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Liste des participants

1. AFNOR
2. Wavestone
3. AGC Plasma Technology Solutions
4. CENAERO
5. GDTech
6. ChemLabServices
7. CRM Group
8. MITIS
9. UTAC
10. Saint-Gobain
11. Touch Sensity
12. HYCCO
13. Institut de la Corrosion
14. TEMISTh
15. Régions Ile de France/Normandie

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AFNOR

Alexandre COLOMBIER

+33 7 72 20 26 47 – alexandre.colombier@afnor.org

AFNOR, French National Standardization Body - NGO

Innovation and Development for Standardization in the Field of Energy Production and Efficiency

More information on https://normalisation.afnor.org/ and https://www.hsbooster.eu/

Unlocking the Potential: Practical Gains Standardization

- Enhanced safety measures and risk mitigation through standardized protocols in hydrogen production, storage, and transportation.
- Increased interoperability and market acceptance by adhering to common standards, promoting a more robust hydrogen ecosystem.
- Accelerated time-to-market for hydrogen technologies due to reduced barriers and streamlined regulatory compliance.

Innovation towards the market: Setting the frame

- Include standardization in your Horizon Europe call and benefit from the platform call "CEN Workshop Agreement" to define the outlines of the future standards based on the solution you have developed through research projects or innovation

More information on : https://www.hsbooster.eu/

How can we help you?

- AFNOR relies on a community of 25000+ technical experts on many fields, we can help in reaching out for potential partners in a consortium. More over, AFNOR is part of a global European network and can reach experts all over Europe
- AFNOR has the ability to do bibliographical mapping on the technical state of the art (standards, best practices) to serve as a basis of work as well as a support for
- AFNOR is link with the national PI organization, to provide a 360° support on innovation
- AFNOR has the platform to build technical standards in Europe to ease the transition from a R&D project towards industrialization and market adoption
- AFNOR is expert in project management and consensus-based animation facilitating group work
- AFNOR will guide in drafting and follow-up of the Horizon Europe Standardization Questionnaire

In practice

HORIZON-CL5-2023-D1-01-03: Climate impacts of a hydrogen economy

- A rigorous assessment of the behaviour of hydrogen in the oxidizing cycles of the atmosphere related to methane, water vapour, carbon monoxide and ozone.
- A rigorous assessment of the ways in which large-scale production, distribution and use of hydrogen (e.g. as an energy carrier or industrial feedstock) can affect anthropogenic radiative forcing.
- Better monitoring tools (methodologies and instruments) for detecting and quantifying hydrogen leakage (in situ or through remote sensing).

CEN-CENELEC GUIDE 39

What are your needs?	What can standardization contribute?	What should you include in your R&I project?
Have a starting point for your project	Standards are state of the art for industrial and societal practices	
Ensure methodological robustness Improve the quality of your project's activities and outcomes Ensure broad applicability of your project results	Ensure compatibility of your results with what is already on the market	A task related to screening of existing standards
	Comply with recognized test methods, health and safety requirements	A standardization partner or subcontractor
Increase the impact of your project Long term dissemination of your results Ensure market acceptance of your project results	Give you access to discuss and promote your project outcomes with stakeholders and potential customers	Task(s) aimed at contributing to new standards
	Disseminate your results to a relevant range of European or world-wide stakeholders	
	Ensure that your project results are known and used by the market well beyond the duration of your project	A standardization partner or subcontractor

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Wavestone

Wavestone works with it’s clients on large transformation programs as well as innovation financing & Management

- Mathias Kechemair- Consultant Energy & Innovation Financing - Wavestone MNU
- Wavestone: Consulting Company
- Manufacturing Energy & Utilities Practice
- Within this practice, Wavestone addresses all the challenges of the actors of those sectors on management & Strategy.
- A dedicated team has experience and expertise working with multi-sectorial consortia for funding through public Grants both national and international. We have experience in supporting actors in their applications, negotiation with the institutions as well as project management and monitoring of funded projects.

Feel free to reach out !

- Mathias kechemair: mathias.kechemair@wavestone.com +33638742166
- Wavestone: Discover the Positive Way

Overview of Wavestone MNU Activities

Industrial Value Chain

- Management of research & Innovation
- Digitalization & Performance of Engineering
- Operational Excellence
- Supply Chain
- Sales & Customer experience

Business Functions

- Finance & Procurement Transformation
- Innovation Financing
- Sustainable Industries

IT & IS roles

- Data and process digitalization
- IS Architecture & transformation

Transformation Management & Assistance

- Change Management
- Large Project management

AGC Plasma Technology Solutions

AGC Plasma Technology Solutions

Offering innovative and clean solutions to deposit functional nano-layers on a variety of substrates by leveraging our experience in **thin film coating technologies.**

Jeroen Schotsaert

Jeroen.schotsaert@agc.com

+32 499 99 30 09

www.agc-plasma.com

A business unit within AGC Glass Europe SA (Industry)

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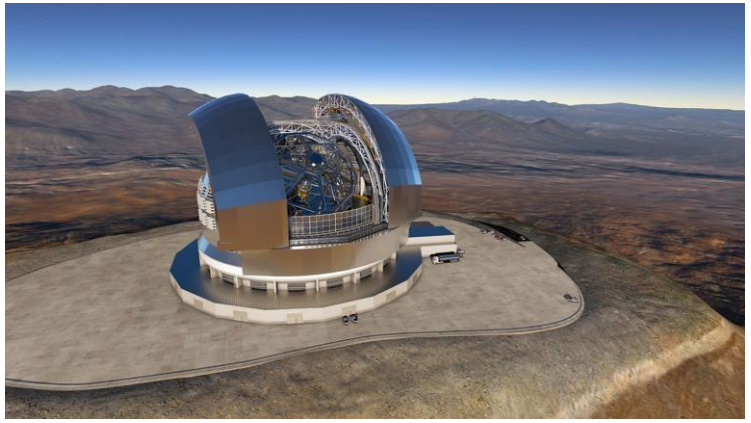
AGC Plasma Technology Solutions

Supplier of industrial vacuum coating equipment

Sheet-to-sheet

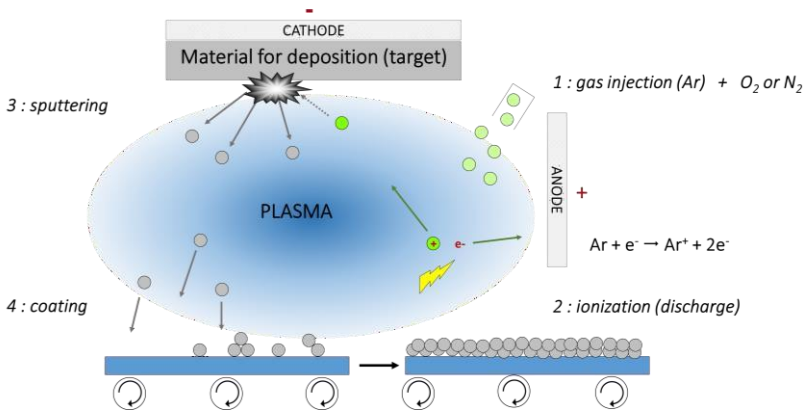
Roll-to-Roll

Custom made



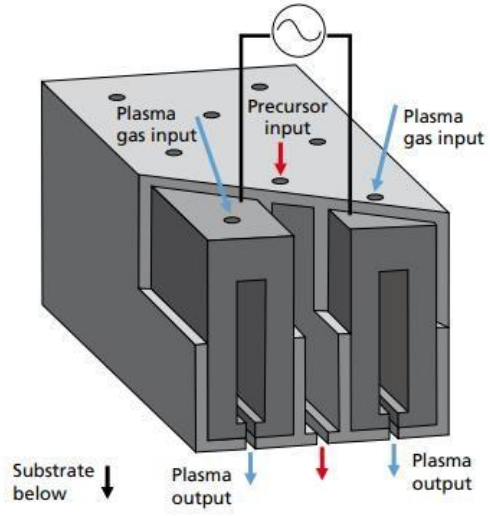
Expertise in PVD and PECVD technologies

Magnetron sputtering



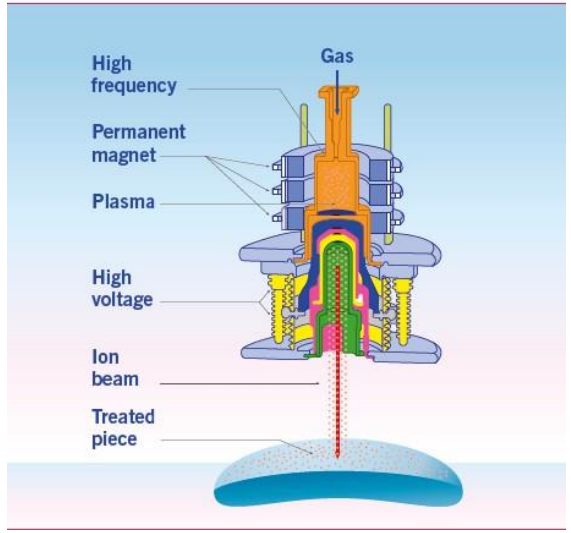
Deposition **of metals, oxides, nitrides, carbides** with superior coating uniformity

Plasma Enhanced Chemical Vapor



High rate deposition of **oxides and oxynitrides** with low internal stresses in the film

Ion implantation



Surface modification by **implantation of nitrogen ions** into glass, metals or polymers

