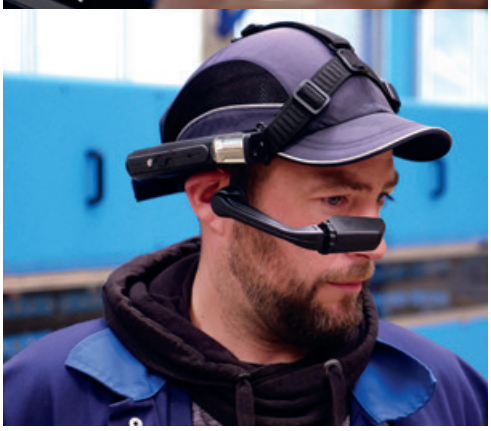
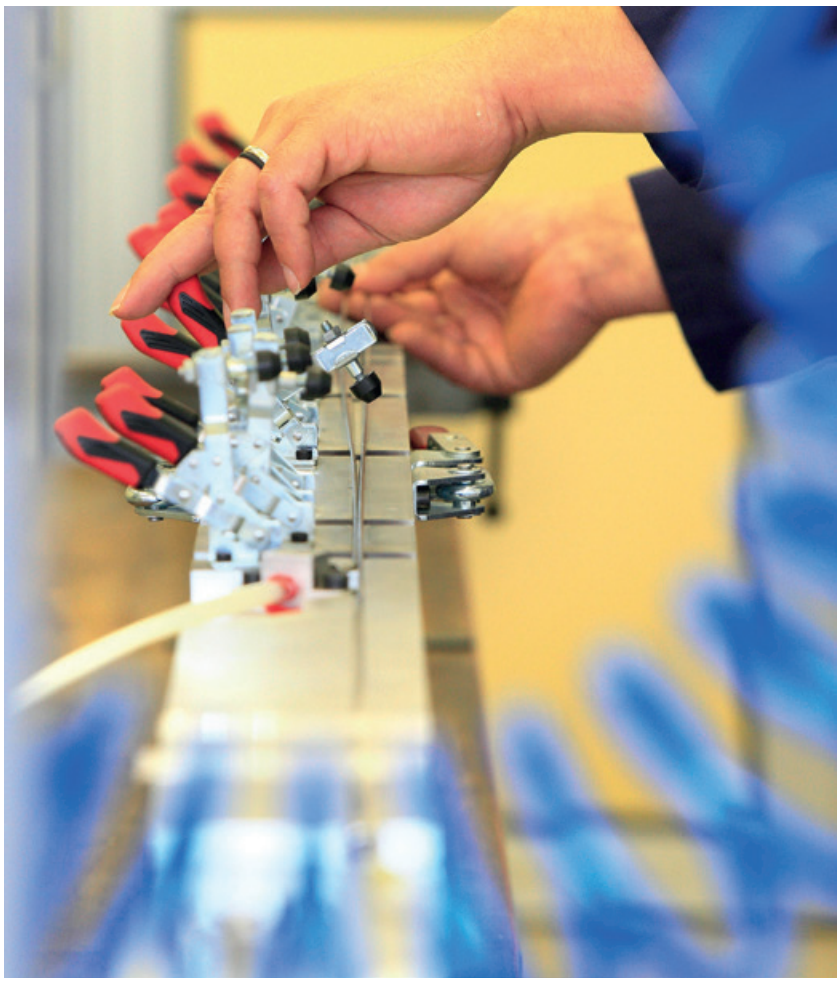










Free is covering Europe's largest 5G manufacturing site

PRESS PACK
DECEMBER 9, 2022

free | iliad GROUP

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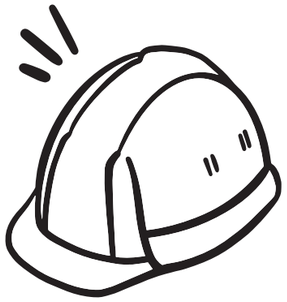
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In brief

Free has deployed 5G coverage at Alcatel Submarine Networks' site in Calais. With 57 indoor 5G access points and 2 outdoor 5G access points, covering a total surface area of 50,000 sq.m., this private 5G network designed, rolled out and integrated by Free Pro's and Free Mobile's teams has made ASN's Calais site Europe's largest 5G-connected manufacturing facility.

