EDM

MAGAZINE



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70\^{YEARS} CHANGING TIMES IN AUTOMOTIVE SECTOR

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EDITORIAL

ONA MOVING FORWARD WE CONTINUE **MOVING FORWARD**



We are going through a period of uncertainty that is probably longer than expected. The best way to face these new times is to invest in Research and Innovation. At ONA, we passionately believe in the benefits that our technology provides to production processes. That is why this year we have continued working to present new technological EDM solutions that we are confident will translate into competitive advantages for our customers. Throughout this edition, you will find the latest from ONA on its path towards the EDM technological revolution.

This year, we are very happy to present the most advanced machine in die-sinking EDM technology; our new ONA IRIS model. Three key points support this statement. First, the ONA IRIS machine is simple, intuitive, and easy to use thanks to a more complete integration of digital tools that make it easy for any user to handle. Second, its powerful graphics engine allows simulations to be made in order to test possible results. This way, the user has absolute control over the project. All of this while the ONA IRIS completes another >>

project. Lastly, the ONA IRIS machine integrates the market's most powerful generator, that is 100% digital, configurable, and programmable. All of these benefits make it our strongest push yet towards revolutionising the way EDM is done.

Plus, for those that need to get the most profit out of their production processes without major investment, we at ONA have developed our AD models, a lowcost wire EDM series. With the AD25 and AD35 machines, our aim is to offer the very best, while still within everyone's reach: precise, reliable units at the best price.

In addition, in recent months during 2021, we have been developing the FAST HOLE range of machines. FAST HOLE technology provides a solution to machining cooling holes in turbine components (blades and vanes) for both the aviation and energy sectors. With this project, we are working on the design of a new

series of special ONA FAST HOLE EDM DRILL machines with a modular design and integrated solutions to produce cooling holes in turbine components. All this hard work has been rewarded with our continued growth in sectors such as aviation and automotive, which have brought us new benchmark customers in China, the United States, France, and others.

Likewise, I can't forget about our new major push towards additive manufacturing technology. Both SAMYLABS (Laser beam powder bed fusion technology) and ADDILAN (WAAM technology) have had their first successful international cases this year. We are truly proud of our entry into additive manufacturing, and of having been a part of the success they achieved.

Lastly, I would like to dedicate these last few words to our new ONA MOVING FORWARD communication plan. Out of

\People \Technology \Profitability

this plan comes our new claim: PEOPLE, TECHNOLOGY, and **PROFITABILITY.** Words that perfectly define who we are, what makes us important to our customers, and what differentiates us from the competition. This new communication plan was developed following a complete analysis of our company, the ever-changing markets, and our competition, and emerges to face the need to improve our visibility and remain relevant in an increasingly competitive market.

From here, all there is left for me to say is that I hope that you enjoy our passion for EDM in the following pages of this magazine.

ONA manufactures and develops all the technology



AEROSPACIAL INDUSTRY

EDM the prefferd technology to manufacture aerospace complex geometry parts.

The range of aerospace components and applications where EDM can be applied continues to grow. Before there were only a few applications, belonging almost exclusively to traditional EDM such as cooling holes and grooves in NGVs, segments, and blades. Now EDM is also applied in impellers, IBRs, OGVs, turbine discs, combustion chambers, and fan blades. ONA has been involved in aerospace sector projects for more than 20 years. We work with our customers to find specific machining solutions for their components. We always seek solutions to their problems using EDM. These approach exercises produce interesting and often surprising solutions.

INTERVIEW

"Our strategy involves offering aerospace companies personalised machines with high added value".

The development of new smart digital generators has been a major driver behind EDM having been transformed into a viable and highly competitive manufacturing process in the aerospace sector, even for so-called 'critical parts', meaning rotating parts or those that support cyclical loads and can experience fatigue failure. ONA has played a major role in this positive evolution, with contributions such as the AV35 wire cutting machine for turbine disc firtree manufacturing.

As mentioned in this interview with ONA Key Account Manager Marius Petean, the future involves continuing to focus heavily on a sector that already represents 25% of the company's annual turnover. "All of the aerospace sector's most important companies use ONA machines. Our business goal is to further grow within our own customers, in their various manufacturing facilities they have all around the world, as well as with first and second tier suppliers that use EDM machines, with particular focus on the North American market", Petean notes.

QUESTION. How did ONA begin developing applications for the energy and aerospace sectors?

