

A RECORD YEAR FOR THE LNG TT BU

THE TECHNICAL DEPARTMENT

NEWS



the
CRYOSTAR
MAGAZINE
issue #40 - fall 2022

NEWS

Last step before the commissioning of the new assembly and test building

A €15 million investment in a new 1,600 sqm assembly and test building is being finalized at Cryostar France's Haut-Rhin site. Started at the end of 2020, the project is progressing well according to schedule.

"The capacity for testing 4- or 6-stage compressors and turbines will be doubled. This investment is the largest investment ever made in Cryostar's history. It illustrates the confidence that the company has in the future and in its growth opportunities", says Didier Walch - Director, Information Systems and Industrial Infrastructures at Cryostar.

Cryostar has chosen an industrial building that respects the environment in terms of energy. The building will include a green roof, 350 sqm photovoltaic panels, rainwater recovery for sanitary use and solar thermal panels for hot water production.



The raw building with the office area and control room in front (status August 2022)

The building is out of the ground since January 2022. The 4 overhead cranes were delivered and installed in March. Each of the two halls is equipped with a 80-ton and a 20-ton crane.

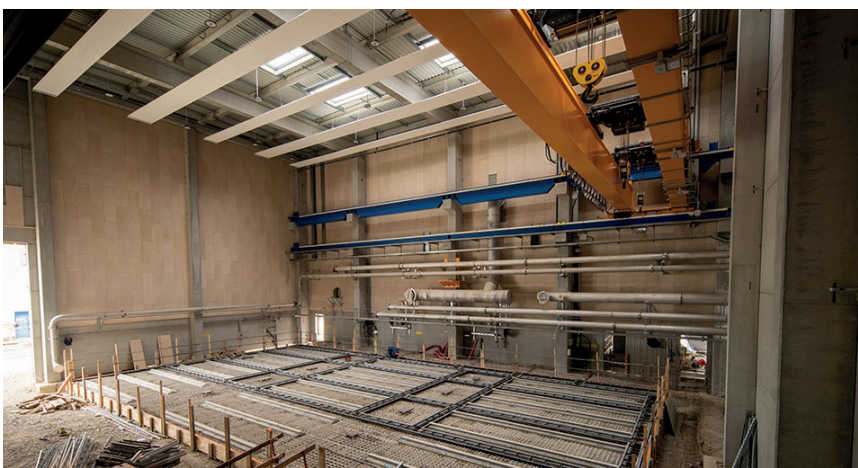
Since this spring, efforts have been concentrated on:

- Waterproofing the roofs after installation of the photovoltaic panels.
- The implementation of the test pads slabs (reinforcement, pouring of the concrete layers and installation of the rails in the test sites).

- The advancement of the sanitary areas and changing rooms; the control rooms and adjacent offices as well as the meeting rooms.
- Installation of test piping.
- Installation of the cooling tower and cooling water pump and piping.

The preparation of the asphalt on the platform around the building and the finalization of the slabs in Hall 9 A and B were in progress in October at the time of writing.

The finalization of the wood siding of the front part (administration, control and meeting rooms and cloakrooms), the installation and start-up of the air compressor for the tests, the high-voltage cells and the heating system, as well as the finishing touches and last pipe connections will be the last interventions before **the official inauguration, which is already scheduled for December 19, 2022!**



The zone B in Hall 9: we see the 80- and 20-ton overhead cranes, the test pipes at the bottom of the wall, the sound insulation on the walls, and the concrete slab including the rails for fixing the machines during the tests (state of progress in September 2022)



People are at the forefront of our company's development

Our magazine #40 honors some of our employees who make Cryostar successful, in connection with our current events and our strategic projects.

Our LNG TT Business Unit is experiencing a record year. Indeed, for the first time since its creation in 2010, we will exceed €300 million in orders. We have also signed very important partnerships with Cluster LNG and Hyundai Global Service, which will enable us to continue to grow in our markets. Roger Dambach, Executive Director of our LNG TT BU, tells you all about it in an interview where he gives his point of view on the reasons for these successes and reveals his personality traits.

Our Technical Department is also in the spotlight in this autumn issue. For what would we be without it? The technical expertise of the teams, managed by our new director Amandine Blache, is vital to Cryostar's performance, in its ability to support its customers in their developments. We thought it was time to

introduce you to the faces of these colleagues who are committed on a daily basis and enable Cryostar to be and remain the technological leader in its markets.