This record is the outcome of the Industry 4.0 project launched by ASN two years ago, with several million euros worth of financing provided by the French government under the Plan de Relance (France's national economic recovery plan) and the Investissements d'Avenir program that supports investments for the future. A subsidiary of Nokia France, ASN is a world leader in its field, designing, manufacturing, laying and carrying out maintenance work on submarine cables across the globe.

The aim of ASN's Industry 4.0 project to significantly enhance the productivity, quality, traceability and security of the operations at its Calais site. The private 5G infrastructure has enabled the deployment of an integrated software architecture comprising three platforms (design & industrial engineering, production, cost management & planning), which now inter-connect all of ASN's operations. There is also a hardware layer with a range of connected devices, such as goggles, tablets, and sensors, which can collect data from the production workshops in real time.

Several 5G applications are already up and running at the site, including digitalizing manufacturing procedures, measuring the fill levels of 130 fiber optic cable storage containers in real time, and remote maintenance support.

The Industry 4.0 project is currently being rolled out to ASN's other manufacturing facility, at Greenwich in the UK. This site will have 5G service by the end of the year thanks to eight indoor 5G access points.

This pioneering project combined the expertise of Free Pro and Free Mobile, who worked together to deploy the Nokia Digital Automation Cloud solution, which offers industrial-grade private 5G network connectivity and edge-computing capabilities.

As a key participant in France's digital transition, Free has clearly illustrated through this project how it can help major industrial players meet their imperative of implementing state-of-the art technologies.

59
5G access points

50,000
sq.m. with 5G coverage

5
5G applications already deployed

A several million-euro project financed by

The Investissements d'Avenir Program

France's Plan de Relance

ASN's Industry 4.0 project at Calais

1 THE ASN SITE AT CALAIS

Alcatel Submarine Networks (ASN) is a French company that has formed part of the Finnish group, Nokia, through its French subsidiary, Nokia France, since 2016.

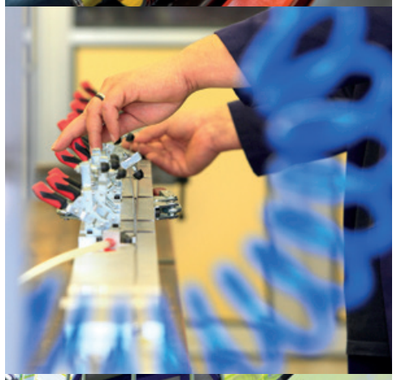
ASN is a world leader in manufacturing and laying fiber optic submarine cables. It designs, manufactures, lays, and provides maintenance services for submarine cables and related equipment, delivering fiber across the world.

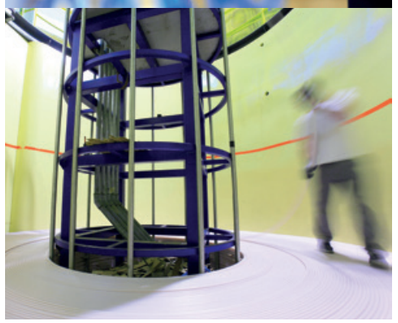
As at January 1, 2022, ASN had laid more than 700,000 km of cable on the seabed, had more than 300,000 km of submarine network under maintenance and had delivered over 200 fiber optic systems.

ASN's Calais site is dedicated to the production of fiber optic submarine cables. It covers 160,000 sq.m. and manufactures, tests, stores and then assembles 50,000 km of cables every year before they are taken out to sea.

A fiber optic submarine cable is manufactured in six stages, and the Calais site has all of the workshops needed for the whole process, from dyeing and insulation through to assembly. Once a customer has confirmed that the manufactured cable is compliant, it is loaded onto a ship in special storage containers. Everything is then tested to ensure that the connections work properly before they are shipped off to be laid on the seabed.