- Offering access to demonstration center with S-to-S and R-to-R pilot coaters for **test campaigns, proof-of-concept and prototyping services**
- Partnering with knowledge centers and start-up's **to upscale** innovative PVD and PECVD **technologies towards industrial scale equipment (**engineering, manufacturing, installation, start-up)
- **Platinum** sputtering capabilities as protective thin film coating for PTL and BPP including glow discharge cleaning of the substrate prior to coating.
- Partner in funded development projects:
  - ✓ NanoBloc (upscaling of anti-bacterial & anti-viral coating)
  - ✓ HeCO2 (methane pyrolysis)
  - ✓ Stellar (Lithium evaporation)
  - ✓ …

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CENAERO

CENAERO in a nutshell

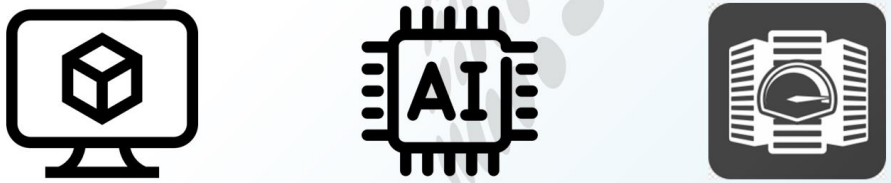
- Belgian private nonprofit **Research Centre** (RTO)
- Located in Charleroi (B) & Moissy-Cramayel (F)
- 85+ employees (PhD's, skilled engineers)
- Background in **digital simulation** for aeronautics
- Operator of a 4 Pflops **HPC**

Pierre-Jean Fondu

- Technology Transfer Officer
- pierre-jean.fondu@cenaero.be
- +32 470 633 475

Synergy of Key Digital Technologies

- **Numerical simulation for multiphysics flows and advanced manufacturing & materials**
- **Artificial intelligence**
- **High performance computing**



www.cenaero.be

Expertise and value proposal in H2 :

- **Production process optimisation** (Steam reforming, Electrolyse)
  - Multiphysics virtual prototypes based on fluid, thermal, electro-chemical models
- **Composite tank**
  - Optimisation of a manufacturing process, specific to H2 tank and reinforcement parts design (confidential)
  - Reliability to impact assessment through probabilistic design (inc. delamination propagation-to-ruin)
  - Health management assessment based on sensors & predictive models
- **Critical component design**
  - Valves & pipes : H2-tight cavity coating quality prediction
  - Additive Manufacturing process control and parts optimisation (i.e. electrodes structuration)
- **Conversion systems**
  - Engine & Fuel cell design & optimization
  - Thermal management (incl. 2 phases flow technologies)
- **H2-to-buildings**
  - Energy digital twins in buildings / cities
  - Energy management systems
  - Simulation environment for sizing production, conversion & storage units in (renewable) energy mix

A few collaborative projects (past & on going)

- **IIS e-WallonHY** : Green H2 value chain development in Wallonia (from production to final application) : H2 to industry, H2 to mobility, H2 to building
- **Inoxypem** : Fuel cell stack optimisation by thermochemical model
- **Loop-FC** : Fuel cell control management
- **Enhance** : Health management of composite structures (digital twin sensors/models)
- **Tioc-Wings** :Impact behaviour prediction of composite structures
- **H2CS** : Development of tools enabling the deployment and management of a multi-renewable energy community with hybrid storage
- **Wal-e-Cities** : Energy digital twins in cities

GDTech

Michael Bruyneel

Michael.bruyneel@gdtech.eu

Scientific director

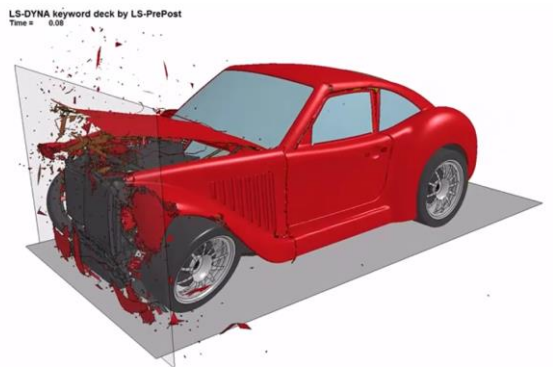
Global Design Technology – GDTech

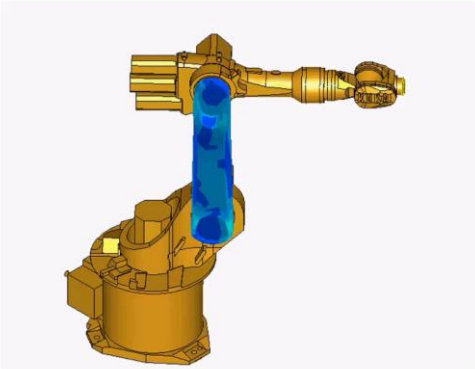
SME – France (Pau) and Belgium (Liège)

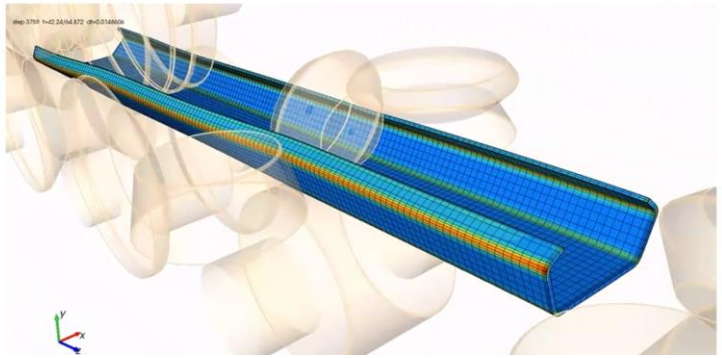
www.gdtech.eu

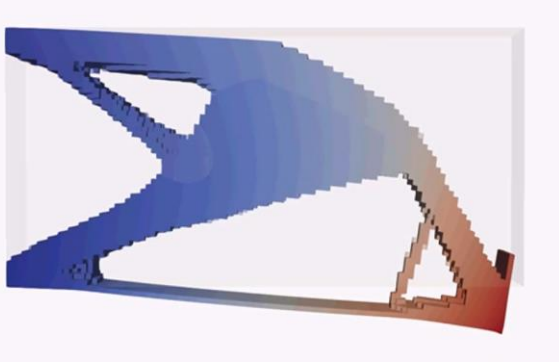
HYVOLUTION
Booths 6C22 and 6D61

Expertise: advanced modelling and simulation (0D/1D/2D/3D), multi-physics, digital twin, numerical optimization





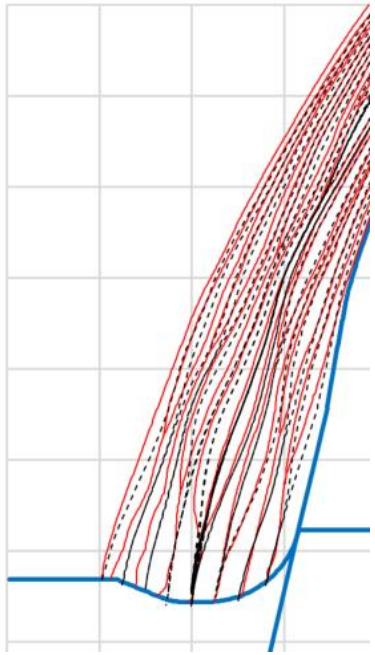




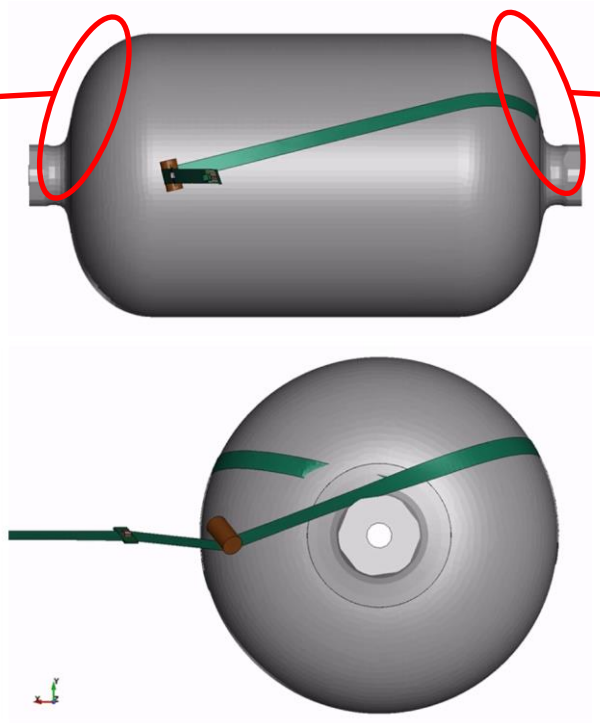
Competence offer: advanced modeling and simulation in the context of H2

