JUNE 28 2018 | PARIS NORD VILLEPINTE

WNE TRIBUNE

TO-DO LIST

3
DAY THREE

01
9.30am
Join us for a special Investors' Day breakfast meeting
VIP LOUNGE

02
11.30am
The WNE lunch debate on advanced reactors
SEE RECEPTION

03
4.00pm
WNE closing ceremony concludes the 2018 show
PANEL DISCUSSION ROOM

Gérard Kottmann

EDITORIAL | GÉRARD KOTTMANN

SHINING A LIGHT ON OUR FUTURE

Welcome to Day 3 of WNE 2018 – our final day of what I hope has been a very successful show for you.

As you look around the exhibition hall, you will have noticed the great diversity of what's on display from exhibitors who have come to Paris from around the world.

Equally, like me, you will have remarked on how much intellectual capital our industry represents. We can be proud to be part of such a dynamic and innovative sector.

Innovation is crucial to the success of the nuclear industry. It is truly our future. We can see it all around us, and not just on the stands of the big players.

WNE makes a point of reaching out to small and very small companies because this is where some of the brightest new ideas come from. The WNE Awards this year featured categories for VSEs and SMEs. We also have a good representation of bright new ideas in the Start-up Planet, and I'm confident the agile minds behind them will find partners among our exhibitors. The future of our industry depends on it.

Our future direction in France received a boost yesterday when the GIFEN initiative was unveiled. This is a huge step, and we have our friends in the aerospace industry to thank for showing us a model of how such an industry-wide body can work. I am very optimistic about GIFEN and believe that working together in this way will result in benefits across a wide spectrum.

As for WNE, as we bring the show to a close for another two years, we can also reflect on the successes of our two new features, the lunch debates and the guided tours. Both have been well-received and I'm confident they will return – as we will – bigger and better, in 2020.

It remains for me to thank you for supporting WNE once again, and I look forward to greeting you at WNE 2020.

Gérard Kottmann
Président, WNE and AIFEN

FRENCH INDUSTRY SPEAKS WITH UNIFIED VOICE

REPORT | ALAN DRON

France's nuclear sector will speak with a single voice in future after the announcement at WNE yesterday of the creation of a new organisation representing the industry.

The French Nuclear Energy Industry Group – GIFEN in French – will speak for 2,600 companies in the sector, which employ 220,000 people.

It will represent the common interests of its members both in France and internationally when dealing with governments and other organisations.

It will also be a key driver in the industry's continuing transformation, with several major projects under way covering areas such as competencies and training, nuclear safety and R&D, as well as strategy and economic development – notably at the regional level.

Currently, there are several associations covering various aspects of the country's nuclear industry.

"As nuclear, we need to have a strong voice," said Gérard Kottmann, president of AIFEN. Other energy sectors already had their own associations. "We are going to reinforce all the advantages of the existing [nuclear] associations by being together."

Kottmann said GIFEN had been put together over the past nine months, with an initial constituent meeting held two weeks ago. The organisation's details were now being finalised. It was expected to become operational in the last quarter of 2018 and was a further example of the French nuclear industry using Gifas, the French aerospace representative body, as its benchmark, he added.

WNE, for example, was based on Gifas' biennial showpiece for the French aerospace industry, the Salon Aeronautique at Le Bourget, just a few kilometres from the WNE site.

Kottmann said that the nuclear industry had followed some, but not all, of Gifas' characteristics: "We copied intelligently."

Digitalisation dream team

Louis Hauvette has reason to smile – his start-up SiteFlow has just signed a partnership agreement with Daher (H69) to develop a new method of preparing and supervising industrial projects.

SiteFlow has created an app that optimises the preparation and supervision chain in high-value industrial projects. Daher is testing and backing the development of the app, with the aim of digitalising several steps in its industrial projects.

Daher sees the new partnership as a means of improving the competitiveness of its processes at nuclear work sites.

The app automates certain administrative tasks and generates standard documents, enabling project

› Continued on p2

TEASER PANEL 1 – ADOBESTOCK

› Continued from p1

Digitalisation dream team

managers and operators to focus on tasks with greater added value. The results, say the companies, are savings in time and increased productivity.

SiteFlow's solution helps engineers quantify and calibrate all the steps in work-site projects. Once the preparation phase has been completed, the app then assists operators on-site and allows them to specify constraints at the location, creating a permanent link between the engineering office and on-site teams.

Hauvette, one of the four Siteflow associates who launched the company a year ago, said: "There is a requirement for so many sets of documents in the nuclear industry. We developed the intelligence-based system to reuse material but also to have traceability to record every modification."

The partners plan to roll out a pilot version of the app initially, followed by four months of on-site testing. This test phase will be completed by the end of the year. Daher founded its DaherLab unit in 2015 to improve its processes through partnerships with start-ups with innovative or disruptive ideas.

The lab identifies and tests technologies from other sectors that it could usefully incorporate. "We're delighted to support SiteFlow as part of these efforts. If successful, the solution could be implemented by all the Group's nuclear teams," Hervé de Chillaz, Daher's senior vice-president, Advanced Technologies Business Unit, said.

SiteFlow's chief executive, Louis Hauvette, added: "Our solution offers an innovative work methodology that frees users to be more productive.

"This partnership represents a real opportunity for us to pursue the development of our solution and test it on site in the highly demanding nuclear sector."