2 A NEW INDUSTRIAL ERA

Launched two years ago, ASN's Industry 4.0 project is aimed at meeting the challenges of today's fast-growing market for submarine communication networks.

The aim of ASN's Industry 4.0 project is to give it the tools it needs to enhance its management of product lifecycles and data-driven decision making. By doing this, it can improve the efficiency, quality, traceability and security of its operations.

This transformational project – which is linking up the whole of the company's value chain – has positioned ASN as a pioneer in its industry.

The project's 3 main components

- **PRIVATE 5G INFRASTRUCTURE**
  The private 5G infrastructure at the Calais site is the bedrock for all the other layers of the project, underpinning the transformation of the facility. Eleven buildings at the site now have 5G coverage.
- **INTEGRATED SOFTWARE ARCHITECTURE**
  Three structural platforms have been put in place to inter-connect ASN's operations (design & industrial engineering, production, cost management & planning). This ecosystem will be progressively added to going forward.
- **A HARDWARE LAYER**
  Connected devices have been deployed, such as goggles, tablets and sensors, to collect more data in real time and facilitate day-to-day operations.

An operator using a 5G-connected head camera in one of the production workshops at the Calais site.



3 A MULTI-PARTNER PROJECT CONTRIBUTING TO FRENCH SOVEREIGNTY

ASN's Industry 4.0 project is backed by major French and European industrial players, who are putting their expertise to the service of France's economic and technological sovereignty.

Free Mobile

ROLES:

- Identifying all of ASN's coverage needs
- Validating the solution and technical design for the network architecture
- Deploying the Nokia Digital Automation Cloud (DAC) network platform – which offers industrial-grade private 5G network connectivity and edge-computing capabilities – and monitoring its effective implementation
- Verifying that the installed equipment works properly
- Using a portion of Free Mobile's 5G spectrum

Free Pro

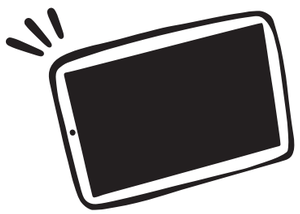
ROLES:

- Devising the contractual framework for the whole project and providing end-to-end support for ASN
- Creating a secure inter-connection between the private 5G network and ASN's IT system, business-specific applications, MPLS network and cloud infrastructure
- Providing 24-hour, 7/7 support for the solution, 365 days a year

Nokia

ROLES:

- Deploying the Nokia DAC network platform
- Offering an end-to-end solution combining, on the same platform, private 4.9G/LTE and 5G networks with indoor and outdoor access points, edge computing capabilities and ruggedized user devices
- Facilitating the management of the network and devices through an advanced web-based portal offering a broad range of click & deploy apps
- Working with iliad and Free Pro on planning and designing the network as well as on deploying and commissioning the solution, and on integrating the project's different building blocks supplied by the project partners
- Enabling Industry 4.0 use cases thanks to a technology collaboration with PTC, which provided industrial IoT, augmented reality (AR) and product lifecycle management (PLM) solutions



The largest private 5G network deployed at a manufacturing facility in Europe

With 57 indoor 5G access points and 2 outdoor 5G access points, ASN's site at Calais boasts the largest private 5G network to date in Europe. In total, it represents 50,000 sq.m. of surface area with 5G coverage.

The 5G infrastructure was deployed at the Calais site in two phases. First, two outdoor and four indoor 5G access points were installed to cover the loading docks of the cable ships and two of the site's buildings. Then 53 other indoor access points were deployed to cover seven more buildings. The Nokia Digital Automation Cloud (DAC) solution was selected to create a private 5G network with a dedicated core network. The private mobile network uses 3.5 GHz 5G frequencies provided by Free Mobile.