- **Design and analysis of COPV (Composite Overwrapped Pressure Vessels):**

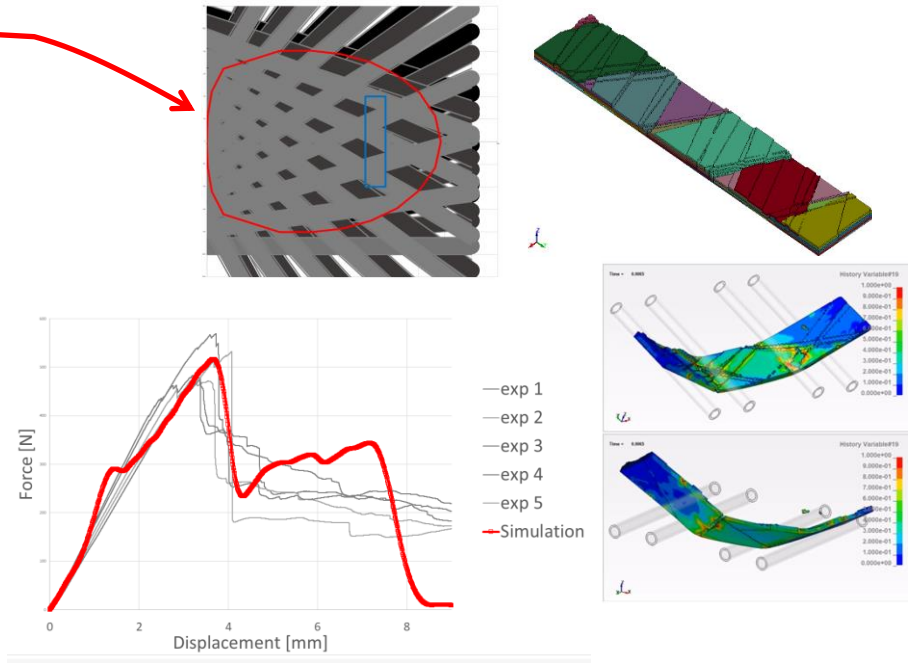
Prediction of layer thickness, interaction with the boss (axisymmetric representation)



Finite Element simulation of Filament Winding process



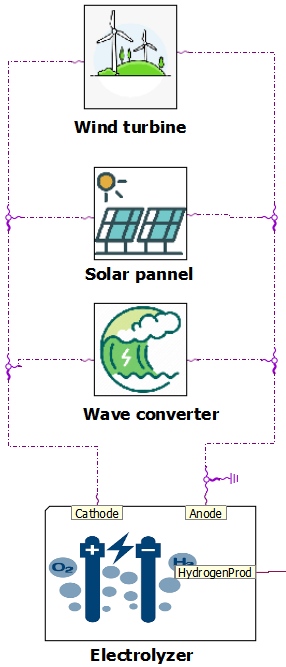
Simulation of damage propagation up to failure in dome area (incl. characterization at coupon level)

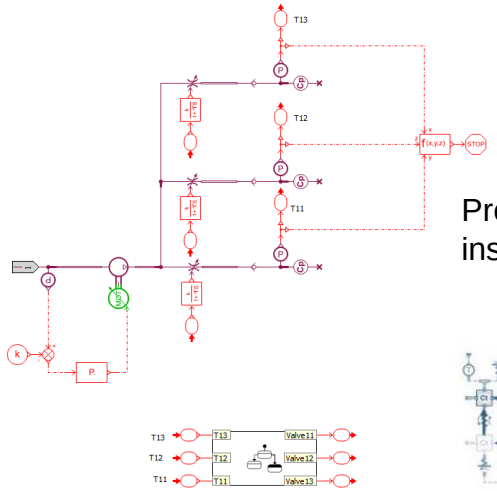


Competence offer: advanced modeling and simulation in the context of H2

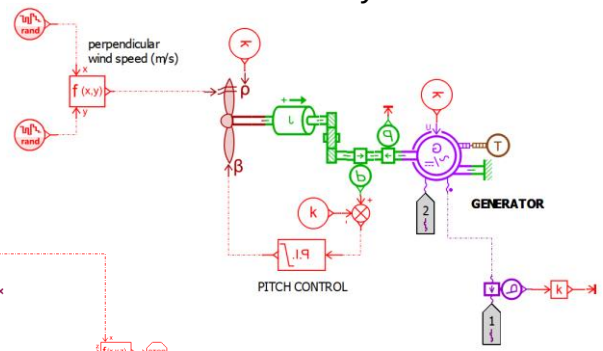
• System modeling (0D/1D)

- From <u>production</u> to <u>final use</u>, via <u>distribution</u> and <u>storage</u>

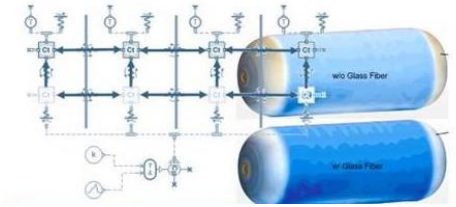




Prediction of the electric power delivered by the turbine

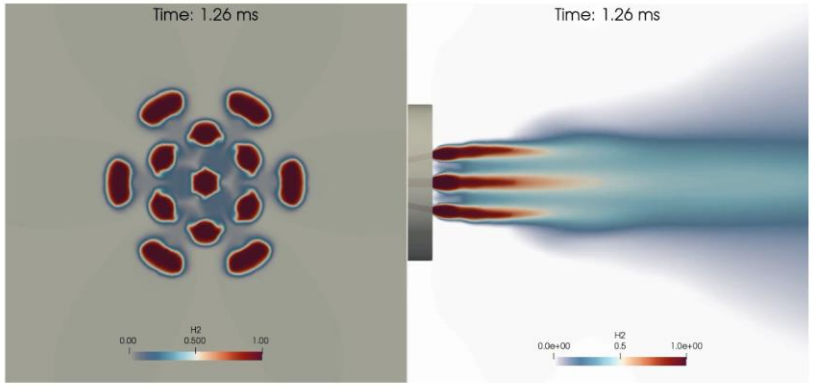


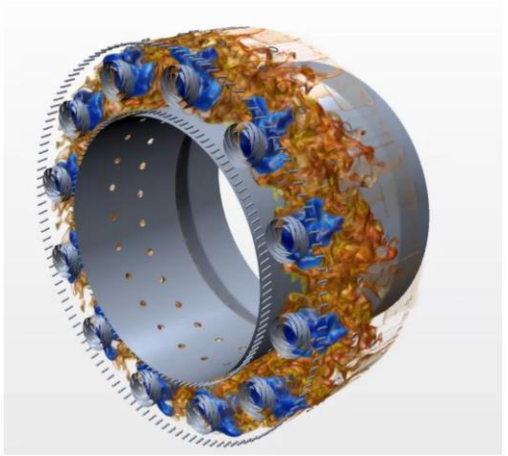
Prediction of behavior inside the storage system



Compressed and cryogenic tank design

• CFD (Computational Fluid Dynamics)





H2 injection

H2 combustion

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ChemLabServices

Introduction:

- Delphine SCHMITT
- CHEMLABSERVICES SAS - SME
- Project Manager
- Chemical analyses expertise

Contact:

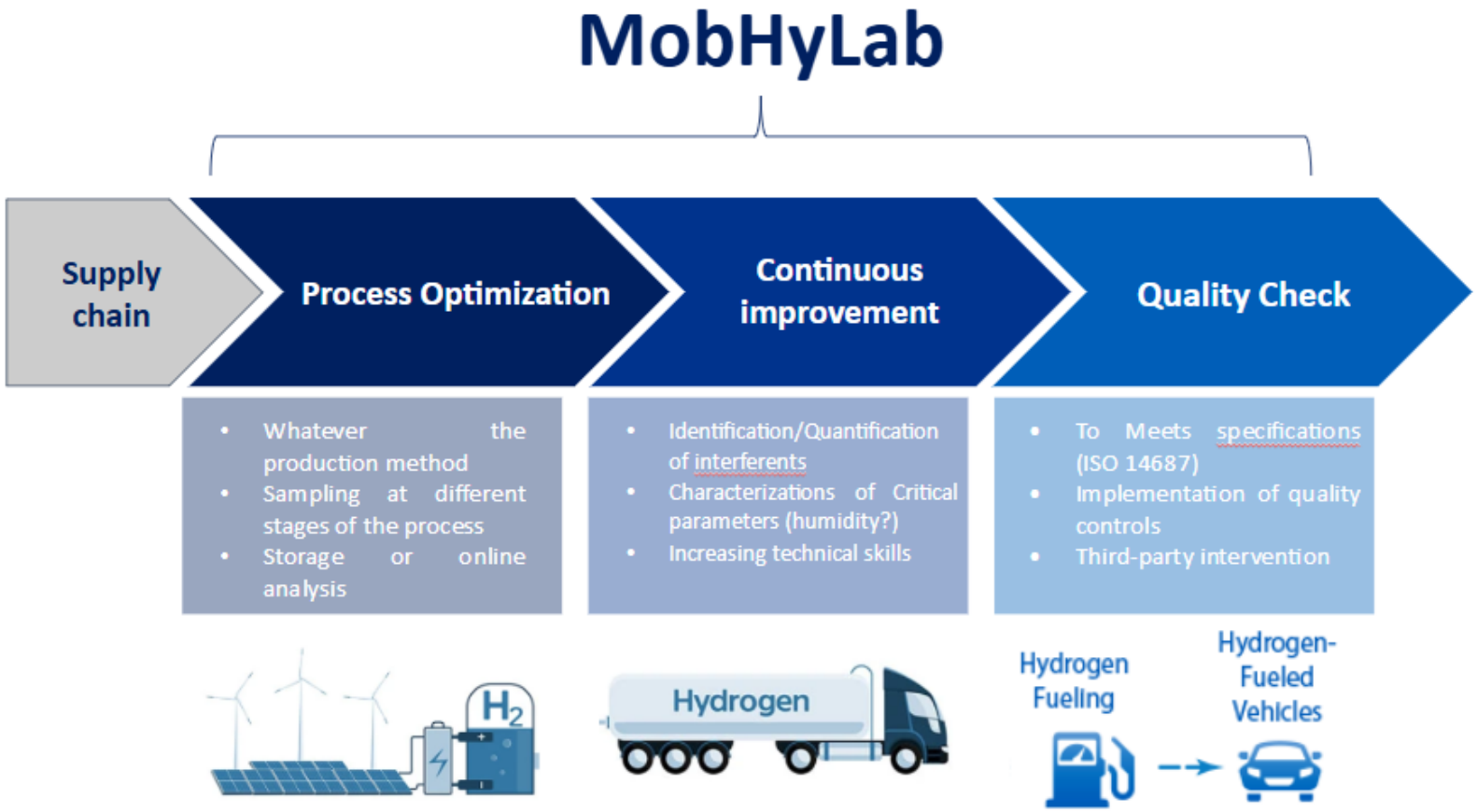
- Email: chemlabservices@gmail.com
- Phone:+33 6 81 75 50 61
- https://chemlabservices.wixsite.com/chemlabservices

a competence offer :