WNE TRIBUNE

Want to share a story with us? Find us at the Press Centre or email our editorial team at: chuck.grieve@gmail.com

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WNE FOCUS ON FINANCE DURING INVESTORS' DAY

Thursday is Investors' Day at WNE 2018 – an innovation at this year's show designed to help link up companies on both sides of the investment equation.

The initiative is sponsored by BPI France, the state-backed investment bank, and starts with a breakfast meeting in the Lounge. Potential investors will then be encouraged to meet exhibitors at their stands to discuss their products and services, their plans for the future and what financial involvement might be possible.

WNE president Gérard Kottmann said the exhibition, as a business-oriented event, "is committed to supporting companies looking for investment for development. It's not always easy for companies to find the right investment partners.

"By creating this event, we're providing a unique opportunity for our exhibitors to meet investors interested in this industry and do business with them."

Likewise, for investors interested in opportunities in the civil nuclear field, it is a chance to find companies, from start-ups to those with maturing development projects, which combine "a project in which you believe and values that match your own".

BPI France spokesman Jacques Solleau said the bank welcomed the opportunity to be involved with WNE and the nuclear industry through Investors' Day. As well as its own equity investments, BPI's work with the industry included managing the now-closed Nuclear Companies Development Fund (FDEN) whose backers included major players in the French civil nuclear sector.

"BPI's objective is to support French businesses to develop, especially abroad," he said. "We are the biggest private equity investor in France, and have been involved in the nuclear industry for some years.

"We're there to give impetus and encourage other investors to come into the nuclear industry."

> By creating this event, we're providing a unique opportunity for our exhibitors to meet investors interested in this industry and do business with them...
> –Gérard Kottmann

REPORT | STEVE NICHOLS

Lunch debate highlights importance of SMRs

What were the key considerations that influenced your decision in the design of your small modular reactor (SMR) and how does your design master the environmental impact in case of a severe accident?

These were just two of the questions posed to an expert panel during yesterday's inaugural WNE lunchtime debate.

The event, which focusing on SMRs and their viability, attracted a packed audience. The format was a series of questions posed by experts from around the world and delivered by video to the panel comprising Song Danrong (CNNC), Bernard Salha (EDF), David Powell (Hitachi GE), Jae-Sung Song (KAERI/Smart), Tom Mundy (NuScale), Alan Woods (Rolls-Royce) and Anton Moskvin (Rosatom Overseas). The event was moderated by Gérard Kottmann, president of WNE and AIFEN.

Although billed as a debate, in fact all agreed on how important the new designs will be to the nuclear power industry. On safety, for example, David Powell said there can be no compromise. He said both its BWR X300 and Prism designs are inherently safe. "The design can cool itself for seven days, even with a total loss of electrical power," he said. "In designing them we focused on passive safety."

Alan Woods said: "We are in a business where safety is paramount. We cannot ever be in a position where we tell the public our technology is not safe."

Tom Mundy agreed and said the small cores and simplicity of its design means there can be no events that could damage the core – period. "The risk of an accident is approximately one in every three billion years," he said.

"The power modules will shut down in the event of loss of power and will cool in perpetuity. The design is safe, without the need for external power."

Another question dealt with the benefits of a modular approach to design and construction.

Song Danrong said an SMR can be deployed nearer to the end user due to its modular, safer design. "A large nuclear power plant can't be located near them – that's a different target market," he said.

Anton Moskvin said: "We have been developing reactors for 70 years and with our first SMR we decided to put it on a floating base, with it being commissioned in 2019.

"We worked on the concept and decided 50MW was the most marketable. We can scale this up by adding more modules."

Other questions looked at cost, the importance of a modular design in terms of scalability, and the benefit of SMRs in terms of faster, cheaper construction and easier financing.

> Feedback from the audience was that they welcomed the opportunity to hear from acknowledged experts and market leaders and would like to see the format developed for future WNE events.

›See the WNE website for a video recording of the SMR lunch debate.

Bright future for nuclear in sub-Saharan Africa?

While South Africa has seen the light, the rest of the Dark Continent remains in nuclear darkness. One Cape Town-based company believes it is not unrealistic to suggest that sub-Saharan Africa could benefit from nuclear technology.

Francis Carruthers, chief executive of Lesedi, (pictured) backed the call by Yukiya Amano, the head of the International Atomic Energy Agency (IAEA), to develop smaller reactors to work safely and sustainably in remote areas and bring billions of people out of energy poverty.

"Lesedi means light," said Carruthers. "We have been in operation since 1989 supporting the two reactors located at the Koeberg nuclear power station

"Reliability has been shown at Koeberg. It is the most reliable on the African continent and the cheapest.

"From that basis we should be exporting some of our coal and minerals and be concentrating on nuclear. It's a big technical challenge getting people upskilled into that process. It's not too far-fetched."

Carruthers believes the expertise developed in South Africa is ready for the global stage. "We built a good relationship with French suppliers and do all the modifications and upgrades at Koeberg," he said.

"We are trying to leverage off that capability and capacity to do work elsewhere in Europe, such as Sweden and Finland, and getting involved in commissioning activities."

ASSYSTEM THROWS ITS WEIGHT BEHIND START-UPS

You don't have to be 100m ahead of your customers when it comes to the need to introduce new processes or technologies, 2m will do.

That is the philosophy of Assystem's chief technology officer, Robert Plana, as he described the reason why his company is so keen on supporting start-up organisations.

At WNE yesterday, Plana signed a number of partnership deals including one with the UK research organisation NANC and four with start-ups Sparte, Cosmotec, REBIM and SAAGIE.