The benefits of a private 5G network

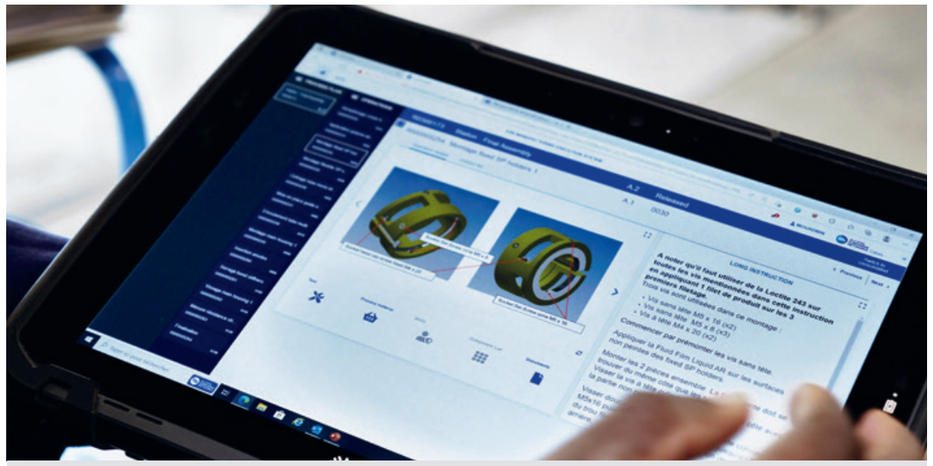
At its Calais site, ASN now has dedicated connectivity that offers excellent benefits not only for speed and latency but also in terms of:

- **SECURITY: thanks to the dedicated core network all data remains within the company. Access to ASN's 5G network is restricted and it can only be used by people who have a special SIM card.**
- **AUTONOMY: the private 5G network connection is always separate from that of the national operators' networks, with its own service quality and capacity.**
- **EFFICIENCY GAINS: 5G apps are already enabling ASN to digitalize more of its procedures and develop M2M operations (remote management, virtualization, data collection, etc.) and therefore significantly increase its efficiency.**
- **TECHNOLOGICAL SCALABILITY: thanks to the 3GPP LTE/5G standards, all of the legacy wired networks can be replaced. This base of connectivity means that the Calais site is already set up to develop in the Industry 4.0 ecosystem by implementing all of the solutions that will be available in the future.**



The project partners opted for the Nokia Digital Automation Cloud solution to create a private 5G network with a dedicated core network. Shown here is one of the 57 indoor 5G access points for the site.

Industrial use cases for 5G at ASN's Calais site



USE CASE 1

Digitalized manufacturing procedures

Having 5G coverage at the site means, first of all, that ASN can deploy the integrated software layer for all of its products. In other words, ASN can digitalize its manufacturing procedures, which will now be integrated in real time into its various IT systems, such as PLM, performance tools and ERP.

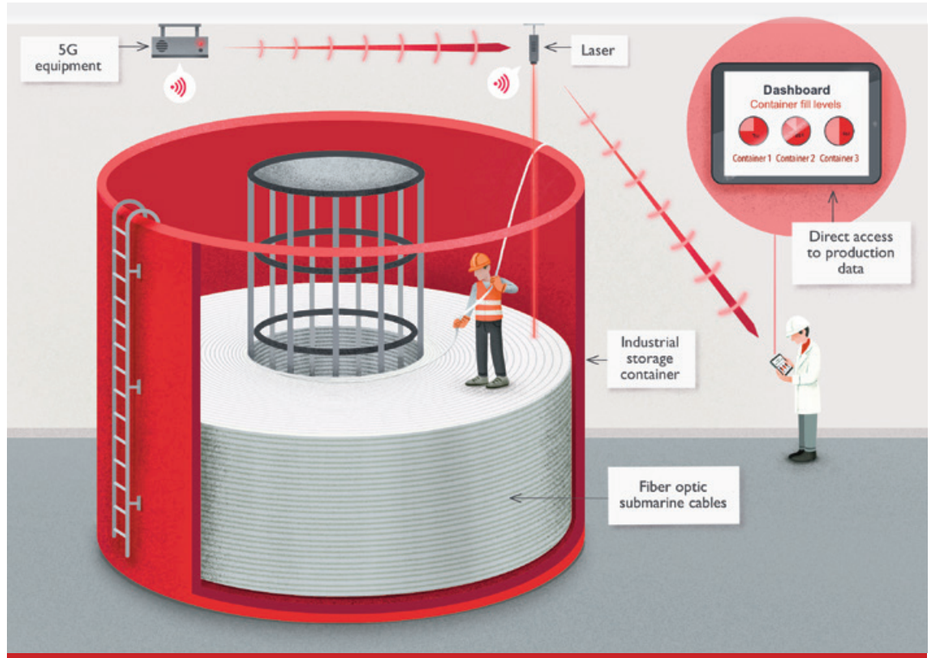
Until now, ASN's manufacturing procedures were prepared manually, on paper. Now, with the new integrated solution, operators can use any mobile 5G device to have access, in real time, to all of the technical and production specifications for the company's products in the PLM system, and to digitally update the production registers which will then be used in a centralized database.