ANSWER. ONA has been involved in aerospace sector projects for more than 20 years. But for a long time it was within a limited scope. These were customers that required machines that needed to meet certain technological requirements associated with gas turbine component EDM machining processes. Just 10 years ago, aerospace company sales represented less than 5% of ONA's annual sales. Nevertheless, we saw not long ago that there was a need to refocus management of a sector that



could increase sales and, at the same time, counteract and complement other traditional business sectors such as moulds and die-stamping for the automotive sector. This new approach began 6 years ago. Since then, ONA's aerospace sector sales have continued to grow, now representing 25% of total annual turnover, with outlook for a significant increase in coming years.

O. Could we say that EDM is already the preferred technology for manufacturing certain parts with complex geometry in a sector as demanding as aerospace? Is it on par with broaching and milling in terms of final product quality? ≫

A. EDM was considered a 'necessary evil' in the aerospace industry. There are certain components that can only be machined using EDM. For that reason, aerospace part designers have developed specific drawing definition procedures for these components that include EDM process requirements as well as metallurgical and surface quality acceptance requirements. EDM is considered a special process that must be approved before being applied to serial production. Nevertheless, this perception has been changing in recent years. On one hand, new EDM technologies based on cutting-edge digital generators now allow for a substantial increase in material removal and, on the other, a significant "All of the aerospace sector's most important companies use our machines".

increase in eroded surface quality. EDM continues to be a 'necessary evil', but now it is considered an industrially viable alternative to replace or complement other types of machining. For example, the surface quality that wire EDM can currently achieve makes this process a worthy alternative for replacing turbine disc broaching.

O. What kind of parts/applications are we talking about?

A. The range of aerospace components and applications where EDM can be applied continues to grow. If before there were only a few applications, belonging almost exclusively to traditional EDM such as cooling holes and grooves in NGVs, segments, and blades, they have now been diversified to include impellers, IBRs, OGVs, turbine discs, combustion chambers, and fan blades.

Q. What caused this leap in recent years? Was it simply the development of new generators that transformed EDM into a competitive machining technique for the aerospace sector, even when it comes to so-called 'critical parts'?

A. Obviously, the leap forward in technology has been triggered by new generations of EDM machine generators, but also by advancements in the development of EDM technology. While only a few EDM parameters could be configured previously,

EDM is already a viable and competitive alternative for manufacturing critical aerospace components.

now more than 30 configurable parameters can be used. This provides much greater flexibility when it comes to finding the optimal solution. Then, we must acknowledge the work of the OEMs to introduce EDM into critical parts, the drive and tenacity of their engineering and manufacturing managers that were open and prepared to accept, check, and approve EDM for these types of parts. Without them, it would have been impossible to reach this point.

O. What technical advantages have the new generators brought to EDM manufacturing of, for example, gas turbine discs, rotating parts that reach up to 60,000 rpm and must be prepared to withstand extreme pressure fluctuations and temperatures?

A. In the case of ONA's new generators, it was the fact that they are digital. Now EDM technologies can be developed such as electrolysis and micro-cracks can be diminished or even eliminated, achieving very low recast layer levels of just a few microns. The surface requirements are acceptable, and the parts can be approved for flying..

O. What advantages does EDM offer aerospace sector parts manufacturing over more traditional techniques such as broaching and milling?

A. From an industrial point of view, some very interesting advantages have been defined, particularly with wire EDM. Compared with conventional machining using milling and broaching, recurring consumables costs are significantly lower. In respect broaching, wire EDM offers fast and cheap prototyping solutions. Between designing and manufacturing, a broaching tool could require up to a year, while wire EDM is nearly immediate and directly associated with the cut profile's programming. In addition, this approach does not allow for errors; if for some reason the broaching tool is not right, design modifications have to be made and manufacture a new one. In the case of EDM, after cutting the piece , the profile is measured, and if it must be adjusted, it can be done directly by programming the cutting path. On the other hand, the wire EDM machine's autonomy is another major advantage. All of ONA's AV models have the option of using a 45 kg wire spool system, which is nearly 8 times more than a standard 8 kg spool. And when it comes to die-sinking EDM, we can see a trend towards automation using robots and shared or individual electrode storage.

O. Do traditional machining methods have limitations that EDM does not when it comes to achieving certain geometries or processing certain materials?

A. EDM is a contactless machining process. It only requires that the materials to be eroded have electrical conductivity. Obviously, this is an advantage over conventional machining. There is almost no difference between material removal and tool wear (electrode) if aluminium or nickel alloys are eroded, which is not the same with conventional machining. >>



Some recent examples include ONA's AV35 wire cutting machine for turbine disc firtree manufacturing.



O. What role has ONA played in this evolution to transform EDM into a preferred technique for manufacturing aerospace parts?