"These partnerships are for our customers," said Plana. "This is not for our R&D. We want to be 2m ahead of our customers' needs and as it comes to a new technology or a system, then we want to bring the innovation to the customers."

Plana said Assystem has no interest in the IP rights. "These stay with the company. For the start-up, they have the chance to prove their product and develop a reputation.

"We develop services, not products and the speed that start-ups can deliver the best of the new technologies enhances our position with our customers too."

One of the delighted start-ups at Wednesday's reception was REBIM.

Andrew Holt, managing director of REBIM technology innovation consultancy, said the business was designing intelligent engineering solutions for complex-built structures.

"We created REBIM out of our need for a more reliable, user-friendly BIM tool. Now we're offering it to other professionals," he said.

Cheers! Assystem's Robert Plana (left) with Andrew Holt of the technology innovation consultancy

"We are delighted to be in this partnership with Assystem," he said, "I can't wait to get working."

Plana added: "These are exciting times. These partnerships include areas like artificial intelligence application, virtual reality scenario, augmented intelligence for complex systems and utilisation of big data and developing a toolbox for data science and engineering."

in**brief**

Clextral safety pumps for Hinkley Point C

› The French nuclear pump manufacturer Clextral (H174) will be installing its safety pumps on the UK's Hinkley Point C EPR nuclear reactor.

The company's contract with EDF includes the supply of a large batch of volumetric pumps, featuring piston, membrane, fixed, and mobile models, used to inject different fluids into the reactor circuits. Certain units also help to cool both reactors.

The first deliveries are scheduled for the start of 2021 and should be spread over about two years.

Clextral has equipped more than 100 reactors in France, Belgium, Switzerland, Finland, South Africa and China.

Westinghouse offers component monitoring

› As nuclear power plant (NPP) operating licences are extended to 60 years and beyond, the costs associated with the maintenance of aging NPPs makes component reliability an important area of focus.

Westinghouse (G73) has developed a scalable, open technology platform for monitoring components.

The data captured can include bearing temperature, stator temperature, vibration, voltage, current and RPM, oil pressure and oil temperature.

The company says this technology can be used to monitor multiple components within an NPP and provide reliable component data to a central data server for additional processing and analysis.

› Read more about Digitalisation at world-nuclear-exhibition.com

Swedish steel for tough applications

› Sweden's Sandvik Materials Technology (D89) brings to WNE its experience in supplying a range of products for the nuclear industry, including stainless steel and high nickel alloy tubing for demanding tubular applications. The company says these provide uncompromising precision and performance as well as exceptional safety and documentation. Sandvik has had one of the world's largest mills dedicated to the manufacture of stainless steel for nuclear applications for more than 50 years.

Korea outlines expertise in safety measures

› Korea Hydro and Nuclear Power (H66) is showcasing its expertise in features for nuclear safety. These include improved multi-redundant safety systems for reactors, post-Fukushima countermeasures (such as watertight doors) and enhanced seismic resistance for sites with different types of soil.

in**brief**

Atos provides NLP solution to EDF

› Atos (F89), through its subsidiary Atos Worldgrid, is providing its AnTARES solution to EDF (F137).

AnTARES – French for animator for accidental transients of simulated PWRs – enables EDF engineers designing pressurised water reactor (PWR) operating procedures to simplify and automatically test changes on a simulator.

The system uses machine learning and natural language processing (NLP) technologies. Atos said its challenge was to identify natural language semantic content in procedures that were formerly kept and used in paper format.

The NLP tool analyses natural language and estimates a confidence level. AnTARES then learns and applies continuous improvement to the automatic translation. Atos is giving a presentation on natural language processing today at 12.30 in Zone 1.

IFA steels itself for new customers

› Independent Forgings and Alloys (IFA) on Stand H33 specialises in steels and super alloys for the nuclear industry.

Its range includes round and flat bar for reactor vessel components, blocks for valve bodies, nozzles, forged rings for sleeves, flanges, gaskets, and seals, and forged shafts for motors and pump assemblies. IFA says its nuclear customers include Rolls-Royce Nuclear and Areva, plus it is a nuclear Advanced Manufacturing Research Centre (AMRC) Tier 2 original member, alongside F4N Fit for Nuclear.

Vinci Technology Centre secures EDF framework

› Vinci Technology Centre UK (D23) has been awarded a framework agreement by EDF Energy to provide specialist support on seven of EDF's eight operating nuclear power stations in the UK.

The contract is initially set for five years with an option to extend to a further five years and could be worth up to £25m.

The work will involve providing specialist support services to pre-stressed concrete pressure vessels (PCPVs). This is critical to ensuring the safety case for continued operation of the stations. The Vinci Technology Centre team measures the load in the tensions in the tendons and removes some for further inspection.

Vinci's experts have been delivering specialist services to the nuclear industry for more than 35 years, working with EDF Energy and its predecessors.

FOUR HONOURED IN WiN GLOBAL AWARDS

Women in Nuclear (WiN) honoured four industry professionals yesterday – two women and two men – for their contributions to gender equality and support for young people in the nuclear industry.

The winners of this year's WiN Global awards were Gabriele Voigt, Melina Belinco, Denis Janin and Cristian Vega.

Gabriele, president of WiN Global since 2016, has been active in promoting gender equality for her entire career at the International Atomic Energy Agency (IAEA).

Melina, a member of the Argentine WiN executive committee since 2014, is a specialist in international cooperation with more than 10 years of experience in technical cooperation at the National Atomic Energy Commission (CNEA) of Argentina.