MobHyLab, a tailor-made solution to check gas quality

- Analytical services to support the development of hydrogen's uses (ISO 14687 quality) for example at a hydrogen refueling station
- Service transferable to other gases (biogas, CO2 capture and storage, etc.)
- First time participation to call for projects

a competence offer : MobHyLab, a tailor-made solution to check gas quality



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CRM Group

Ce template doit être rempli **en anglais** afin de pouvoir être ensuite facilement disséminé au plus grand nombre.

Pour rappel, vous devez remplir cette présentation et la renvoyer au PCN (pcn-climat-energie@recherche.gouv.fr) **avant le 24 janvier 2025**, 17H00 (UTC+1).

En cas d'un grand nombre de demandes, la sélection des pitchs sera faite en fonction de la date de réception des présentations.

- Name : Maïwenn LARNICOL
- Organization : CRM Group, ASBL, R&D centre
- Department : A3S/Hydrogen & Electrochemistry
- The Expertise of this Department / team :
  - Product and process development : prototypes at pilot scale
  - Development of components for electrolyzers
  - Measurement of diffusible/total hydrogen, gas-metal interaction
  - Mechanical and corrosion characterization under hydrogen
  - Materials and components characterizations
- Contact : maiwenn.larnicol@crmgroup.be (+32 474 24 52 12)
- Web page : http://www.crmgroup.be/

Test benches and R&D activities for addressing hydrogen challenges GH2 et LH2

Thermal Desorption Analysis
Embrittlement
Electrolytic & gaseous charging
Electrolytic permeation
Electroplating
High Temperature H_2/H_2O steam interactions
Corrosion tests

Coating technologies booths
Roll-to-roll pilot lines
Laser treatment
Tensile-fatigue machines
Hydroforming press

Alkaline Electrolyzer : cells and stack
Electrochemical devices & methods
Membrane development

Dynamic Tube Rupture Test at 10-100 bars
High Pressure permeation up to 1000 bars
High Temperature permeation up to 800°C

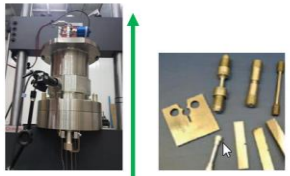
Location of the platform
Site BEBLUE, Liège

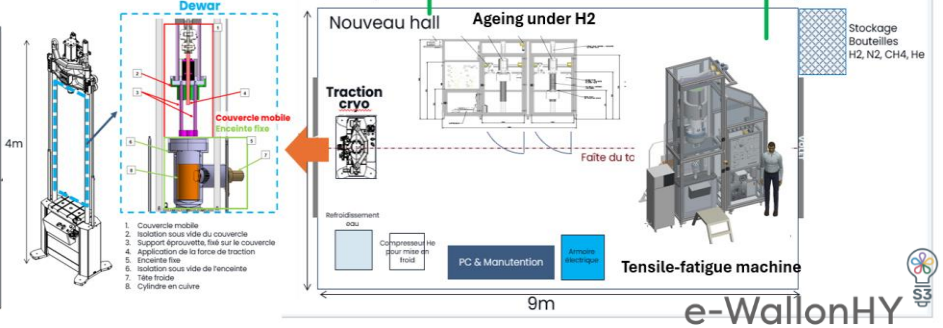
MaterHYum Platform covers the hydrogen environmental conditions for liquid and gaseous state (LH_2 & GH_2)

Gaseous H2 charging

2 autoclaves 4,5L :
- 100 bars H_2 [20°C ; 450°C]
- 700 bars H_2 [20°C ; 200°C]

Tensile-fatigue machine under gaseous H2
Up to 500 bars H_2 [-20°C ; + 200°C]





Cryogenic tensile-fatigue machine
- Brand: MTS
- Height: 4 meters
- Hydraulic cylinder: 250 kN
- 2 force cells: 250 and 100 kN

Equiped with a Dewar:
- Insulated chamber containing a gas at atmospheric pressure (He or H2)
- Cooling system at 20K (CryoMech brand cryogenerator)

e-WallonHY
H2 innovation hub

CHP25 : search of partners / consortium to join

HORIZON-JU-CLEANH2-2025-01-03: Scale-up and Optimisation of manufacturing processes for electrolyser materials, cells, or stacks

CRM Research activities

- Development of innovative products to accompany industrial implementation: electrolyzer and fuel cell components; protocoles;
- Development of barriers to hydrogen
- Metal-hydrogen and metal-gas interactions

Our technical expertise

- **Upscaling technology : electrolyzer test benches**
- Electrochemical characterizations, benchmark of solutions
- Coating deposition : roll-to-roll PL and 3D equipment
- Surface finishing
- Experimental data supply for lifetime assesment

HORIZON-JU-CLEANH2-2025-02-01: Development of mined, lined rock cavern for gaseous hydrogen storage

CRM Research activities

- Understanding the impact of hydrogen on steel, including fatigue and fracture (capacity to perform low-cycle fatigue with large strain) and to deliver data to validate simulation based on rupture mechanics, fracture propagation, plasticity theory.
- Research on steel corrosion, crevice corrosion, and hydrogen quality after storage and withdrawal.

Our technical expertise

- Determining appropriate steel grades for hydrogen storage, including testing the impact of welds and residual stresses
- Thermomechanical testing and crack propagation under hydrogen
- Equipment and expertise to characterize corrosion
- Desorption, permeation and embrittlement tests under hydrogen

HORIZON-JU-CLEANH2-2025-02-02: Development of cost effective and high-capacity compression solutions for hydrogen

CRM Research activities

- Upscaling of technologies and development of innovative products for industrial implementation
- Prototype building
- High pressure testing expertise under various gases
- Understanding of metal- hydrogen interaction and metal-gas interaction (H embrittlement)
- Development of barrier to hydrogen and coatings with surface properties (low friction coating + characterization methods)
- Permeation of materials under hydrogen
- Post-mortem analysis and root cause analysis

Our technical expertise

- 3D equipment for low friction coating deposition
- Surface finishing (mechanical, chemical and electrochemical)
- Characterization of coating friction and wear.

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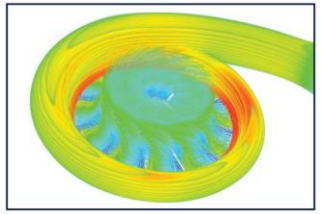
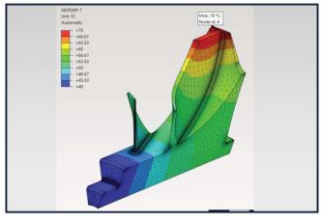
MITIS

MITIS (booth 6C22)

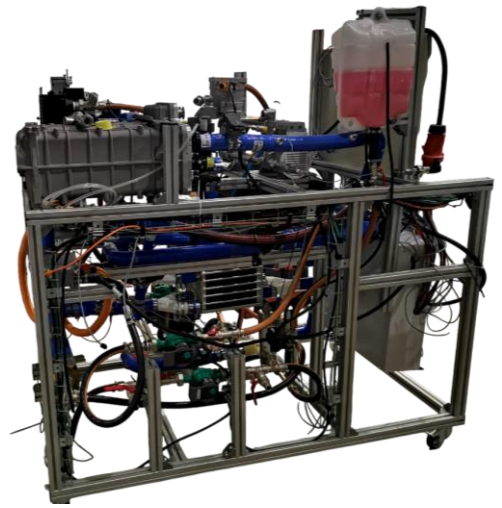
- Located in Liège (Belgium)
- 18 employees (SME)
- Team R&D:
  - Construction and instrumentation of prototypes, tests
  - Numerical simulations (CFD, FEA), rotor dynamic, advanced modelling (Simulink,…)
- Team industrialization:
  - Electronics (electronic board development, power management, …)
  - Design (P&ID, CAD, DFMEA,…) + Assembly
  - Manufacturing capabilities



