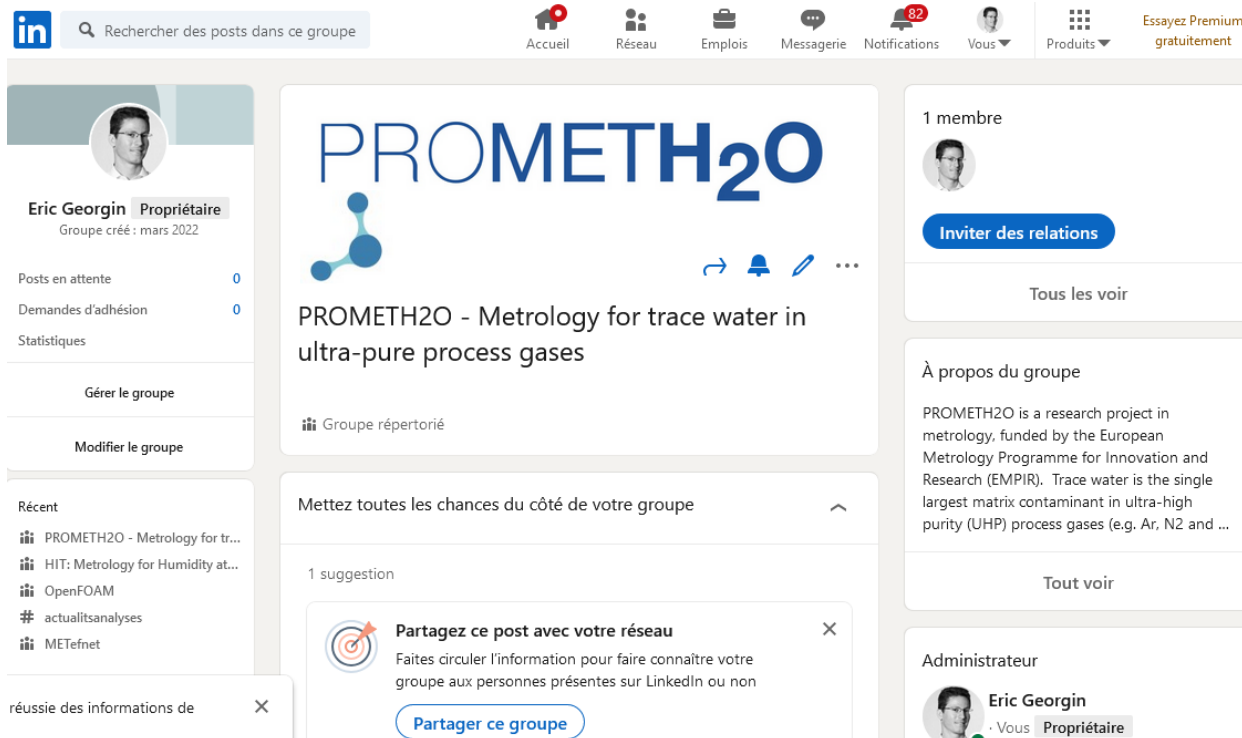
- A4.1.3 dissemination to key standards bodies and committees (**INRIM**, all partners) – **M36**
 - Contact standard committee, technical committee and working group
 - Provide to PL all proof of exchange
 - E-mail, letter, presentation ...

- A4.1.4 \geq 20 presentations (oral and poster) in national or international conferences (**CETIAT**, all partners) – **M36**
 - The target international conferences are:
 - International Metrology Congress (CIM) 2023, International Measurement Confederation (IMEKO) World Congress 2023, World Gas Conference (GAS) 2022, Symposium on Temperature and Thermal Measurements in Industry and Science (TEMPMEKO) 2023, International Temperature Symposium (ITS) 2023, European Conference on Thermophysical Properties (ECTP) 2023, Symposium on Thermophysical Properties (STP) 2024, International Association for the Properties of Water and Steam (IAPWS) Annual Meeting
 - The target national conferences and media are:
 - Electronic Journal e-medida, Spanish Congress of Metrology, Tutto Misure, Revue Mesures
 - See Excel file