Our French entity Cryostar Automation, nestled in the Aveyron region, has new premises which were proudly inaugurated in October 2022. Small and agile in size, but big in heart and generous in its actions and commitments, Cryostar Automation has always been able to cultivate its specificities while contributing significantly to the success of the Cryostar group.

You will also meet Isabelle Delplanque, responsible for the Hercule programme dedicated to Cryostar's digital transformation, without forgetting our two young retirees who have been loyal to our company for over 30 years!

As you can see, our employees are the face of our company and our greatest pride!

Samuel Zouaghi

PRESIDENT

| | |
|---|----------|
| EDITO | 3 |
| A DAY WITH the Technical Department | 4-5 |
| FEATURE STORY: 2022, a record year for the LNG TT Business Unit | 6-8 |
| NEWS | 2, 10-11 |

summary



The Technical Department: its expertise makes all the difference!

> CRYOSTAR'S TECHNICAL DEPARTMENT IS A CROSS-FUNCTIONAL DEPARTMENT THAT WORKS FOR THE COMPANY'S THREE BUSINESS UNITS. IT IS INVOLVED IN THE OPERATIONAL ACTIVITIES OF DESIGNING TURBINE AND COMPRESSOR EQUIPMENT AS WELL AS IN R&D ACTIVITIES FOR THE DEVELOPMENT OF THE CRYOSTAR PUMP RANGE.

Sizing, aerodynamic design, structural calculations, mechanical construction, vibration diagnosis, performance analysis, pump development... The teams' expertise covers a very broad spectrum.

Amandine Blache, Cryostar's Technical Director, has taken over as head of the department after a 19-year career with the company and a solid experience acquired in the Cryostar product range.

"Competent, passionate and committed teams...these are the words that spontaneously come to mind when I think of my staff", enthuses Amandine. A large part of Cryostar's technical expertise is indeed found within this department. "We currently have 41 people, mainly engineers, but also experienced technicians in the Mechanical Construction and Sizing teams. We are currently recruiting about 10 people to strengthen our teams, which are also supported by 11 external people."

Technical experts in rotating machinery

Cryostar's customers have little direct contact with the Technical Department, yet without it, the products "made by Cryostar" would not exist. "In the tender phase for turbine and compressor equipment, our mission is to meet our customers' expectations as best as possible, by sizing suitable and high-performance equipment. We support our sales representatives in clarifying some specific technical needs. We are also in charge of validating the performance tests of turbines and compressors, we prepare the tests and analyze the results. Of course, we may sometimes have to discuss the results with the end customer".

In short, the Technical Department's mission extends from the bidding phase to support for customer site operations, if expertise is needed. "We are committed to the entire life



cycle of the product. This comprehensive vision encourages feedback, develops global knowledge of products and processes, and is an additional source of motivation for the teams”.

Development projects

R&D activities on turbine and compressor equipment are carried out under the direction of Stéphane Sgambati, in close collaboration with the Technical Department.

“Several projects and developments are being carried out at the same time, but to mention just a few of the latest developments in recent months: our teams are working on expanders with improved performance, on the follow-up manufacturing and testing of the first equipment developed for BOG’s “EcoChill” subcooling units, on the study of a new compander combining an expander and three compression stages, on the finalization of the NeoVP pump range and are working on developments around hydrogen... Quite a program!”

Amandine Blache, new Technical Director

Amandine Blache took up her new position as Technical Director in March 2022 and joined the Cryostar Management Committee. The Management Committee is composed of 45% women.

An engineer and graduate of ENSMA in Poitiers, she has spent her entire career with Cryostar since 2003, which gives her a very comprehensive approach to equipment. In particular, she participated with Roger Dambach in the creation of the Technical Sales Support Department which she managed from 2007 to 2010. Commercial trips and customer visits finished polishing her customer culture before returning to the Design Office as Turbomachinery Design & Calculation Manager.



Amandine Blache, new Technical Director



Samuel Zouaghi, President of Cryostar: “We would like to thank Amandine for her dedicated professionalism, her loyalty and her continuous interest and focus on technical matters while serving Cryostar throughout the course of her 19 years with us. Both on behalf of Cryostar and on a personal note, I would like to recognize and pay tribute to Stéphane Sgambati and Jean-Louis Galelli, for their unique expertise and invaluable contributions over their respective 33 and 30 years of presence, to our core technical developments and, consequently, to Cryostar’s global reputation. All of which is greatly reflected in our present vast product portfolio”.