Aerodynamics



Structural Integrity



Adrien Châtel
Project engineer
MITIS SA
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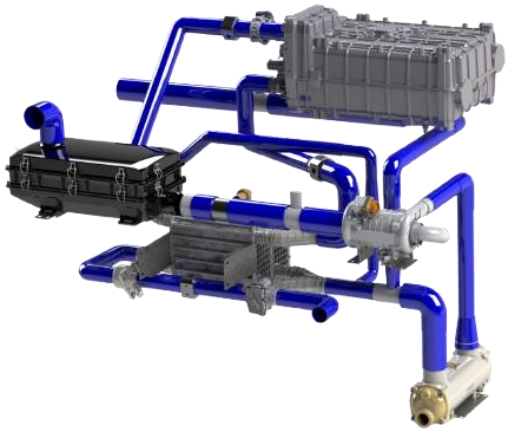
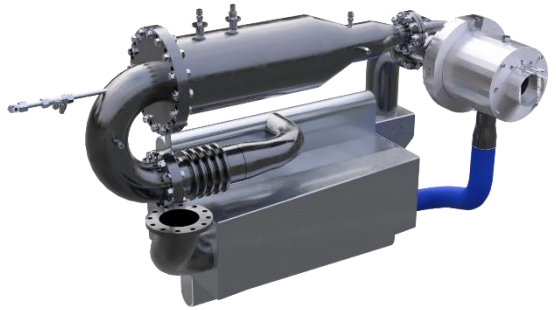
+32 (0) 492 49 55 88
https://www.mitis.be/

Our ambition: ***Reduce GHG and therefore mitigate the effects of climate change by means of new decentralized power generators***

Our mission:

- Develop new generation of decentralized power generators
- Being clean and efficient
- Renewable friendly





Our offer:

- Multi-fuel flameless microgas turbine and PEM fuel cell
- Services for technical problems or new developments
- Innovative products for critical fluids or gas flameless combustion process
- Innovation in sustainable energy as a high-tech manufacturer
- Innovative test bench and prototype instrumentation

Projects:

- Fit4Micro (Horizon Europe): coordinator
- Hyguane (ESA founded project)
- RESTORE (CET Partnership): coordinator
- Cryogenic compander: industrial project

Prospects – looking for consortium partners in:

- Aero and space market
- Biogas/biofuels market
- Energy transition projects (fuel cell in marine and stationary applications, micro-CHP, …)

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UTAC

- José FERNANDES
- UTAC SAS
- Technical service , vehicle test laboratory
- Expertise department
- Type Approval, testing

Contact:

- jose.fernandes@utac.com/tony.perkins@utac.com
- Tel:(+33) 6 43 32 24 53
- https://www.utac.com/

Previous experience

- Supporting bus manufacturers to certify their new technology buses.
- Supporting SMEs and technology innovators, such as the development of a hydrogen fuel cell truck.
- Running events for customers to market their products.

Service offering for hydrogen vehicle development

- Millbrook Proving Ground, UK
  & Mortefontaine, Montlhéry, FR
- test tracks FR and UK
- Suitable for passenger cars and heavy-duty vehicles
- Off-road tracks
- Workshops
- Office space
- Hydrogen refuelling to 350bar (700bar planned) in UK
- Heavy-duty chassis dyno facility

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Saint-Gobain

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SAINT-GOBAIN

Booth 4R92

Thin Films and Coatings Competencies of Saint-Gobain

Capucine TONG
R&D Engineer, PhD
capucine.tong@saint-gobain.com

1. Saint-Gobain

- Industrial company **founded in 1665**.
- Leader in construction and high-performance materials.
- **€47.9bn** turnover in 2023.
- Present in **76 countries**.
- **160 000 employees**.

2. Saint-Gobain Research (SGR)

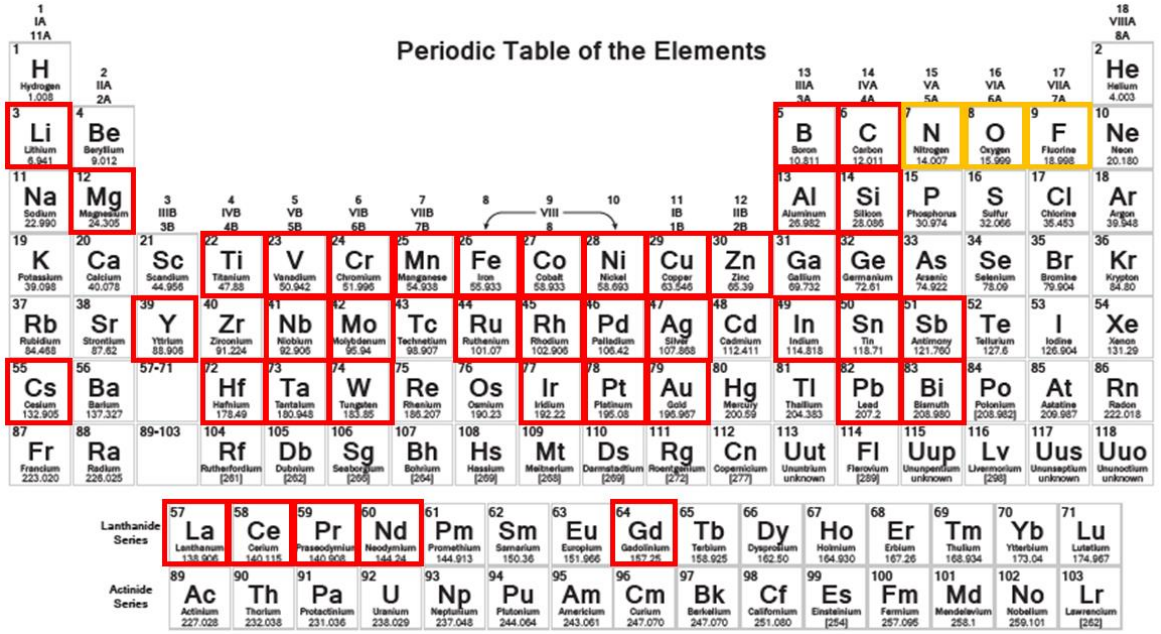
- 8 R&D centers (4 in Europe): **4000 researchers**.
- Innovation efforts focused on customer needs.
- **Open innovation approach:** Partnerships with start-ups, academic and corporate entities.

3. Thin Films Department

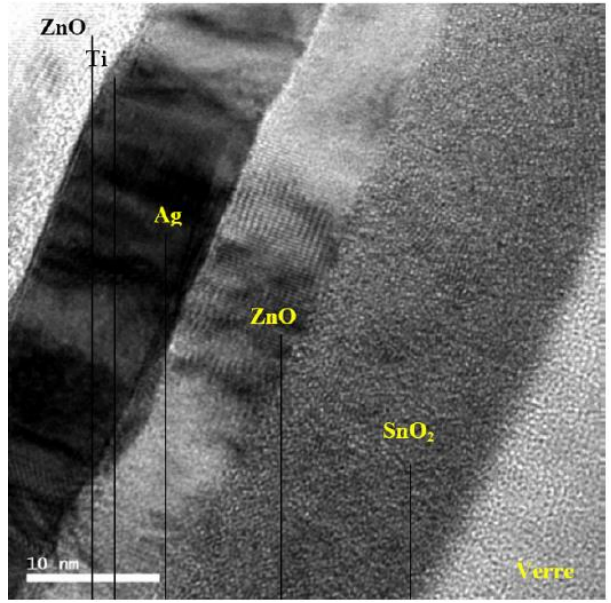
- **Magnetron sputtering & wet-deposition** processes on various substrates
- From small to large-scale coatings, innovation in materials and processing.
- **Pilot & Industrialization**.

Materials we can deposit by magnetron sputtering

Target



Nano coatings



- **Targets:** Ceramic & metal, various alloys + reactive gas for compounds.
- **Coating thickness range:** 0.1 nm to > 1 µm
- **Porous and non-porous substrates:** glass, polymer, ceramic, etc.

Ability to produce home-made targets of desired composition (*www.coatingsolutions.saint-gobain.com*)

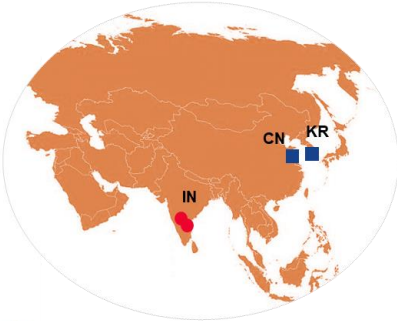
Coating innovation capabilities at R&D level and global footprint

< 10 x 10 cm^2 → 3.2 x 6 m^2

R&D

Pilot line

Industrialization



Hydrogen focus areas:

- Catalytic coatings
- Protective coatings for bipolar plates
- Gas permeation membranes
- Etc.