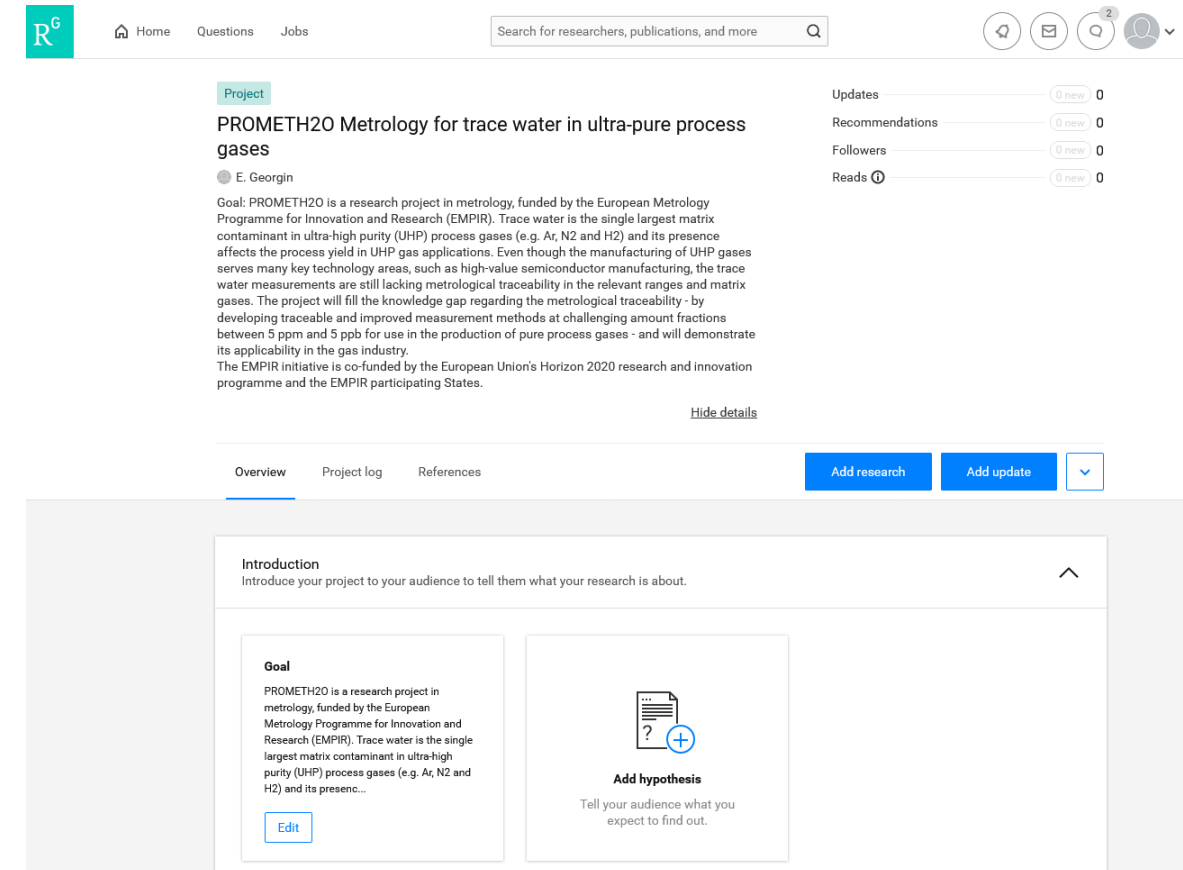
- A4.1.5 \geq 8 peer-reviewed open access publications to scientific journals (**CETIAT**, all partners) – **M36**
 - Typical content:
 - i) ultra-trace water vapour standards, ii) methods and procedures developed to improve the ultra-trace water vapour measurements with their corresponding uncertainty budgets, iii) results on the enhancement factor in real gas matrices and saturation vapour curves
 - The authors will clearly acknowledge the financial support provided through the EMPIR
 - This project (EMPIR 20IND06 PROMETH2O) has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme
 - The authors will ensure that the following meta data is submitted and included for each paper
 - Funder name: European Metrology Programme for Innovation and Research, Funder ID: 10.13039/100014132, Grant number: EMPIR 20IND06 PROMETH2O
 - See Excel file