A RECORD YEAR
IN 2022

**FOR THE LNG TRANSPORT
& TERMINALS BUSINESS UNIT**

➤ **ROGER DAMBACH, EXECUTIVE DIRECTOR,
BUSINESS UNIT LNG TRANSPORT & TERMINALS**

erview

INTERVIEW

Roger Dambach, Executive Director, Business Unit LNG Transport & Terminals

the CRYOSTAR MAGAZINE: Roger Dambach, you are the Executive Director of the LNG Transport & Terminals Business Unit. Can you introduce yourself in a few words?

Roger Dambach: I am pleased to have been working for Cryostar for 23 years. After a Master's degree at the "Ecole Polytechnique Fédérale" of Lausanne in Switzerland, I obtained a PhD in Mechanical Engineering at the University of Cambridge in England. I started my career at Cryostar as an Aero Design Engineer, then I was Director of Engineering before becoming Deputy Director of Process and LNG and General Manager of the LNG Transport and Terminal Business Unit. Since 2019 I am part of the 11-members Management Committee team as the Executive Director of this Business Unit. As a Swiss national, I am one of the few border residents to commute to France to work for Cryostar!

The C MAG: What would you like to say about the LNG TT Business Unit?

RD: With eighty people, our BU is very customer oriented. We serve shipyards, integrators and ship owners and have been able to customize our products to our customers' needs. I would like to salute the quality of our teams; they have a united and efficient spirit in the face of this year's record order intake. Everyone is very involved! The very regular contact with the

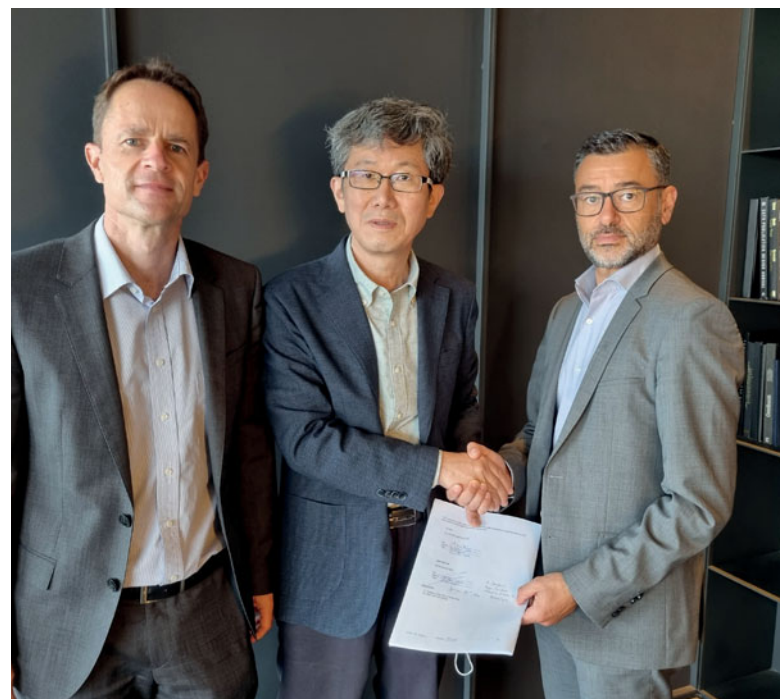
shipping world, which is a very international world, requires a great flexibility of mind that my team members deploy with enthusiasm, despite the daily life which brings its share of difficulties.

The C MAG: What are your main markets?

RD: We mainly address two markets: the management of evaporation gas from LNG carriers with our compressors, exchangers, liquefaction and sub-cooling units, and the market for LNG as a fuel for ships with our cryogenic pumps and compressors and our vaporizers.

The C MAG: How is your news?

RD: Well, this is the first time since the creation of our BU in 2010 that **we will exceed 300 million euros in orders!** And we are very proud of that! This represents **more than a hundred vessels.** We have also signed very important partnerships with Cluster LNG and Hyundai Global Service, which will enable us to continue to grow in our markets.



From left to right: Roger Dambach, Junhan Lee - President of Cluster LNG and Samuel Zouaghi, President of Cryostar

interview

> ROGER DAMBACH, EXECUTIVE DIRECTOR, BUSINESS UNIT LNG TRANSPORT & TERMINALS

The C MAG: Can you tell us more about these partnerships, starting with the MICROBOG Project with Cluster LNG?