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SAINT-GOBAIN

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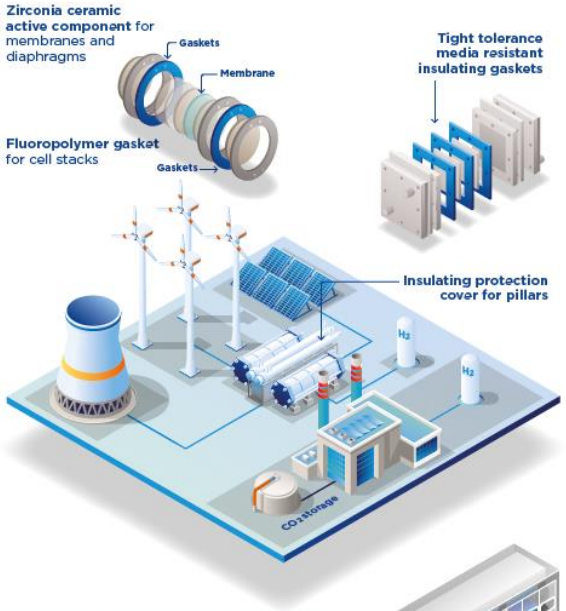
Existing Saint-Gobain solutions for the Hydrogen market

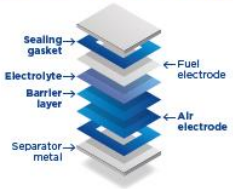
PRODUCTION

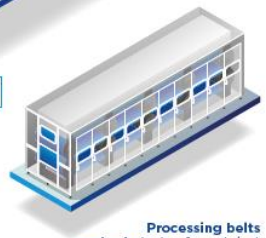
COMPONENTS AND MATERIALS FOR ELECTROLYZERS

PEM & ALKALINE ELECTROLYSIS



SOLID OXIDE ELECTROLYSIS





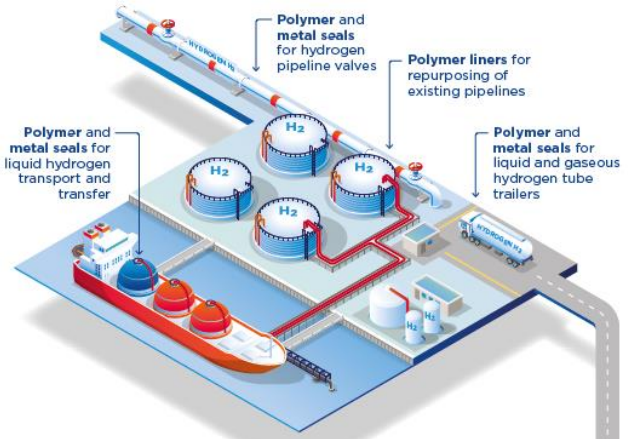
Processing belts and substrates for catalyst coated membranes (DECAL process)

Ceramic solutions:
customized powders and slurries, conductive ceramics, functional layers, cermet glass sealing, stack, module and system design

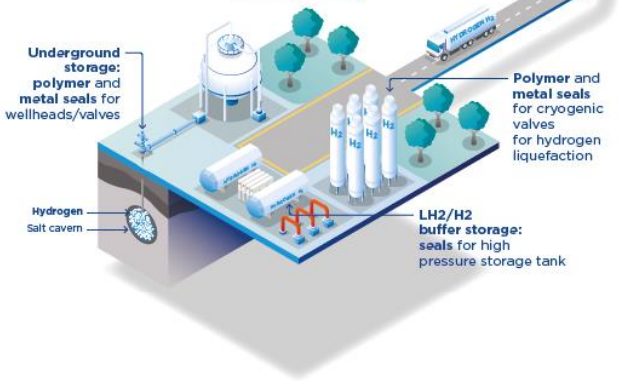
TRANSPORT AND STORAGE

POLYMER & METAL SOLUTIONS FOR TRANSPORT AND STORAGE

TRANSPORT



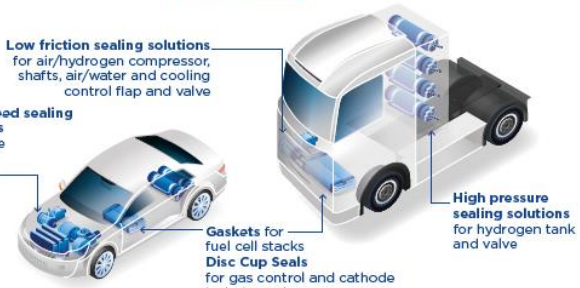
STORAGE



MOBILITY, REFUELING & INDUSTRY

SOLUTIONS FOR MOBILITY & INDUSTRIAL APPLICATIONS

MOBILITY



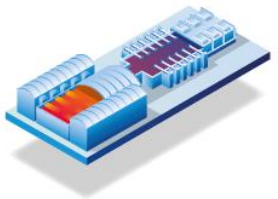
H2ICE flip and metal seals for injection and exhaust manifold

REFUELING

Sealing Solutions for refueling stations:
HP buffer storage, tank type IV, GH2 nozzle, HP compressor booster, LH2 pump, valves breakaway couplings

INDUSTRIAL APPLICATIONS

Refractories for glass floats and for industrial furnaces (green steel, glass, alumina)



Total burner solutions: silicon carbide inserts to improve combustion & energy savings while reducing NOx levels

https://www.saint-gobain.com/

Touch Sensity

TOUCH SENSITY

Deeptech SME Company
Innovative Structural health monitoring solutions

Contact

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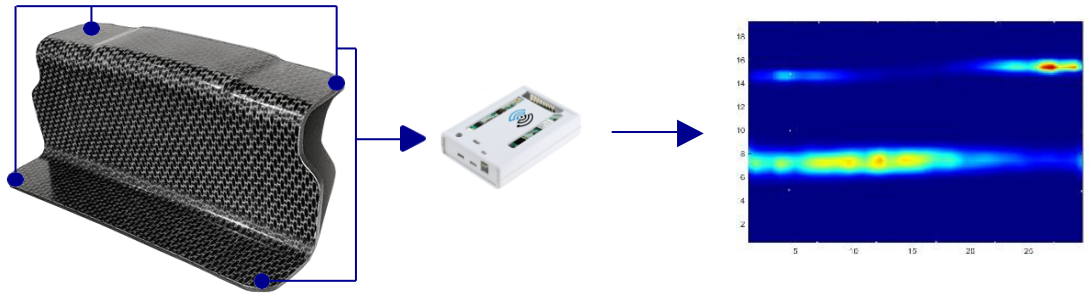
Laetitia.Lafforgue@touchsensity.com
France +33 (0) 6 58 43 03 54
www.touchsensity.com

Touch Sensity :

Touch Sensity develops a new monitoring solution for the SHM market :

- **Global** solution with **internal** and **structural vision**
- **Continuous** monitoring and reversible and irreversible events detection
- Complete **data acquisition and analysis** system raising alerts
- **Minimally invasive, robust,** easy to integrate and adaptable to all sizes

An innovative and patented technology to monitor the structural health state of a material :



- 2D or 3D mapping of the material's structural state
- Innovative peripheral instrumentation if needed
- Connected system to stimulate the material and read its response (electrical signal)
- Relative data: comparison with an initial or simulated state of the part
- Data transmission to a terminal (PC, mobile device or in-vehicle)
- Association with physical data
- Low on-board system power consumption (mA and 5-12 V)

Since 2019 :

Touch Sensity has been working with over 25 European customers in the Aerospace, Defense, Energy, Railway, Naval and Automotive sectors.
With an experienced team of 15 people specializing in embedded systems, signal processing, materials characterization and mathematical algorithm development.

SMART HYDROGEN TANK

Providing a **Smart** and **Communicative Tank** to industrials through its **Monitoring**.

Optimize sizing to iso-security :

- Challenge **current regulations**
- Reduce **current security coef** (2,5)
- **Increase security** and safety (while filing and in operation)
- **Reuse tanks** into new vehicules
- Assess **rest lifetime**
- Reduce **inspection costs**

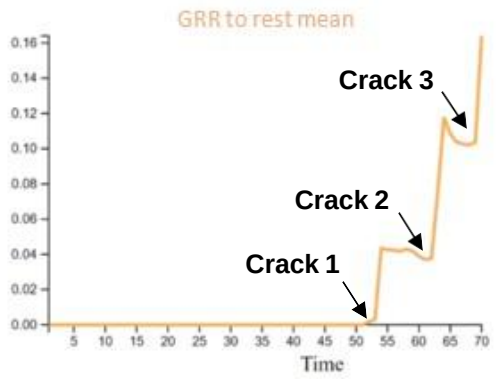
Provide Tanks Digital Passport :

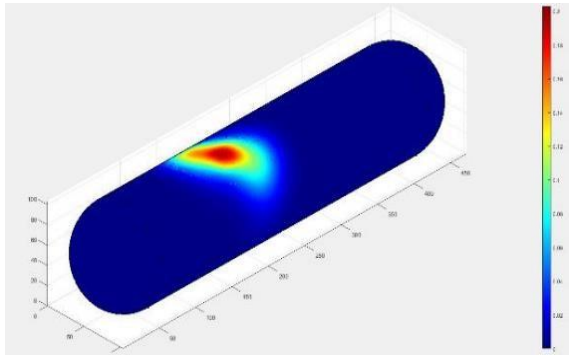
During manufacturing
- Manufacturing monitoring
- Parameters optimization
- Reduce material scrap

On test benches
- Data enhancement
- Deepen material knowledge
- Evaluate material health under mechanical stresses

During operation
- Reduce maintenance costs
- Optimize processes
- Increase security

During repair
- Reduce tanks replacement
- Repairs' historic
- Healthy tanks reuse





SMART HYDROGEN TANK

Integrations :