- A4.1.6 ≥ 4 e-newsletters (**CETIAT**, all partners) – **M9, M18, M27, M36**
 - Please send to eric.georgin@cetiat.fr your inputs : pictures, small texts (typ. half page), events...
- A4.1.7 information package (**CETIAT**, all partners) – **M36**
 - Provide materials to facilitate project presentations and to promote consistency on what is shared
 - **Templates**
 - Presentation
 - Posters (A1: 594 x 841 mm and A0: 841 x 1189 mm)
 - **Activity report**
 - e-newsletter

- A4.1.8 social media account (**CETIAT**, all partners) – **M36**
– **Linkedin and research gate**

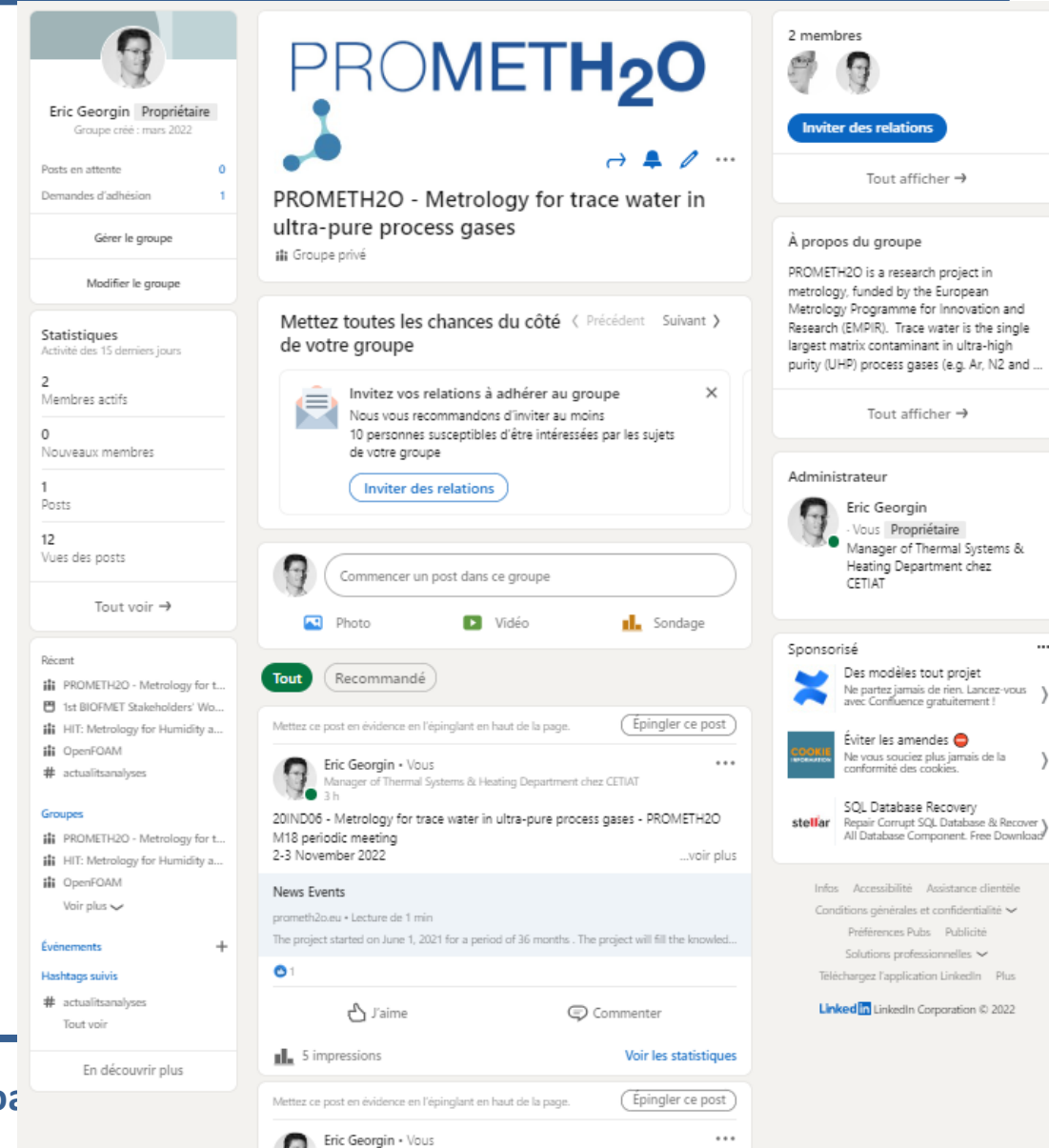


The screenshot shows the LinkedIn group page for PROMETH2O. The group is owned by Eric Georgin and was created in March 2022. The group description is "PROMETH2O - Metrology for trace water in ultra-pure process gases". The group has 1 member and a button to "Inviter des relations". The group is categorized as "Groupe répertorié". The group's goal is to "Mettre toutes les chances du côté de votre groupe". The group has 1 suggestion. The group is also featured in the "Récent" section with a post about "PROMETH2O - Metrology for tr...".