RD: In June 2022, we signed an exclusive license contract in Busan, South Korea, with Cluster LNG, for the manufacturing and sales of micro boil off gas compressors for LNG fueled vessels. We will thus expand our range with this small compressor, called MICROBOG. Cryostar will have a priority exclusivity access to sell this centrifugal technology. This technology will address the requirements of small-flow boil-off gas compression for LNG powered merchant vessels. This technology presents the advantage of being less expensive, more compact and more reliable than commonly used screw and piston compressors.

In addition, Cluster LNG has filed a patent for the use of such a compressor for LNG-fueled vessels, which protects this technology. Another strength of this micro-compressor is its low maintenance requirements.

Cluster LNG invented this machine and patented it, Cryostar will market it. We are addressing the same customers to whom we currently sell our pumps, we are relying heavily on this synergy effect. With this addition to the product portfolio, Cryostar's LNG TT Business Unit is expanding its product range and therefore plans to enter the boil off gas compression market for LNG merchant vessels. In addition to our existing wide range of submersible and/or piston pumps for these vessels, we will now be able to offer our customers a complete range of boil off gas processing equipment. **The MICROBOG was launched at the Gastech exhibition in Milan in early September.** It was very well received by the professional community!

The C MAG: Any final words?

RD: I would like to take the opportunity of this interview to warmly thank my teams for their commitment, our customers for their trust which has been constantly renewed for many years and to salute our partners with whom I am looking forward to continuing the development of a win-win collaboration.

The C MAG: What does the partnership with Hyundai Global Service involve?

RD: We signed a co-operation agreement with Hyundai Global Service in early June 2022. We will co-operate to provide a service to retrofit LNG carriers and FSRU vessels with systems and equipment to **reduce CO2 emissions** from the vessels, in compliance with EEXI and CII environmental regulations.

By providing turnkey solutions, such as the retrofit of "EcoChill" Subcoolers and upgrades to our compressors, ship owners will be able to improve the efficiency and compliance of their vessels. We are confident that our combined expertise will provide safe, simple and cost-effective solutions for vessel upgrades to **meet the current and future environmental and operational challenges** facing some of the existing LNG carrier fleet.

The cooperation has entered its operational phase. We held a meeting in Korea at the end of August with HGS and started working on concrete opportunities, including the conversion of an LNG carrier into an FSRU.



Ki-Dong Lee - President & CEO of Hyundai Global Service Co, Ltd, and Samuel Zouaghi - President of Cryostar, jointly sign the Memorandum of Understanding (MoU) to provide LNG and FSRU vessel modernization services with CO2 emission reduction systems and equipment.



CRYOSTAR'S DIGITAL TRANSFORMATION PROGRESSES

Cryostar's extensive "HERCULE program" includes the deployment of a new Enterprise Resource Planning system. The IFS tool is now Cryostar's new ERP. The GO live was given in January 2022 after the training of the 800 users. The IFS project represents an investment of over 10 million euros including internal costs.

Isabelle Delplanque took over as head of the HERCULE program on June 30, 2022.

"In recent months, we have continued to implement features to simplify the use and save time for users, notably by improving ergonomics and the fluidity of the process. This improvement phase is part of the life of any project, it occupies my team on a daily basis in order to make the support to the user efficient. We update the application every 15 days. Two concrete examples: navigation between several screens is now simplified, and data validation is more fluid thanks to the overhaul of the tool's processes", says Isabelle.

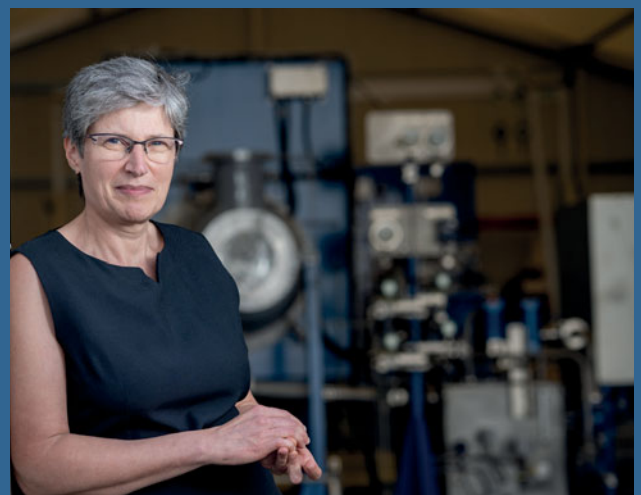
The benefits to customers are already very real today: *"Thanks to data monitoring, we are alerted in real time, if some parts are missing for a customer order, for example, we are able to react very quickly, continues Isabelle. At the same time, we are setting up indicators to monitor the performance of the various flows and to implement any corrective measures".*

The year 2023 will see the start-up and deployment of IFS in all Cryostar's Business Centers.