Why 5G?

This integrated software layer needs an extremely reliable cellular network, with secure data transmission and a high degree of mobility between the radio cells without any loss of data. Also, because these data flows are so vital, the infrastructure needs to be supervised and kept in proper working order in real time, like a public network. In addition, access to and transmission of this sensitive data have to be highly secure, and 5G offers an unrivalled level of security through the specific SIM card (unique and encrypted) and the APN.

Main advantages

Better transmission and updating of data and manufacturing procedures, manual tasks no longer needed for consulting and creating documents, sharp reduction in risk of error, less stressful and easier to use for operators, traceability, better tracking of production/ reports, improved operational performance.



USE CASE 2

Measuring the fill levels of industrial storage containers

Once they come off the production lines in ASN's workshops, the fiber optic submarine cables are stored in large containers while awaiting final assembly with repeaters and other connection systems and then being loaded onto a ship to be installed at sea. The Calais site has 130 of these containers.

Until now, the container fill levels had to be recorded manually in the IT system by ASN's operators, with all the risk of error and uncertainty this entails, such as input mistakes and approximations. And yet this information is critical for the plant's operation because the volume of cable that can be manufactured depends on how much space there is in the containers to store it.

A laser has now been installed above every container which gives a highly precise measurement of its fill level. The information is transmitted in real time, via a web-based application, to the operators and integrated into the IT system.

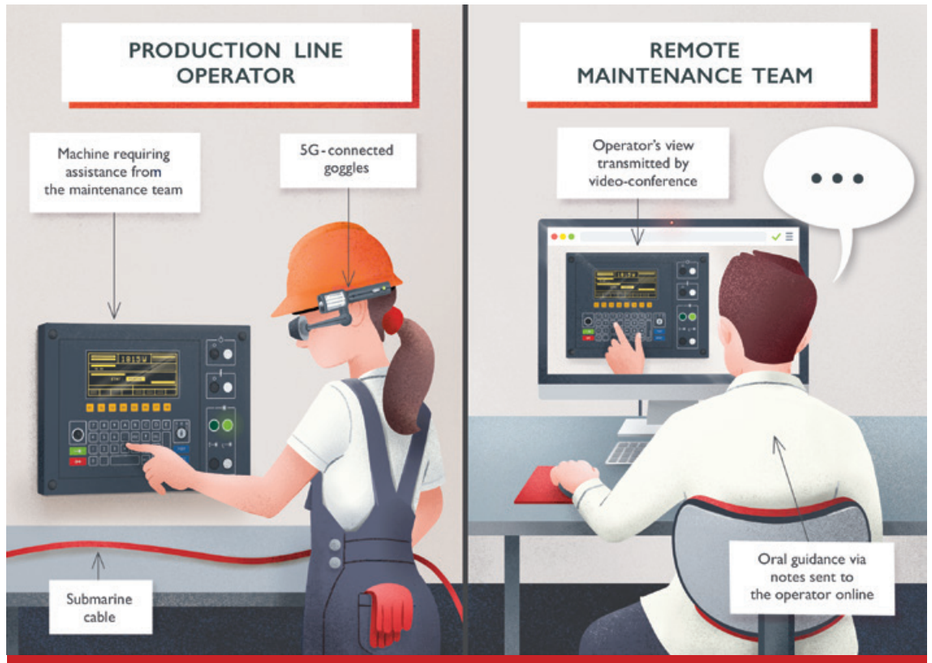
The measurement data is processed and then fed into a dashboard which will ultimately group together all of the information concerning the facility's production lines (lines where production is in progress, stopped lines, etc.). Being able to collect and process this type of data will enable ASN to forward plan and manage production more easily. And ultimately, the company will also be able to use the data for predictive planning.