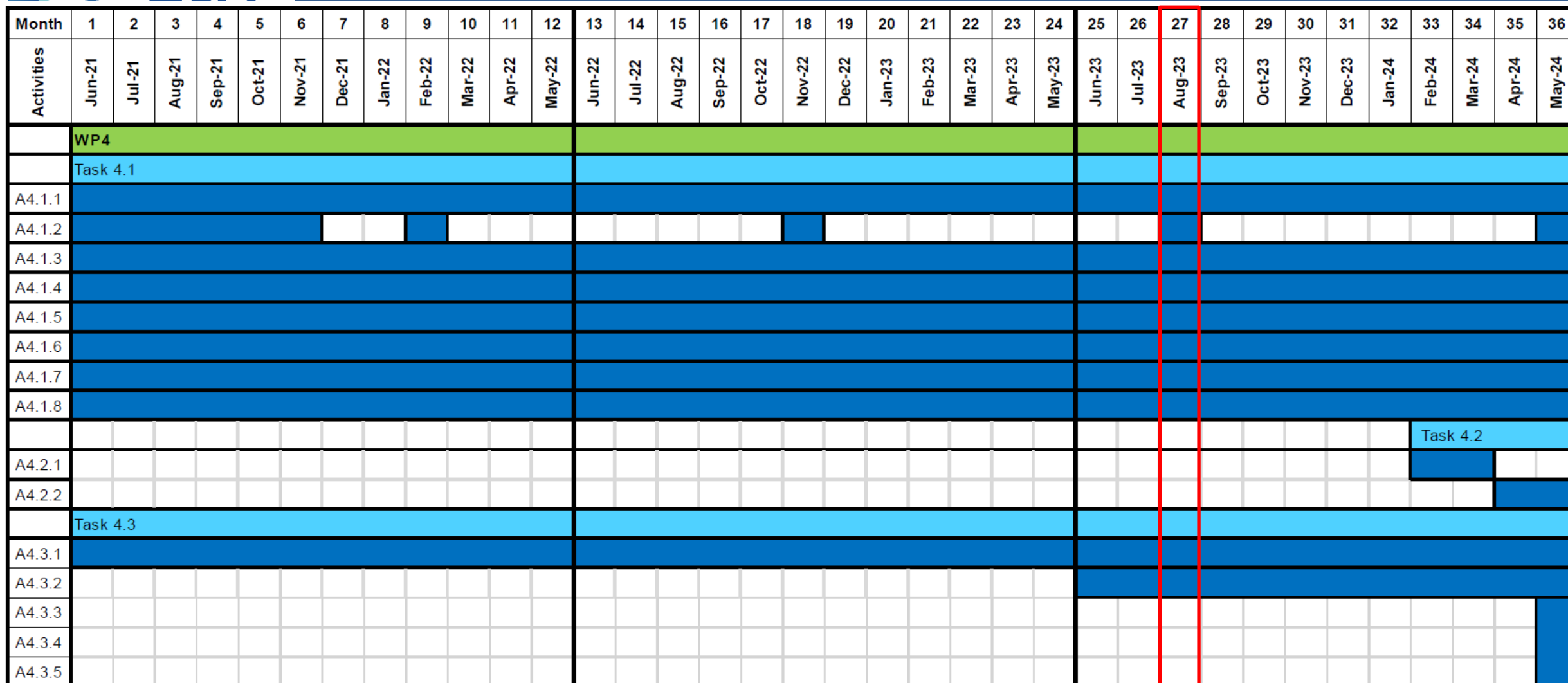


The screenshot shows the ResearchGate project page for PROMETH2O. The project is titled "PROMETH2O Metrology for trace water in ultra-pure process gases" and is managed by E. Georgin. The project description states: "Goal: PROMETH2O is a research project in metrology, funded by the European Metrology Programme for Innovation and Research (EMPIR). Trace water is the single largest matrix contaminant in ultra-high purity (UHP) process gases (e.g. Ar, N2 and H2) and its presence affects the process yield in UHP gas applications. Even though the manufacturing of UHP gases serves many key technology areas, such as high-value semiconductor manufacturing, the trace water measurements are still lacking metrological traceability in the relevant ranges and matrix gases. The project will fill the knowledge gap regarding the metrological traceability - by developing traceable and improved measurement methods at challenging amount fractions between 5 ppm and 5 ppb for use in the production of pure process gases - and will demonstrate its applicability in the gas industry. The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR participating States." The project has 0 updates, 0 recommendations, 0 followers, and 0 reads. The project is categorized as "Project". The project is also featured in the "Récent" section with a post about "PROMETH2O - Metrology for tr...".

- A4.1.8 social media account (**CETIAT**, all partners) – **M36**
 - **Linkedin and research gate**
 - **Subscribe**
 - **Share your news: congress, workshop, article, training ...**
 - **Events and updates: inform WP4 leader for the forthcoming events**