Denis was president of the International Youth Nuclear Congress (IYNC) from 2016 until Aprl 2018, and has been involved in French and international programmes for young professionals. He has been with E.ON since 2011.

Cristian, founder and current president of the Argentina Youth Nuclear Generation (YNG), is his country's representative at the IYNC and former general co-chair for the IYNC WIN18 in Argentina.

WiN Global is a worldwide non-profit organisation promoting the understanding and public awareness of the benefits of nuclear and radiation applications. It has 35,000 members in 109 countries.

Above: WiN Global awards winners - Gabriele Voigt, Melina Belinco, Denis Janin and Fabricia Pineiro, representing Cristian Vega

STUDY TO ASSESS NUCLEAR ROLE IN LOW-CARBON EU

The European Union (EU) has set itself the ambitious target of reducing greenhouse gas (GHG) emissions by 80-90% of current levels by 2050. An even more ambitious target is likely to be agreed later this year to come closer to meeting the commitments of the 2015 Paris Agreement.

Achieving the current target will require expanding the use of electricity in Europe to more than 40% of total energy consumption, a doubling of the share in 2015.

Given the important role nuclear energy will continue to play in Europe's decarbonisation, the European nuclear energy association FORATOM has commissioned a study to analyse the contribution of nuclear power in the 2050 low-carbon European economy.

The consultancy FTI-CL Energy will be working throughout summer and autumn 2018 to develop contrasted scenarios to provide fact-based evidence on the impact of nuclear on the three main dimensions of Europe's energy policy: security of supply, environmental impact and competitiveness.

A final report is expected by the end of 2018.

FORATOM director general Yves Desbazeille said the study is designed to look at the role of nuclear power as a low-carbon, flexible and baseload source of power to address the expected long-term growth in electricity demand.

"FORATOM foresees the need to increase the total installed capacity from 120 GW to around 130-140 GW by 2050," he said, adding it was "only in this way" that the EU would be able to comply with the Paris agreement with a sufficiently reliable energy system.

"Nuclear power is an essential part of the solution. It provides security and predictability in a sustainable and competitive manner."

EDF, Orano, Nuclearelectrica, Finnish Energy, CEZ, Westinghouse, AIFEN, Vattenfall, ENGIE, CEA and the Spanish Nuclear Industry Forum are co-sponsoring the study.

Jack of all trades

Meet Jack, from TBC-France (C183). It you need an autonomous surveillance robot for difficult field and weather conditions, he's your robot.

Jack works fully independently while transmitting video footage in real time. It is equipped with infrared cameras that offer a 360º view, enabling day and night surveillance.

It also has three speeds in autonomous mode: surveillance (3 km/h), routine trip (10 km/h) and emergency response (18 km/h). Jack also has an extended range of up to 13-15 hours of continuous work or a range of 50 km.

Jack's embedded artificial intelligence also allows it to quickly and autonomously reach a specified location.

› Read more about Robotics at world-nuclear-exhibition.com

Left: Hit the road, Jack - Président Renato Cudicio and Mathilde Bravais of TBC-France with the robot at the show

REPORT | ALAN DRON

Disruptive innovation and how to harness it

New technologies bring the promise of disruptive innovation to the highly regulated nuclear industry. But how should the industry embrace innovation and make best use of it?

That was one of the questions put to a panel of experts from the nuclear sector and other industries with experience of fast-moving companies that have broken new ground, at a panel discussion sponsored by Orano on Tuesday.

Thinking outside the box: ArianeGroup has set up a team of experts

Nuclear industry companies had to create their own disruptive technologies, or be prepared to be open to ideas coming from other sectors, the audience heard.

"For us, as a legacy player, innovation is very much about the methods we use to shorten our development cycle," said Philippe Lugherini, director of strategy of space launcher systems company ArianeGroup. His organisation had set up a team of experts, fully empowered to 'think outside the box', he said. More staff and resources could be pumped in as they got closer to developing a product.

Jérôme Rigaud of autonomous and electric vehicle maker Navya said several barriers had to be broken to allow disruptive innovations to take place in industry.

Firstly, the 'mental barrier' against allowing innovation had to be broken – that sometimes meant changing the attitudes of "grey-haired senior executives" like him, he admitted. The 'industrial barrier' also had to be tackled – that could mean inventing new tools to allow the production of disruptive innovations. And the 'regulation barrier' had to be overcome. This was difficult, because new technologies were not always covered by existing regulations. Cooperation with the regulatory authorities was necessary to allow sensible regulations to be put in place that would allow research and experimentation to proceed.

Additive manufacturing (AM) – often referred to as 3D printing – was one external technology that held great promise for the nuclear sector, said Jean-Luc Laval, marketing and communications director of Addup, but it had to be used correctly.

AM's ability to create highly complex shapes "provides a high degree of design freedom. The more complex a part, the more that additive manufacturing is interesting. But you're wasting your time in using AM on a common item."

AM "is important for research and development because parts can be modified far faster than before and you can try all the shapes you need". This ability gave companies the ability to try multiple permutations of a component's shape to find the best variant.

The US space agency NASA, for example, had redesigned a 3D rocket motor around 10 times faster using AM than by traditional methods, he said.

Supergum product expansion provides a breath of fresh air

An Israeli company known best for its protective solutions for the CBRN (chemical, biological, radiological and nuclear) markets has unveiled a new active air sampler at WNE.

The sampler was developed by Supergum (H39) in conjunction with Israel's defence ministry as part of cooperation between the two organisations.