Why 5G?

As the 130 containers are very spread out across the site, and in view of how critical fill-level data is for production, this use case needs a dense and highly reliable cellular network, optimized to support IoT applications (high performance and low latency).

Main advantages

Reliable measurements to the nearest 1 mm, better management of the use of containers (which are critical for production at the Calais site), availability of data so algorithms can be used for container management.



USE CASE 3

Remote maintenance support

The workshops at ASN's Calais site make fiber optic submarine cables. Each workshop has specific machine tools, and until now maintenance and repairs of those tools were carried out in the traditional way. So if there was an incident with any machine, the specialist maintenance team had to come out on site to analyze the problem and perform the required repairs. The timeframe for doing that – which couldn't be shortened – had a significant impact on production.

Having 5G connection at the site has enabled ASN to deploy a remote support solution for the machine tools. The company's operators have smart goggles which they use to communicate with the specialist maintenance team located off-site. The operator speaks with the maintenance team in hands-free mode, so it's all totally safe. The support team guides the operator in real time throughout the duration of the intervention. This saves a lot of time as the machinery can be repaired and put back into use for production as soon as the incident is identified, which therefore optimizes the availability of the machines. At the same time, it reduces travel for the support teams and therefore reduces the overall carbon footprint of ASN's operations.

The solution is currently being deployed across all of the site's fleet of machine tools, with the best-suited approved suppliers selected to provide the remote support for each type of machine. ASN's ultimate aim is to use the same platform with all suppliers in order to fluidify communications and centralize data flows.

Why 5G?

ASN needs remote maintenance and repair support for all of its products and machines across the site, potentially including in the port zone and even for ships docked at the quay. So the company needs to have reliable, continuous and high-performing indoor/outdoor service to be able to transmit data at ultra-fast speeds. As certain maintenance work is vitally important, ASN requires infrastructure that guarantees the secure transmission of certain data even if there is a lot of traffic on the network.

Main advantage
Easier and faster maintenance operations.