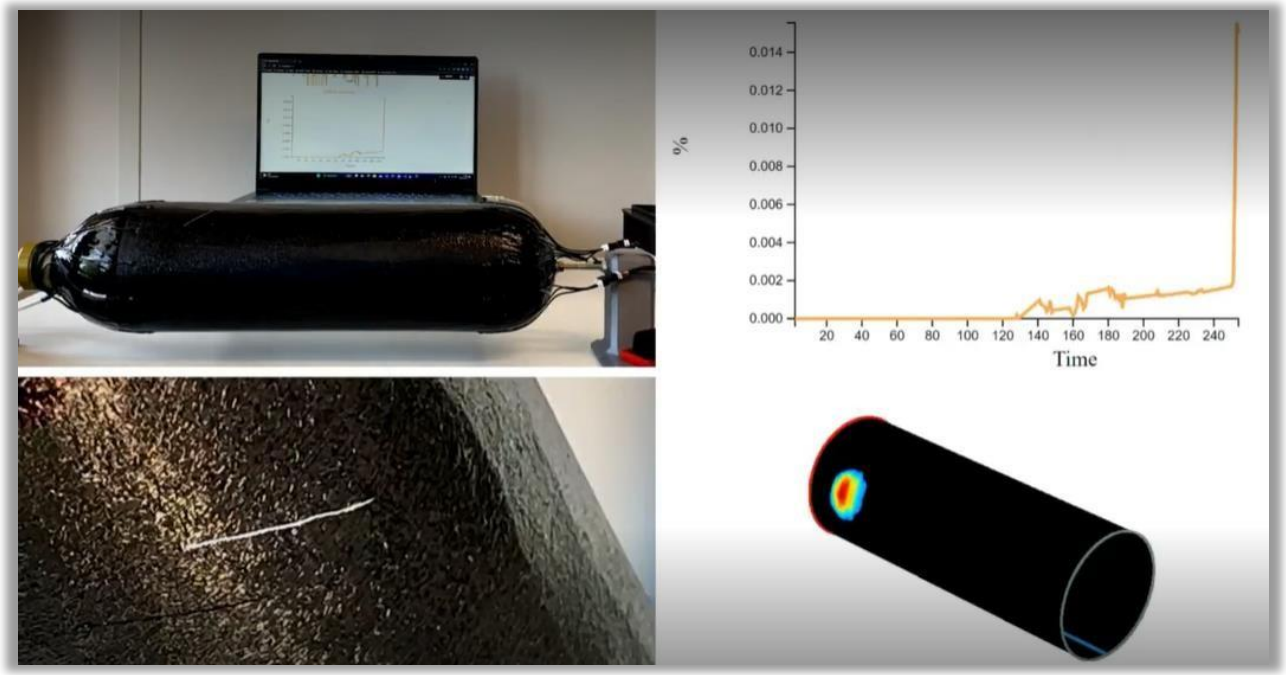
- Direct integration into the vessel materials: **surface and volume monitoring**
- Use of a coating (sprayed or deposited paint): **surface monitoring and extrapolation for in-depth analysis**

Information provided :

Altered zone localization	**Accurate localization**
Damaged global state (ON/OFF)	**Alteration intensity**

Solution characteristics :

- Entire delamination and fiber breaks monitoring (**from 1 cm**)
- Deep detection: swellings, scratches, shocks, cracks, etc.
- Swelling monitoring (**from 0.05%**)
- Temperature : **- 40°C to 120°C**
- Lifetime : **300 000 fatigue validation cycles** (for system and monitoring capability) equivalent to more than 20 years



PARTNERSHIP FOR COLLABORATIVE AND INDUSTRIALS PROJECTS :

- Hydrogen tanks manufacturers (HP, liquid, etc.)
- Vehicles manufacturers for tanks retrofit (monitoring, reuse, increase reliability, etc.)
- Technological research centers (laboratories, tests, etc.)

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HYCCO

Ludovic Barbès
Chief Industrial and Financial Officer
Co-Founder

Phone : +33 6 49 49 45 41
E-mail : ludovic.barbes@hycco.fr

www.hycco.fr

The most compact, durable, lightweight, scalable bipolar plates available on the market.

NEXT GENERATION CARBON FIBER BIPOLAR PLATES

Evaluate our technology in a representative environment

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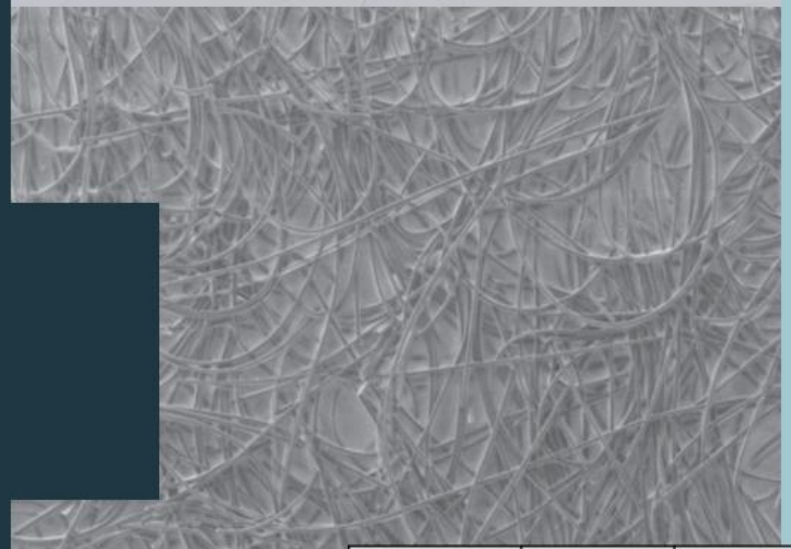
HYCCO BIPOLAR PLATES

Focus on our material

Drastic increase in power density +60% (up to 7.5 kW/kg)

- Maximum use temperature: **180°C**
- H_2 Permeability: **< 4.55 x10^{-5} mol/s/m²/MPa**
- ASR **< 10 mOhm.cm²**
- Density: **1.48 g/cm³**
- Young modulus: **20 Gpa**
- Tensile strength: **90 Mpa**
- Flexural strength: **> 3 GPa**



X4 Durability

Weight -70%

Similar compactness

	Graphite / Composites	Expanded Graphite	StainlessSteel 100 µm	HYCCO 200 µm	HYCCO (2024) 150 µm
Lifespan (hours)	+30 000	+30 000	10 000	+30 000	+30 000
BPP Thickness (mm)	3.60	1.55	0.80	1.09	**0.90**
Power density (kW/kg)	1.2	3.8	4.0	**5.6**	**7.5**

Material developed for:

HT & LT PEM Fuel Cells & DMFC

REDOX Flow Batteries

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HYCCO BIPOLAR PLATES

How to integrate HYCCO tech ?

From project inception to production

Engineering service
- Co-development of OEMs, Tier 1 & SME's next stack generation
- Prototype manufacturing

Bipolar plate manufacturing
- High precision mold
- Plate manufacturing
- Plate assembly
- Plate gasketing
- Quality control

In-Situ & ex-situ testing
- Performance analysis
- Durability testing
- Polymer qualification
- Elastomer & glue qualification

Engineering service



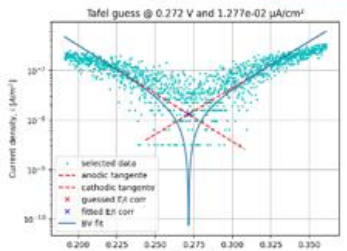


Bipolar plate design | *Mold design* | *Sealed & assembled BPPs* | *Prototype assembly* | *Stack testing*

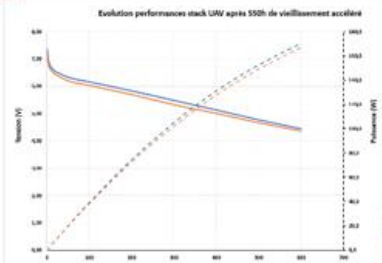
Bipolar plate manufacturing

- *Assembled & sealed plates*
- *100% qualified*
- *Ready to stack*
- *In-house production*

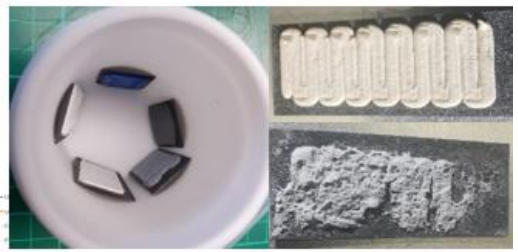
In-situ & ex-situ testing



Acceletated ageing test



Performance test



Elastomer qualification

Partnerships

Past / current

- MangabHy : hydrogen drone
Delair, ISAE, Pragma
- RUP Estonia : portable power generator
PowerUP energy
- NeGerHy : heavy duty Fuel cell
Illuming Power, Hynology
- Joined development agreement
Siensqo, Arkema, Datwyler

Foreseen

- Improvements in lifetime and cost of low temperature electrolysers by introducing advanced materials and components in stacks and balance of plant

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Institut de la Corrosion

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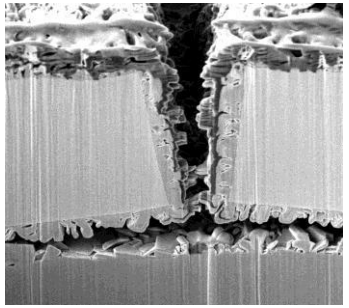
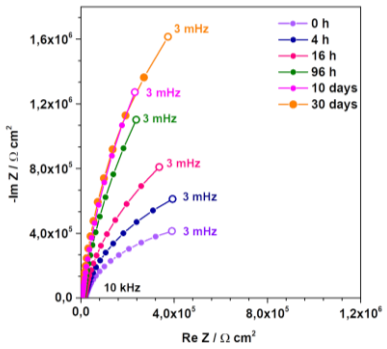
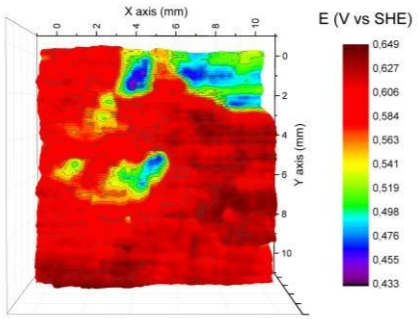
https://www.institut-corrosion.fr/