According to Supergum's research and development manager, Adi Plaschkes, environmental radioactive air sampling and monitoring is becoming increasingly important as regulatory agencies promulgate requirements for the measurement and quantification of radioactive contaminants.

"This system works by drawing in the air which passes through the tube and is filtered. The tube then contains the contaminants and is sent to a laboratory to be analysed. This tells us when it is safe to go back into a contaminated area," he said.

A number of organisations have taken a keen interest in the air sampler, said Plaschkes. "We think this is a good addition to our product range."

Freshly aired: Supergum's Adi Plaschkes with the debutant sampler

Aerospace has lessons for nuclear

› Can the nuclear industry learn lessons from other industrial sectors? Hervé de Chillaz, head of advanced technology (pictured above) and executive committee member at Daher, believes so. But some work needs to be done to achieve this.

Daher works in both the aerospace and nuclear industries. As well as being a Tier 1 supplier to Airbus, it also produces the TBM range of single-turboprop light aircraft. "The fundamentals of both industries are very similar," says de Chillaz. "Both are highly-regulated, and quality and security standards are very high. These are clear common points.

"They also have very long cycles, probably the longest cycles of any industry, with heavy investment at the beginning.

"And the supply chains of both industries are global, or becoming global. My view on the supply chain and the way it's evolving is that the aerospace industry is ahead of the nuclear; I would say the nuclear industry is at the beginning of globalisation."

For obvious reasons, both industries also take the traceability of components throughout those global supply chains very seriously.

As well as technologies, however, Daher's culture, or mindset, extends across both sectors, where it takes similar views when it comes to investment and insisting on extremely high quality standards, says de Chillaz.

While there is little synergy in actual products between the two sectors, there is rather more when it comes to being a logistics and supply chain service provider.

The company has the 'Daher control room', which it uses for the ITER nuclear fusion experimental project, for which it is the global logistics provider. Monitoring the flow of components for ITER helps to ensure that these arrive on time and to the required quality so construction proceeds on-time. The control room also gives the company real-time transparency on all the flows and quality of different products as they come out of suppliers' plants. It uses the same technology to feed Airbus's factories.

One area at which Daher is looking at carefully is how it can use data. On its TBM aircraft, for example, it is creating a system "where all the data produced by the aircraft is getting downloaded and used in a way that creates value". That could be used for predictive maintenance at nuclear installations.

in**brief**

Experconnect offers pool of retired nuclear experts

› Baby-boomers build a wealth of expertise throughout their careers which they take with them when they retire. The post-retirement collaboration scheme run by Experconnect (H46) is unique in offering outside expertise for companies on their nuclear projects. It matches retirees from its pool of 1,500 nuclear experts to companies looking for short-term help. It says it has experts in design, construction, operations, maintenance and much more. With offices in Germany, Belgium, France, United Kingdom, Singapore and Switzerland, Experconnect says it can call on a worldwide pool of nuclear expertise.

New comms protocol uses ultrasound signal

› Stimshop (J152) says it has invented a new wireless communication protocol, Stimcom, based on its patented ultrasound signal. Ultrasound wireless communication is harmless and secure, says the company, while being universal and easy to deploy.

REPORT | STEVE NICHOLS

EDF and Veolia sign partnership on decommissioning and waste

EDF and Veolia signed a partnership agreement yesterday at WNE to co-develop remote control solutions for dismantling gas-cooled reactors (natural uranium graphite gas, or UNGG, in French) and for vitrifying radioactive waste, in France and worldwide.

EDF is currently decommissioning six gas-cooled reactors reactors at Bugey in Ain region, Chinon in Indre-et-Loire, and Saint-Laurent-des-Eaux in Loir-et-Cher. EDF's objective is to dismantle the facilities as quickly as possible, the company confirmed.

Veolia is to provide EDF with its experience in remote handling technologies (robotics) with a view to designing and delivering innovative solutions to access the cores of gas-cooled reactors and to cut up and extract components under safe and secure conditions.

In parallel, EDF and Veolia will also work to develop an industrial solution for the vitrification of low- and intermediate-level waste using Veolia's GeoMelt technology.

Veolia says GeoMelt vitrification destroys organic waste and immobilises radionuclides and heavy metals in an ultra-stable glass. This is typically 10 times stronger than concrete, and more durable than granite or marble. Its leach-resistance is also among the highest of all materials in the world.

GeoMelt has been used successfully around the world, at the US Department of Energy (DOE) in Hanford, and at Sellafield in the UK, for example.

Veolia says this makes it ideally suited for radioactive waste, which is immobilised in a glass matrix, delivering a stable and durable waste form that is easy to transport and store.

Vitrification is considered an ideal choice for high-level nuclear waste by regulators internationally, because of its expected durability over hundreds of thousands of years. The companies' objective is the industrial implementation and joint commercial operation of these robotics and vitrification technologies.

Jean-Bernard Lévy, chairman and chief executive of EDF, said: "We are proud to have signed this agreement with Veolia, which underscores EDF's determination to become a key player in decommissioning and radioactive waste management.

"This partnership is also tangible evidence of EDF and Veolia's desire to pool their know-how in the interest of developing successful industrial sectors." Antoine Frérot, chairman and chief executive of Veolia, added: "I am delighted with this partnership between EDF and Veolia, an alliance between two key players, globally recognised, with a very high level of expertise in their respective fields.