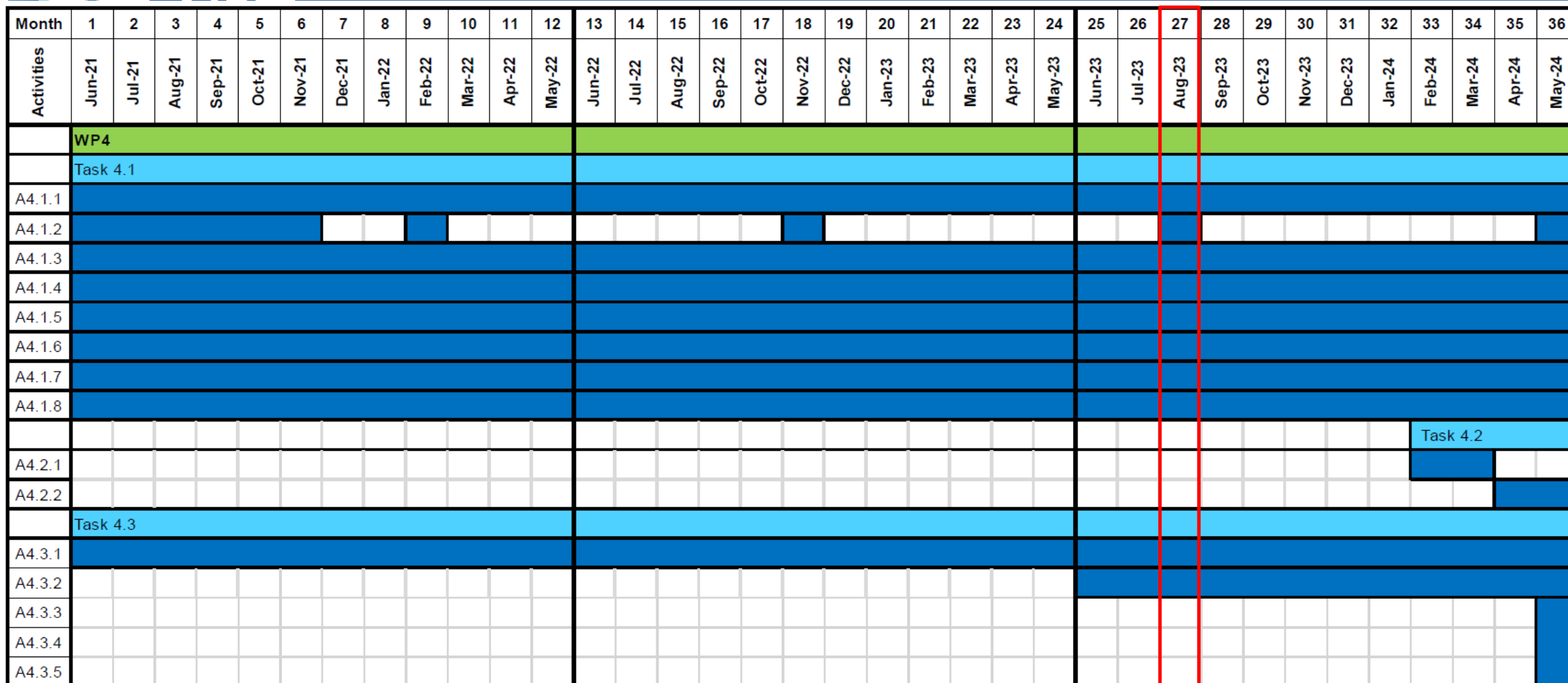


The screenshot shows the LinkedIn group page for PROMETH2O. The group is owned by Eric Georgin and has 2 members. The group description states: "PROMETH2O - Metrology for trace water in ultra-pure process gases". The group is private. The page includes a sidebar with statistics (2 active members, 0 new members, 1 post, 12 views) and a list of recent posts. The main content area shows a post by Eric Georgin about the group's purpose and a link to the group. The right sidebar includes a section for the group administrator, Eric Georgin, and a sponsored section with various advertisements.



- A4.2.1 training course on site and workshop (**Nippon Gases**, all partners) – **M34**
 - The course will be targeted to industry and will consist of one-day training session
 - The course will be provided with special focus on measurements of trace water in ultra-pure gas production and on-site process humidity sensors calibration
 - The course will use data/instruments/methods resulting from A1.2.6 and A3.2.2
 - The workshop
 - The targeted number of attendees is at least 40 for online mode, 20 in presence.
 - **Not yet started**
 - **Need to be discussed**

- A4.2.2 Final workshop and final project meeting (**CETIAT**, all partners) – **M36**
 - The workshop
 - The workshop will be addressed to technicians/engineers/researchers of NMIs, gas and instrument makers, accredited laboratories, and the industry.
 - It will present the results achieved by the project, such as instrument development (A1.2.6 and A3.2.2), trace water standards (A2.1.6) and software tool(s) (A2.3.3)
 - It will allow time for discussion of the results
 - The targeted number of attendees is at least 40 for online mode, 20 in presence.
 - **Combined event during Gas Analysis conference (January 30 to February 1, 2024)**
 - **Workshop and project meeting**
 - **Draft program to be defined by next week**