A. We work with our customers to find specific machining solutions for their components. We always seek solutions to their problems using EDM. Let's say that these approach exercises produce interesting and often surprising solutions.

O. So then, ONA produces personalised and customised solutions for the sector's companies.

A. Absolutely. Our strategy in the sector is to provide customers with high added-value solutions. We listen to them and offer them personalised solutions according to their requirements and their degree of familiarity with EDM. An example would be a customer with little EDM experience asking us for a turnkey solution that includes tool design and manufacturing, EDM technology, NC (Numerical Control) programming, and industrial part approval. Two different part numbers and, in total, nine different EDM operations.

O. What have been ONA's latest technological applications/contributions for the aerospace sector?

A. Some recent examples include ONA's AV35 wire cutting machine for turbine disc firtree manufacturing; wire EDM machines for automatically cutting aerodynamic profiles to fit blades to rings; diesinking EDM with high performance material removal; die-sinking EDM adapted to complex cavities in components like impellers; or die-sinking EDM for shaped holes in blades and NGVs.

O. You said that ONA already attributes 25% of its annual sales to the aerospace sector, but what is forecast for the future?

A. All of the aerospace sector's most important companies use ONA machines. Our goal is to further grow within our own customers, in their various manufacturing facilities they have all around the world, as well as first and second tier suppliers that use EDM machines, with particular focus on the North American aerospace market.

O. Where can we expect the next innovations in EDM machinery for the sector? What are the next challenges to show that EDM technology is more alive than ever when it comes to aerospace part manufacturing?

A. Technologies and processes are constantly being innovated. New EDM applications appear following the development and introduction of new technologies. A revealing example is EDM for cutting parts produced through additive manufacturing. In the future, we will not only need adapted technologies, but also different machines that are better suited to the type and size of additive manufacturing parts. A greater challenge will be the cybersecurity of machines within a digital and connected industrial environment. And an important added value for customers/users of EDM machines will be the machine and process data collection for subsequent analysis in order to improve manufacturing processes and preventive maintenance of the machines. 98% EFFECTIVE AVAILABILITY ON ONA MACHINES.

AVAILABILITY is one of the 3

factors used to calculate OEE

index.

(Overall Equipment Effectiveness)

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EE is the world-recognized standard for measuring manufacturing productivity. It is calculated based on three factors:



Planned downtime comprises

shutdowns and machine preventive

Any malfunctions or unexpected

failures that require interventions

of any kind resulting in machine

mainly of scheduled plant

stoppage are considered

The other two **OEE factors**

depend on the specific process

unplanned downtime.

maintenance.

While the **AVAILABILITY** factor is strictly dependant on the equipment (EDM machine in this case), the other two factors are process related.

AVAILABILITY factor is the percentage of the actual machine production time including planned downtime out of the total scheduled machine production time.

This question is answered by Marius Petean, Key Account Manager at ONA: "It can be considered as normal early in the EDM machine lifetime, i.e. in the first 2 or 3 years. After that it is more unusual, and that is precisely where ONA's success lies: in the durability and feasibility of its machines, which ensure maximum profitability in manufacturing processes".

For ONA EDM machines users. the high AVAILABILITY rate is very well appreciated "machines are available or productive for longer time, so the return on investment is obtained sooner. And out-ofwarranty maintenance costs are lower too", he stresses.

The OEE index was created by Japanese engineer Seiichi Nakajima (1919-2015) based on

Total Productive Maintenance, a concept which he also invented, and which seeks to ensure maintenance in the production system and avoid losses and deterioration based on the parameters of zero defects and zero accidents. Nakajima was one of the great names in 20th century industrial engineering.

tasks carried out by each

company on the equipment (EDM

machine) at their manufacturing

facilities. They depend on how

their manufacturing processes

are setup ("PERFORMANCE")

within their product quality and

quality management systems

("QUALITY").

Is it normal for the AVAILABILITY rating to be so high on EDM machines?

Among other advantages, higher

availability rating means that the

companies get faster return on

their investment.

TECHNOLOGICAL LEADERSHIP

Discover the ONA experience and get to know our solutions in detail.

ONA has become over the years specialist in complex solutions. Its expertise has led him to do so. Complex solutions require a continuos direct treatment and empathy, a terrain where ONA is even stronger.

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TECHNOLOGICAL LEADERSHIP

ONA hits a winning strike with major power-generation gas turbine OEM.