USE CASE 4

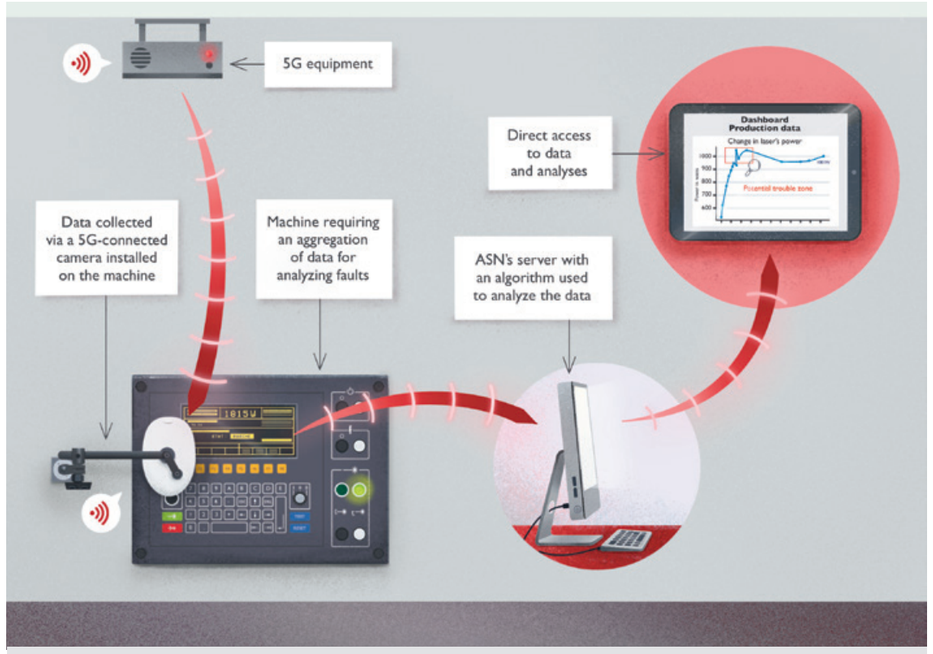
Energy monitoring

By installing 5G detectors in the various buildings the company will be able to fully and precisely monitor the energy used at the site. For example, it will be able to track the use of electricity, water and heat. All of the data collected will then be fed into a dashboard which will provide an overall view of the site's energy consumption. Thanks to this monitoring tool ASN will be able to implement tailored energy-saving measures if required.

Why 5G?

This application needs full and reliable coverage across the whole site to be able to use it in an agile and independent way. It also needs optimized wireless communication technology (reliable communication and low latency).

Main advantage
Optimized energy management.



USE CASE 5

Production incident analysis

In one of the submarine cable production workshops, ASN's teams regularly identify incidents that can't be explained. These occur when the welding laser is powering up on the tube production line, which turns a stainless steel strip into a waterproof tube designed to contain the fiber optic cables. As the machines concerned are not connected to the Internet or ASN's IT system, the teams do not have any data to analyze the source of the problem and therefore resolve it. However, these incidents have a critical impact on productivity because each time they happen they cause an interruption of at least eight hours in order to stabilize the line again before production can be relaunched.

A 5G camera linked up to a computer vision system has now been installed on the production line, which will collect data during the laser's powering up phase so the cause of the problem can be understood. In the future this system will also automatically recognize the configurations likely to generate breakdowns and enable preventative quality measures to be triggered before the incident occurs.

Main advantages

Upstream incident detection, an innovative and mobile system that can be easily transferred from one piece of equipment to another.

Why 5G?

This application requires far-reaching mobile service so the system can be deployed across the whole site, as well as needing an ultra-fast connection speed and low latency.

The executives' viewpoints



Thomas Reynaud
CEO of Free - the iliad Group

"The manufacturing facility of the future is already here! We hear a lot about 5G for the retail market, but what we're doing alongside ASN is a clear demonstration of the huge step forward 5G represents for industry. With the largest 5G-connected facility in Europe, Calais has become the showcase in France, and Europe as a whole, for Industry 4.0. And at Free we're really proud to have partnered this amazing project from end to end. It will go down in history. And one day we'll say that everything started in Calais!"

Denis Planat
CEO of Free Pro



"In today's world, industrial 5G is becoming an indispensable competition driver for companies. As a strategic partner of ASN's digital transformation project, we are responsible for the end-to-end transparent integration of its private 5G network solution. This is enabling ASN – a world leader in submarine cables – to fully leverage its operational data while transforming the workflows and processes of its manufacturing facility. Throughout the project, Free Pro's teams worked alongside ASN to securely inter-connect its cloud infrastructure, its legacy networks and this new private 5G network with its IT systems and business-specific applications."



Alain Biston
President of Alcatel Submarine Networks

"At ASN we were seeking to transform our production processes based on an Industry 4.0 approach so we needed to have a secure and reliable digital infrastructure that could carry the critical data flows for our manufacturing operations. As of 2020, we decided that we wanted to deploy a private 5G network in our manufacturing facilities to meet our needs for high performance, high availability, mobility, security and functional scalability. Thanks to the Nokia technology deployed by our partner Free Pro (formerly Jaguar) and brought into service in our facilities in Greenwich and Calais, we now have ultra-fast connection speeds, continuous coverage, and mobility with no loss of data for the applications we're using in our digitalized workshops. In the near future, we'll be counting on the functional scalability of 5G to be able to massively extend our industrial IoT applications that need reliable communications with very low latency."