Jean-Bernard Lévy (left) with Antoine Frérot sign the contract at WNE

"Our collaboration, which is expected to grow over time, demonstrates the extent of each company's vision and ambition with regard to processing the most environmentally sensitive waste and preserving the environment."

AFCEN's roadmap for growth

AFCEN (D121), the organisation that develops international standards and codes for the nuclear industry, unveiled its embryonic five-year plan at a conference in Paris on Monday.

Philippe Bordarier, AFCEN chairman, presented his strategic roadmap and asked for comments and suggestions from the organisation's members.

The organisation has members in 68 countries and wants to send out a clear message about its commitment and determination to work together in raising the bar on the quality, safety and competitive advantage of nuclear projects and facilities.

Bordarier, who joined AFCEN eight months ago, said his goal was to have a clear strategy on how to grow the organisation, its profile and its publications.

"More than 110 nuclear power plants and experimental reactors are currently being designed or have been built using AFCEN codes," Bordarier said. "Our codes are used in France, China, the UK and India – we recently signed an agreement for our work to be used on the Jaitapur reactor project in India.

"I presented the draft roadmap, which is 90% complete, on how we will continue to produce the best written codes, ensuring that they are selected and implemented correctly, while growing our presence in the industry."

Bordarier said AFCEN was also looking at using more digitisation in its work and expanding its network of user groups around the world.

ON THE ROAD WITH SÉCHÉ

French company Séché Energies (D 94) is opening the door on the safe transportation of hazardous and radioactive waste.

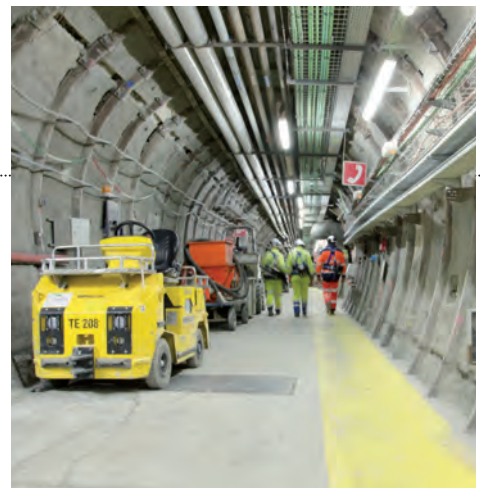
The Laudun-L'Ardoise company is marketing its special containers that can be used for transporting waste or even as a mobile base for analysis or storage of contaminated materials.

"We are supplying to France, Spain, UK and Italy," said sales manager Franck Degrutere. The ISO IP-2 containers come in 10, 20 and 40ft sizes and are certified by the French Nuclear Safety Authority.

"We are also offering customised sizes," Degrutere said. "We have containers for air transport which are just 2.3m high and therefore fit inside a Boeing 737 rather than a 747 and can save a lot of money."

Séché also designs and manufactures a range of radiation protection and shielding equipment such as rod shields and lead blankets.

Safe hands: Séché's Sylvie Cordio has it all contained



Going underground... Andra is at the vanguard of radioactive waste management

REPORT | CHUCK GRIEVE

ANDRA TAKES GLOBAL VIEW OF WASTE MANAGEMENT

There's an understanding among the world's more advanced radioactive waste management agencies that they have "a mission" to help less-advanced countries develop their strategy.

"We are interdependent," says Patrick Landais, Director of Development, Innovation and International Division of Andra, France's national agency. "Radioactive waste exists. It has to be managed and we're here to manage it safely."

France is in the vanguard of radioactive waste management with its operational facilities for managing low-level (LL) waste and its underground laboratory for scientific and technical research into the geological disposal of high-level (HL) waste. This project, called Cigéo, is moving toward realisation after more than 25 years of research, technological development and planning.

Currently 90% of the radioactive waste produced annually in France has a long-term management solution: Andra's surface repositories in Manche and Aube districts.

France, with its 55 reactors at 19 nuclear power plants (NPPs), produces a higher percentage of its total electricity by nuclear than any other country. The HL waste results from the reprocessing of spent fuel by vitrification.

Andra is responsible for finding permanent solutions to all long-lived waste. The agency knows better than most that planning the permanent disposal of waste is a step-by-step process involving painstaking research into geology, creation of an underground laboratory, scientific validation and demonstration of expertise.

Patrick Landais

The Cigéo project team has accumulated the scientific and technological demonstrations to support its licensing application, which it will submit by the end of 2019. Evaluation of the application by the safety authority may take 3-5 years. "We expect to be licensed," said Landais, "and then the real operational work starts."

Landais cautions other countries embarking on a similar mission not to rush the process. "If you are in a hurry, you won't take the time for the science or to demonstrate the system, to explain what's going on, to build a dialogue with the public. Time is a key success factor.

"Even for LL waste, you have to interact with the local population and elected officials to build their understanding and take their concerns into consideration. The main thing is just to proceed. You should be able to show the authorities that you're still working and progressing, not just in the technical sense but also in your constructive dialogue with the public."

Landais said there is worldwide consensus for using deep underground repositories to manage HL and long-lived waste. Differences in approach arise largely because of the volume of the radioactive waste inventories to be disposed of but also the different geology from country to country, with clay (France, Belgium and Switzerland), granite (Sweden and Finland) and salt (Germany and USA) the main geological environments chosen.

quickfacts

25+ *years of research on Cigéo*

55 *French reactors*

19 *NPPs*

Strong international cooperation on waste management exists between countries at every stage of the process through the Nuclear Energy Agency (NEA) and the International Atomic Energy Agency (IAEA), for example. Next year will see the launch of the European joint research programme (EJP) on management and disposal of radioactive waste.