Presently, ONA has the highest expertise in the world as EDM machine-tool manufacturer. Years of experience in the field together with advanced technology focus in providing customized solutions to its customers, position ONA as preferred EDM equipment supplier for a major industrial gas turbine OEM, which is part of a much-admired technology corporation that provides products and services for aerospace, aviation, healthcare, power generation, renewable energy, digital industry, additive manufacturing, venture capital and finance.

A production facility in northern France have recently acquired a large package of ONA EDM machine-tool equipment consisting of 4 AV35 wire EDM and 4 QX4 die-sinking EDM.

AV35, perfect for turbine disc firtree production.

AV35 incorporates the latest wire EDM technology required for high-end critical parts such as the turbine discs and blades. That's why standard AV35 has been customized with complete apparatus and »

The total EDM production capacity consists of:

- \ 4 AV35 wire EDM (2020)
- \ 4 QX4 die-sinking EDM (2020)
- \ 4 AV35 wire EDM (2019)
- \ 1TQX8 double-head die-sinking EDM (2016).
- \ 2 TX8 double-head die-sinking EDM (2013, 2015)
- \ 1 NX6 die-sinking EDM (2013)

The combined accuracy and cutting speed are the main reasons for which ONA was entrusted for such complex EDM projects within longterm relationship.



accessories to be used to wire EDM machine turbine discs firtree. In other case, same standard AV35 has been slightly modified such as to be used to cut larger blades and that way saving money and floor space for purchasing a larger machine. This proofs that ONA EDM finds ways to adapt its machines to the customer needs, creating fully configurable products.

With a robust and compact design, AV35 has high industry reliability standards, and as the rest of the wire EDM equals **profitability** thanks to:



High-efficiency and lowconsumption generator.



Optimized filtration system using cycles and pumps settings that save energy.



Reduced consumable costs. EDM technology including wire low consumption.

In addition to that, in some cases, the machining process can be fully automated. A continuous information exchange between machine and the production facility industrial environment allows better process control, less interruptions and implicitly longer hours of continuous machine operation. These new machines add up production capacity to other 8 ONA machines already in use at the above-mentioned facility.



Any deviation from the initial process setup can be monitored in real-time and decisions can be made right away. For example, if the dielectric temperature gets out of the programmed limits an alarm pops up. All this translates into higher productivity.

After the customer's acquisition of the first four AV35 machines, more machines were required to cope with an increased production volume. The undoubtable performance and reliability of the first four AV35 machines have triggered the acquisition of another four, getting to a total amazing number of eight AV35 installed machines in less than 1 year span.

TECHNOLOGICAL LEADERSHIP

BUILD-A-MOLD - PLASMAN GROUP:

BUILD-A-MOLD has chosen ONA for our EDM machines' high precision and productivity.

BUILD-A-MOLD is a division of PLASMAN GROUP, the world leader in automotive components with more than twelve plants in six countries.

ONA has been at the forefront of virtually all important developments for electrical discharge machining. Throughout almost 70 years of experience, we have always been committed to investing in the future, which lead us to become the most specialized manufacturer worldwide. We have 15,000 machines installed in more than 60 countries, 98% overall equipment efficiency, and hundreds of satisfied customers with whom we have built lasting relationships based on trust.

For all these reasons, we are still chosen by companies like **BUILD-A-MOLD** (Canada), specialized in the manufacture of plastic injection molds for the automotive industry. The company started its activity in 1978 as a small mold workshop. The founder, Alec Pinsonneault, envisaged the industry's changes and needs and, subsequently, bet strongly on expansion, creating the foundations of what today is **PLASMAN GROUP**, a world

The Canadian company acquired four ONA machines after evaluating the results of several tests, in which ONA competed with four other EDM manufacturers.



leader in automotive components (design applications, molds, paint, assembly, among others) with more than twelve manufacture plants in six countries: Canada, USA, Mexico, Belgium, Sweden, and Norway.

BUILD-A-MOLD has recently acquired four **ONA EDM** machines for its facilities in Windsor (Ontario), apart from the other three machines it already had (H600, H400 and PRIMA S900).

The four new pieces of equipment are:

\ TQX10 C2X (SEDM) \ QX6 + (SEDM) \ QX6 (SEDM) \ AV60 (WEDM)

Before choosing these machines, the company asked us and four

other EDM manufacturers to carry out five electrical discharge machining tests. After getting the results, **BUILD-A-MOLD** finally chose us due to our "accuracy, excellent support and best speed".

The TQX10 machine -the one with the largest dimensions on the market- has, in fact, a double head to perform machining operations in half the time. Simultaneous work at the right and left of the tank is also possible, separating it as if it were two independent machines. It is an ideal piece of equipment for the manufacture of large molds with different cavities. More than two decades ago, **ONA** became a pioneer in the development of this second head. Few manufacturers have access to this technology. >>

ONA, 15% faster than the best competitor.