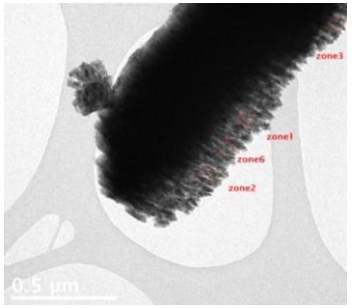
Institut de la Corrosion
French Corrosion Institute

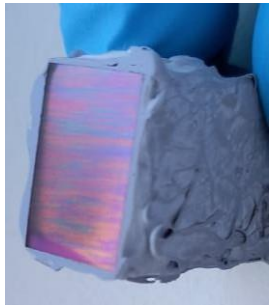
- **Institut de la Corrosion is** non-profit private research organization founded in 2002 (RTO)
- 56 coworkers (60% Ph.D. and engineers) on 3 sites (Brest, Saint-Etienne and Lyon).
- Industrial and academic research in many industrial sectors, including hydrogen technologies.
- **Extensive expertise in European projects** spanning from low to intermediate TRL.
- Site of Brest: R&D activities on corrosion and corrosion protection in water electrolysis systems.
- Site of Saint-Etienne: R&D activities on hydrogen material compatibility (transport and storage).



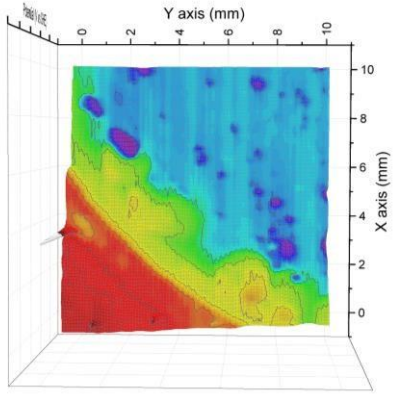


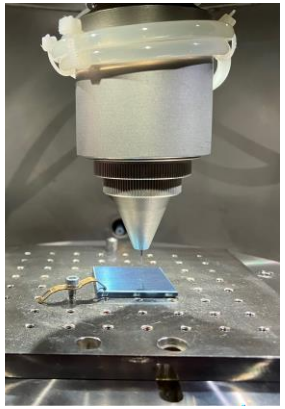






Bertrand Noharet – Business development bertrand.noharet@institut-corrosion.fr





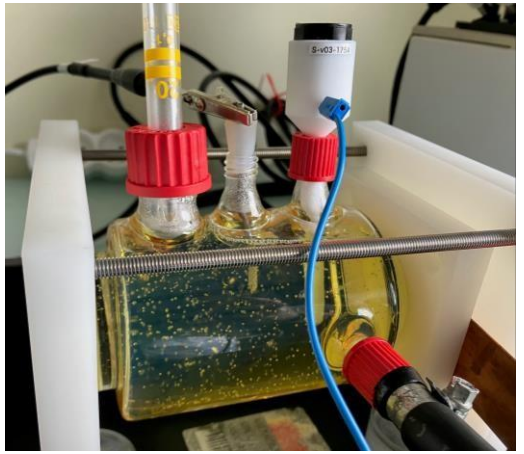
Examples of ongoing European projects:

"**UNICORN**" (CETP, 2023-2026, 7 partners) **TRL 3-6,** Development of the next generation of more cost-effective, more environmental-friendly PEM water electrolyzers.

"**SWEETHY**" (CHJU, 2025-2029, 9 partners) **TRL 2-5,** Direct seawater electrolysis technology for distributed hydrogen production.

Site of Brest: R&D activities on corrosion in water electrolysis (PEM / AEM)

- Fully equipped electrochemistry laboratory: impedance spectroscopy, scanning Kelvin probe, …
- Expertise in **corrosion/durability tests for Bipolar Plates, Porous Transports Layers, Coatings**
- **Long-term corrosion testing (>1000 h)**
- Development of accelerated stress tests
- Interfacial Contact Resistance (ICR) measurements
- Advanced physico-chemical methods for materials characterisation: SEM, EDX/WDX, Raman…



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Liquid amonia testing

Examples of ongoing European projects:

"**CladPipe4H2**" (CETP, 2025-2027, 8 partners) **TRL 3-5,** Clad pipes for safe and effective hydrogen storage and transport.

"**HYSTORY**" (RFCS, 2024-2027, 6 partners) **TRL 2-5,** Mn austenitic stainless and non-stainless steels for hydrogen applications: production, transport and storage.

"**HENRI**" (IPCEI, 2024-2026, 9 partners)**,** Hydrogen energy reservoir.

Site of Saint-Etienne: Material qualification for hydrogen and ammonia service

- R&D services for low-carbon energies.
- Full lab for hydrogen testing up to 700 bar
- Full lab for liquid ammonia testing

High pressure hydrogen testing

Hydrogen and amonia permeation

Contact: Laura Moli Sanchez laura.moli.sanchez@institut-corrosion.fr

/01/2025

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TEMISTh

TEMISTh, YOUR THERMAL INNVOATION PARTNER

From the idea to the manufacturing

1. General Informations

- Workforce : 8
- Status : PME
- South of France
- Turnover 2024 : 1M€

2. Thematic

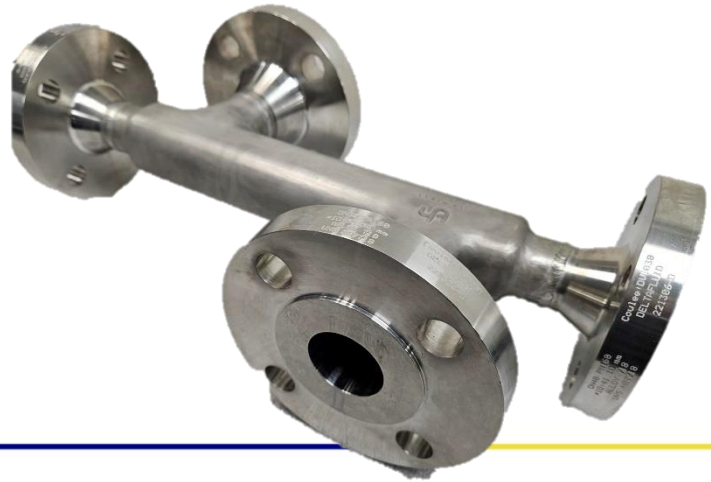
Thermal management and optimization

3. Customers

Aeronautic, Space, Defense, Mobility, Energy

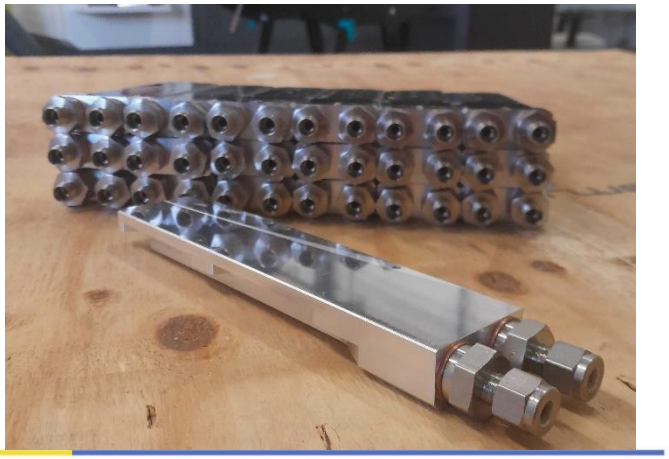
Heat Exchanger for Hydrogen, power-to-X and X-to-Power system

- High pressure
- High temperature
- Compact and resistant to corrosion



European Cold plate manufacturer

- High performance
- On-demand
- FSW / Additive Manufacturing process



Topics of interest in the next call

1. Renewable Hydrogen production

- **Innovative hydrogen and solid carbon production from renewable gases/biogenic waste processes (HORIZON-JU-CLEANH2-2025-01-06)**

2. Hydrogen storage and distribution

- **Development of cost effective and high-capacity compression solutions for hydrogen (HORIZON-JU-CLEANH2-2025-02-02)**
- **Demonstration of scalable ammonia cracking technology (HORIZON-JU-CLEANH2-2025-02-03)**

Past European collaborative activities:

- **3 CLEAN SKY projects on heat exchangers and 1 H2020 project on CSP coupled to sCO2 cycle**

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Regions Ile de France/Normandie

Ile-de-France / Paris Region

European and International Strategies Unit

Normandy Region

Energy, Environment and Sustainable Development Unit

maud.hainry@iledefrance.fr et *frederique.vinay@iledefrance.fr*

pauline.bonnard@normandie.fr

Hy2SEINE : the Seine hydrogen valley

- Large-scale hydrogen valley – Clean Hydrogen Partnership
- Support the development of the entire value chain of hydrogen on the Seine valley (Production, Storage, Distribution and Uses of hydrogen).
- The **Paris Ile-de-France Region** (coordinator) and the **Normandy Region**.
- Looking for partners developing hydrogen production projects, innovative SMEs and hydrogen off-takers. European partners or partners based in Paris Region or Normandy.
- Sectors targeted : land mobility, waterborne transport, hydrogen towards eSAF, logistics platforms and construction equipment.

The Seine hydrogen valley