Andra also has what Landais described as "strong exchanges" with sister agencies throughout the world, including China, Russia and Japan. "There are differences between [waste management] programmes," he said, adding: "We need very close relationships concerning science and strategy."

For its part, Andra has learned that effective management of radioactive waste relies on robust science and technology, safety, an incremental approach and good communication and co-construction. A project like Cigéo has a 130-year time horizon and will not benefit from being rushed.

"This is why it's important to build the right level of acceptance from your local communities," said Landais. "You will never open a facility like Cigéo if there is a low level of acceptance within your local community."

in**brief**

Rwanda, Rosatom sign wide-ranging MoU

› The Rwandan government has signed a memorandum of understanding (MoU) with the Russian state-owned nuclear group Rosatom that focuses on cooperation on the peaceful uses of nuclear energy. The deal was concluded by Nikolay Spasskiy, Rosatom's deputy director-general and international affairs department director, and the Rwandan ambassador to Russia, Jeanne d'Arc Mujawamariya.

The MoU establishes a legal basis for implementing bilateral cooperation in a wide range of areas, including the development of nuclear infrastructure in Rwanda and the development of programmes aimed at raising awareness of nuclear technologies and their applications.

Aubert & Duval forges new relationships at WNE

› Aubert & Duval (D100) has been providing forged and rolled metal products for the nuclear market for almost 60 years. The company says sales of its alloys and superalloys have expanded progressively across a broad spectrum of primary circuit contractors and their subcontractors. Its client base includes Framatome, Valinox, Nucleaire and CEA among others for everything from Gen II models to the futuristic ITER fusion reactor.

Newcomer is surface treatment specialist

› French company F1 Coating (H118) is a new player in the field of surface treatment of metallic parts in the nuclear industry, but has already gained approvals from EDF and AREVA. It offers a wide range of treatments for nuclear applications, including manganese phosphatisation (dry or oiled) to RCC-M F5200 standards and pickling-passivation of stainless steel components according to RCC-M F6000. The company also performs a number of coating processes and offers to be on a customer's site within 24 hours to cope with urgent situations.

Wika measures up with new pressure callibrator

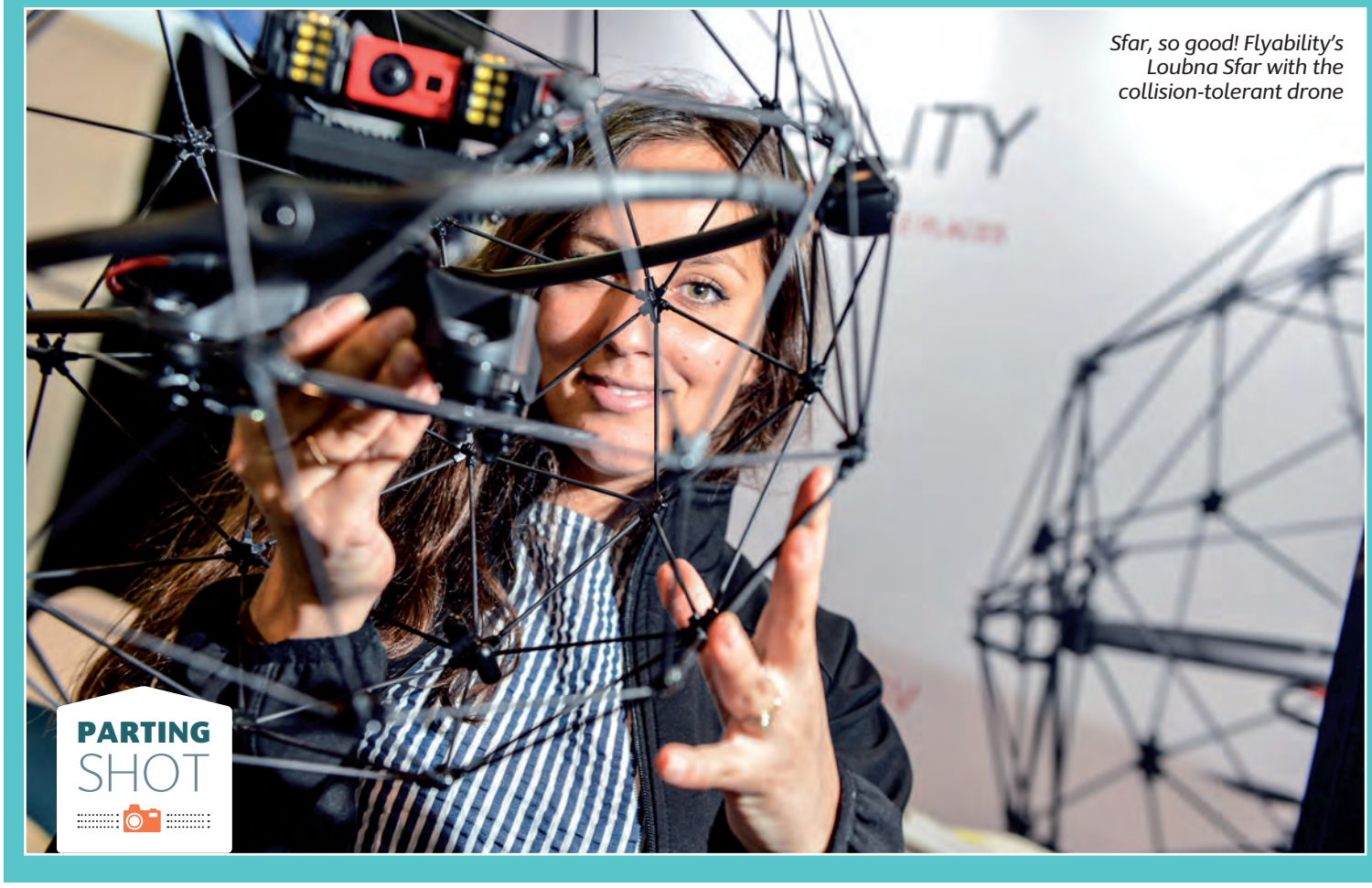
› Wika (K74) is exhibiting its new CPH7000 pressure calibrator, which features a built-in pump, touch screen, and accuracy of 0.025 for on-site calibration. The portable device combines pressure, temperature, current, voltage and ambient parameters. It allows the testing and calibration of both analogue measuring instruments and pressure transmitters. The version with the built-in pressure pump, barometer and ambient measurement module is the ultimate version of the 'all-in-one' concept, says the company.