Isabelle Delplanque, rigor and human qualities

- With 15 years of expertise in the specification, testing, deployment and training of a PLM (Product Lifecycle Management) tool, Isabelle joined Cryostar in **February 2018** as PLM Project Manager.
- In **2020**, as part of the advancement and reinforcement of the HERCULE program, Isabelle joined the Steering Committee as an active member to bring her expertise. Since she joined the company, Isabelle has always shown a strong desire to advance this program, which she has worked to develop with great commitment and to which her expertise, rigor, methodology and human qualities have greatly contributed.
- In **2022**, she was appointed Head of the HERCULE Program.

Isabelle, 54 years old, is a general engineer with a degree from Mines de Nancy. She is married, is mother of 2 children and has a passion for hiking in the mountains. **What she appreciates most about Cryostar is the quality of human relations and the spirit of mutual support.**



NEWS

INAUGURATION OF CRYOSTAR AUTOMATION'S NEW OFFICES: A SMALL AND AGILE ENTITY BY ITS SIZE, BUT GENEROUS IN ITS ACTIONS AND COMMITMENTS!

On October 5th, 2022, Cryostar Automation officially inaugurated its new offices in Capdenac and took the opportunity to celebrate its 20th anniversary.

Ribbon cutting, speeches by Cryostar's management and the town of Capdenac, a tour of the premises and a cocktail party punctuated the event which gathered some 70 guests: all Cryostar Automation's permanent and external employees accompanied by their spouses, the representative of the new owner of the site, the architect of the works, institutional personalities including the Mayor of Capdenac, as well as members of Cryostar's management.

Looking back on 20 years of success

- Cryostar Automation was created in 2001.
- Over the years, the Aveyron-based entity has confirmed its position as a renowned supplier of industrial and medical gas cylinder filling stations.
- But LNG was not to be outdone either, thanks to the LNG fueling station that entered the market in 2008, with the first references in the United States and Tasmania.
- This was followed by years of consolidation and then growth of activities, developments such as the LNG dispenser "made by

Cryostar" and medical certification for cylinder filling stations, and successes including, more recently, the frame agreement with Shell for LNG fueling stations.

These challenges, which were met and won, were only possible thanks to the commitment, motivation and professionalism of all the teams.

A big thank you to them and all our best wishes for the next challenges to be taken up !



The ribbon cutting by, from left to right on our picture, Mr Bertrand Cavalerie, 1st deputy of Capdenac-Gare - Mr Stéphane Bérard, Mayor of Capdenac, Vice-President of the Community of Municipalities of Grand Figeac & Regional Councillor of Occitanie - Mrs Claire Rivollier, Director of the BU Distribution - Mr Samuel Zouaghi, President of Cryostar and the architect Mr Casadepax

NEWS

CRYOSTAR EMPLOYEES RETIRED

Recently, our following colleagues have retired. We thank them for their great professionalism and their loyalty to our company and wish them a long and peaceful retirement.

| NAME | RETIREMENT DATE | JOB TITLE | SENIORITY / YEARS | |
|----------|-----------------|------------|--------------------|-------------------|
| GALELLI | JEAN-LOUIS | 06/30/2022 | Technical Director | 30 years 2 months |
| MITCHELL | DAVID | 09/30/2022 | Service Technician | 37 years |

We would like to highlight and pay tribute to the immense contributions of **Jean-Louis Galelli, who has been by our side for 30 years**, to the development and influence of Cryostar, whose entire product range reflects his commitment as well as his great technical expertise. Jean-Louis did not fail, during a speech strong in emotion, to list the highlights of his 30-year career at Cryostar, sometimes with humor, passing on his best wishes in the challenges facing the company and its employees.



David Mitchell has the longest, if not one of the longest, seniority in the Cryostar world. As a service technician, he was present at the first day of Cryostar UK's opening in 1985, after several years at BOC within the same Group, and has a total of 37 years of loyal service. We would like to thank David for his unwavering commitment to Cryostar over the years and wish him a happy and well-deserved retirement. He will hopefully improve his handicap at golf now he has more time to play!

*On the left side: Richard Price, Cryostar UK Manager, Annie Bonnot, Samuel Zouaghi, Olivier Werth and Mona Mehregan.
On the right side: Mike Henriques, Tyler Beverley, Ray Relf, Johnathan Jessop, David Mitchell and Amanda Walter.*





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