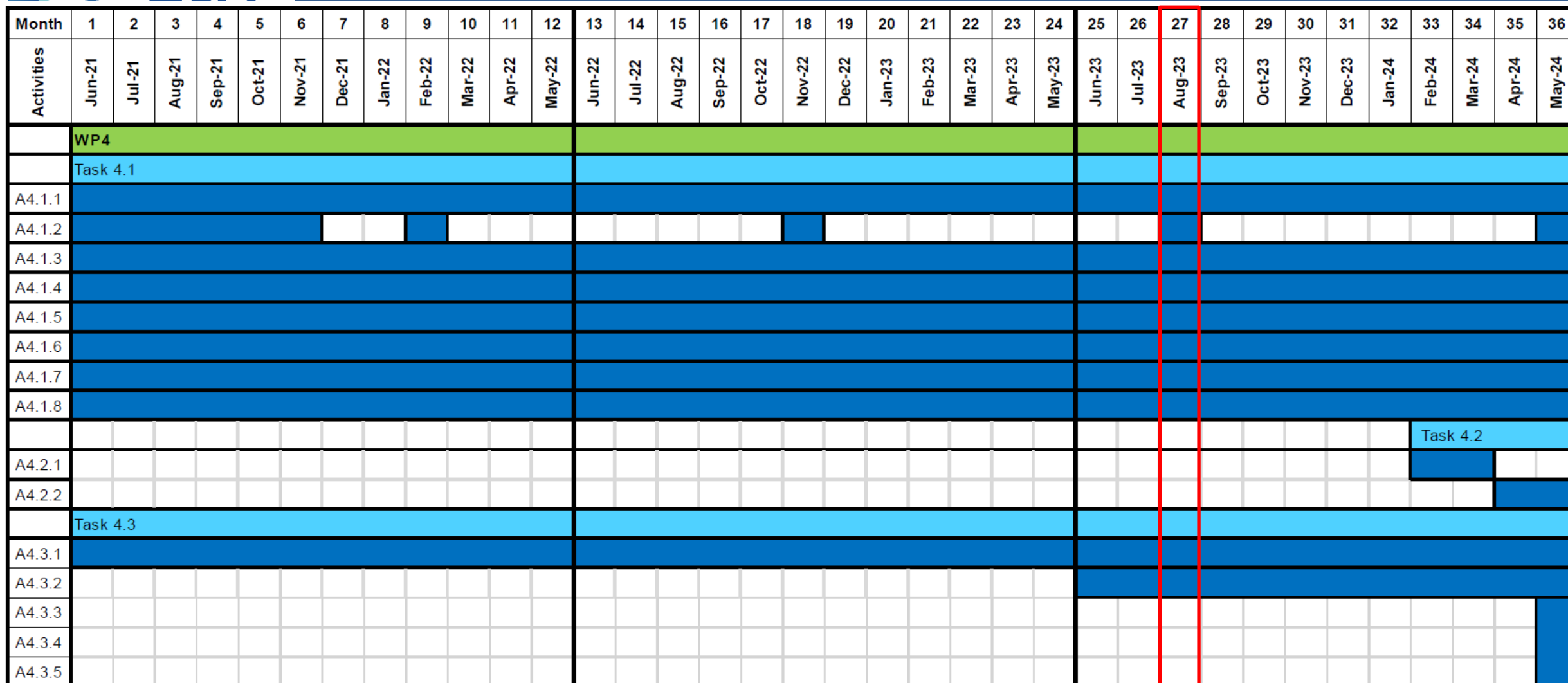
- A4.3.1 Communication and exploitation plan (**CETIAT**, all partners) – **M2, M9, M18, M27, M36**
 - The focus points of this exploitation plan will be to detail how the project will ensure dissemination of the project activities and take up of the technology and measurement infrastructure developed in the project
 - **exploitation_plan_v0.docx**
 - **Update will be done**



- A4.3.2 New primary and reference standards and calibration and measurement capabilities (**CETIAT**, INRIM, VTT, PTB, CEM, UL, CMI) – **M36**
 - Range of generators based on mixed-flow principle extended below -80 °C at pressures up to 1 MPa and with N₂ and air (CETIAT)
 - Range of generators based on saturation down to -105 °C and pressures up to 1 MPa in N₂, Ar (INRIM) and air (VTT)
 - Coulometric generator for water vapour amount fraction between 5 ppb and 5 ppm at 0.1 MPa in N₂ and Ar (PTB)
 - Certified reference gas materials (N₂, Ar and H₂) with trace water vapour (CEM)
 - Saturation-based generator extended below -80 °C at pressures up to 1 MPa operating with N₂ and Ar (CMI, UL)
 - **No input available yet ?**

- A4.3.3 New primary and reference standards and calibration and measurement capabilities (**CETIAT**, INRIM, VTT, PTB, VSL) – **M36**
 - calibration services for hygrometers down to -100 °C in N₂, Ar or air
 - resulting from A2.1.1, A2.1.3, A2.1.5 and A2.2.2 after the project completion.
 - **No input available yet ?**

- A4.3.4 Exploitation of closed-loop trace water calibrator (**Qrometric**) – **M36**
 - Qrometric will exploit the portable, closed-loop, trace water calibrator from A3.2.5 down to -90 °C frost point in N₂ or air
 - No input available yet ?
- A4.3.5 Analysis of trace water vapour in N₂, Ar, and H₂ (**CEM**) – **M36**
 - CEM will exploit the improved analysis of trace water vapour in N₂, Ar, and H₂ from A2.2.3
 - No input available yet ?





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Thank you for your attention

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