DAY THREE PROGRAMME

- **9:25-10:25** CNNC panel discussion
- **9:30-10:30** Investors' Day breakfast
- **9:30-10:30** D&D guided tour – Itinerary B
- **9:30 -1:00** Exhibitors workshops – morning sessions
- **10:00-11:00** Digitalisation guided tour – Itinerary B
- **10:35-11:35** Boccard panel discussion
- **11:30-1:00** Lunch debate – Advanced Reactors, Gen IV and beyond
- **11:30-12:30** D&D guided tour – Itinerary A
- **12:00-1:00** Digitalisation guided tour – Itinerary A
- **2:00-3:00** CGN panel discussion
- **2:00-4:00** Exhibitors workshops – afternoon sessions
- **2:30-3:30** D&D guided tour – Itinerary B
- **3:00-4:00** Digitalisation guided tour – Itinerary B
- **4:00-5:00** Closing ceremony

Having a ball

Swiss company Flyability (E194) builds safe drones for inaccessible places. The rotors of its Elios drones are enclosed in a carbon-fibre geodesic ball-like structure - making it "collision-tolerant".



Sfar, so good! Flyability's Loubna Sfar with the collision-tolerant drone

PARTING SHOT

in**brief**

VTT ProperScan extends facility lifespans

› Finland's VTT (D155) says its ProperScan service offers a collection of semi-analytical tools and research designed to extend the lives of nuclear facilities and their components.

VTT says it can extend component lifetimes by understanding the root cause analysis of failure mechanisms, corrosion management, and the evaluation of mechanical behaviour.

It says its scientific research and practical experience of materials covers processes at temperatures up to 1,500 degrees C.

The company can provide criticality audits, maintenance planning and risk-based inspections to ensure operations run at maximum efficiency.

Belgian partners look to clean up in nuclear

› Belgian exhibitor P-Laser (C43) and its Benelux service partner, Netalux, plan to join forces to market their innovative laser cleaning solution to the global nuclear industry.

South West hub looks to build on nuclear power legacy

A partnership of industry, academic and public sector organisations is on a march to champion the nuclear industry in the South West of England as the premier destination for investment, innovation and growth.

Under the banner of Nuclear South West (C24), the collaborators are set on lifting the veil on the success of what has been almost a secret industry in the area.

"It has been about demystifying the nuclear industry in our region," said Bristol Univerity's Clare Threshes, operations manager of the South-West Nuclear Hub, "and from there developing skills for nuclear rather than nuclear skills."

The nuclear industry has been in the region for many years, but the development of Hinkley Point C, the first new nuclear power station in the UK for a generation, has shone a light that has sparked interest in the sector. It will create 25,000 job opportunities, 1,000 apprenticeships and will pump £100m a year into the regional economy.

But it is also home to the Oldbury nuclear reactors in Gloucestershire and is a key base for the UK's nuclear submarine fleet at Devonport Dockyard in Plymouth, the only facility in the UK licensed to refuel and defuel submarines. Other centres of nuclear defence activity in the South West include MOD Abbey Wood in Filton, and at Keynsham, near Bristol.

The Nuclear Hub has an outreach programme that reaches to primary schools through to university. "The collaboration extends across universities from Bristol, Plymouth, Exeter and Oxford," said new nuclear coordinator Corinne Matthews. "That drives through to schools where we aim to be part of the 'Inspire' programme to encourage young people to follow STEM subjects."

With transferable skills to other engineering-based industries as well as mobile opportunities, the industry is a boon to the region. "It mustn't be boom and bust," said Thresher. "We must build on the legacy. As EDF moves on from Hinkley to Sizewell and other projects, the expertise can be transferred."

The South West is hoping to be part of the Nuclear Sector Deal which is likely to be confirmed "imminently". The initiative is part of the UK government's industrial strategy which recognises the sector's wealth of world-leading expertise in nuclear science, research and development and innovation, much should deliver long-term benefits for generations to come.

The Nuclear Industry Council (NIC) says the deal will better equip the UK to capitalise on opportunities in a domestic market worth £75bn and global markets for newbuilds estimated to be worth £1.2 trillion and for decommissioning estimated to be worth £100bn up to 2035.

In step: (From left) Chris Vital and Corinne Matthews from Nuclear South West; Angela Presdee from Gloucestershire County Council; Clare Thresher, University of Bristol; and Paul Goss, the National College for Nuclear