Pierre-Gaël Chantereau
President of Nokia France



"We're delighted to have worked alongside iliad and Free Pro to help ASN achieve its digital transformation project aimed at optimizing operations and enhancing its security and team communication. As a global leader in the private mobile network market, we worked with our partners on planning, designing and commissioning the network and deploying our application platform, Nokia Digital Automation Cloud (DAC), which offers industrial-grade wireless connectivity and edge-computing capabilities."

The ministers' viewpoints



Jean-Noël Barrot
Minister Delegate for Digital Transition and Telecommunications

"Our infrastructure is the essential backbone for ensuring that our fellow citizens can effectively use all of today's technologies and that our businesses remain competitive. That is why the French government is massively supporting not only the deployment but also the take-up of 5G in industry. I'm very proud to see the inauguration of this 5G manufacturing facility today, which is the largest in Europe to be equipped with this technology. It paves the way for a revolution in how companies use and communicate data, giving their production tools a huge competitive edge, particularly in terms of remote management, virtualization, and machine-to-machine data collection."

Roland Lescure
Minister Delegate for Industry



"Through Industry 4.0, the French government is supporting an evolution that is both tangible and necessary: the digitalization of manufacturing bases and the transition to smart processes that are at the cutting edge of efficiency and agility. 5G for industry is one of the most strategic and promising aspects of Industry 4.0, representing a major driver of competitiveness and growth for companies in our country. We are absolutely determined to support the deployment of this technology, step up its use and demonstrate its benefits throughout the whole of France. I therefore applaud this inauguration of the largest 5G-connected manufacturing facility in Europe."

About Free - the Iliad Group

Free – the inventor of the world's first triple-play box – is a **Fixed and Mobile Ultra-Fast Broadband operator** in France, standing out for its innovative, straightforward and attractive offerings. It currently has **21.1 million retail subscribers** (14.0 million Mobile subscribers and 7.1 million Fixed subscribers).

Free is a subsidiary of the iliad Group, which was created in France in the early 1990s and now also operates in **Italy** and Poland. In Italy – where the Group launched its business in 2018 under the **iliad** brand, becoming the country's fourth mobile operator – it has over **9.3 million subscribers**.

With the acquisition of the **Polish mobile operator**, **Play**, in November 2020, the iliad Group became **Europe's sixth-largest mobile operator** by number of subscribers (excluding M2M). And its acquisition of **UPC Polska** – which completed in April 2022 – has made the Group a convergence leader in Poland.

In March 2021, the iliad Group launched its BtoB business in France under the **Free Pro** brand.

www.free.fr - www.iliad.fr

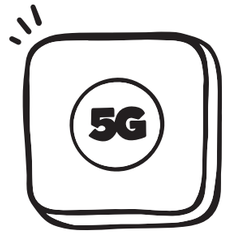
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E-mail : presse@iliad.fr

Free Mobile

Free Mobile is the iliad Group subsidiary responsible for **the design, deployment, operation and development of Free's mobile network**. It currently employs some 1,000 people.

Created in April 2021, Free Mobile's specific coverage team is dedicated to **indoor and outdoor 3G/4G/5G specific coverage projects**. It is made up of project managers, engineers and site leads who work on **the design and deployment of end-to-end coverage solutions in complex industrial environments**.

couverture.specifique@free-mobile.fr



Free Pro

Free Pro's mission is to make best-in-class and secure **mobility**, **connectivity** and **cloud** solutions available to all types and sizes of businesses and organizations through **straightforward, innovative and value-for-money offerings**. Backed by local customer support teams, Free Pro is helping **over 30,000** companies and public organizations to accelerate their **digital transformation**.

Free Pro addresses the whole of the B2B market, from SMEs through to major corporations, offering a combination of straightforward, top-quality **fixed and mobile offerings under the Free Pro name**, and **XPR solutions under Jaguar Network by Free Pro**. To do this, it uses its fiber network that is inter-connected with **its own datacenters** located in France. These datacenters are ISO 27001 and HDS certified, testifying that they meet the highest standards in terms of eco-design, operation and security. With a **network of regional offices**, Free Pro continuously invests in very high availability infrastructure and delivers services that are close to its customers.

www.freepro.com

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