The five different electrical discharge machining tests proposed by **BUILD-A-MOLD** (to us and the four competitors) had to be carried out on a single part. All the tests were performed in the presence of the customer. Our facilities in Durango (Spain) were visited by the EDM Manager and the Mold Maker Manager from **BUILD-A-MOLD**. We made the test using a QX8 machine.





TECHNOLOGICAL LEADERSHIP

WUXI TURBINE BLADE:

A customized solution for the WUXI TURBINE BLADE Chinese company.



WUXI TURBINE BLADE CO., LTD (WTB) is a Chinese company specialized in the manufacture of high-quality parts for the aerospace and energy industries. Founded in 1979, the company's customers include major companies such as Rolls-Royce, GE Aviation, Honeywell, Kawasaki Heavy Industry, Hanwha Aerospace, AIDC, China Aviation Industry, GE, Siemens, Mitsubishi Hitachi Power Systems, and Toshiba, among many others. WUXI TURBINE BLADE provides them with blades, discs, vanes and other key components for steam and gas turbines and nuclear plants, as well as marine and aircraft engines.

In order to improve its machining

The company, which manufactures high-quality parts for the aerospace and energy industries, has recently acquired its first ONA IRIS 6 machine for electrical discharge machining with a doubleshaft rotary table.

capabilities for the energy industry (which require parts like blades and vanes for steam and wind turbines), the company has recently acquired a ONA IRIS 6 machine for die sink electrical discharge machining (X-Y-Z shaft travel: 1000x750x650 mm) with a double-shaft rotary table. It is the first ONA machine acquired by WUXI TURBINE BLADE, a decision made after being "fully" convinced by both the requested test run and the turnkey solution that we proposed.

Our Applications Department was in charge of solving all the company's questions about ONA machines' potential, while our engineers' high capabilities made it possible to provide a machine tailored to their specific electrical discharge machining (EDM) needs. In addition, ONA machines' qualityprice ratio is optimal. Our turnkey solution for WUXI TURBINE BLADE had a lower cost than other alternatives in the market. »

The new equipment can make diffusers with different shapes (for example, conical or trapezoidal) on cylindrical orifices made using Fast Hole technology.

Diffusers with different shapes.

In this case, the customer's requirements were based on having an EDM machine to make holes/diffusers with different shapes on cylindrical holes that were made using Fast Hole technology:

- First, circular holes are made on the part by means of a Fast Hole technology machine.
- Then, using the ONA IRIS 6 machine by ONA, other holes with specific shapes are made on top of the previous ones. Some of these holes may have a shaft that is not parallel to the first hole's shaft.
- It should be noted that a single part may have holes in different shapes: conical, trapezoidal, etc.

Script programming for diffuser electrical discharge machining is factory-set by **ONA** in the CNC system. Naturally, programs can be customized according to the customer's requirements. The machine has data collection functions, which make the subsequent automation of almost any sequence of operations (drilling cycles, configuration, EDM strategy, double verification to avoid operator errors, among others) easier.

These are some of the most significant advantages of **ONA IRIS 6** machines in companies' productive processes:

 A 100% digital, fully configurable and programmable generator. It is a unique technological innovation. It is 30% more powerful than other market alternatives. It can reach up to 400 A.

- It saves on electrodes: wear is reduced by up to 500%. The generator improves the erosion process and adapts it to the discharge conditions at each time.
- The erosive spark can be 100% digitally adjusted, with up to 30 different parameters to improve erosion to the maximum.
- Its powerful control can have up to 8 shafts interpolated simultaneously, and apply volumetric compensation on the entire work area.

In addition, all functions present in the machine represent an evolution due to changes in numerical control and in Human-Machine Interface (HMI). Among other functionalities, the electrodes, the part to be eroded and the entire machining process can be viewed in 3D. The part is displayed on the screen, and the user can easily rotate and move it, thanks to the touch technology. Before running the program, the erosion process is carried out and the electrodes are selected easily and quickly.

Our closeness to all companies and the high qualifications of our team to offer solutions fully adapted to very specific EDM part machining requirements have been the main tools we have used to gain the trust of many customers across the five continents, as well as to achieve, in the vast majority of cases, their satisfaction and, as a result, their automatic transformation into advocates of our equipment.





Blade - Aero Engine Components.

Disc and Shaft - Aero Engine Components.



The world's leading electric vehicle manufacturer turns to ONA.

The automotive sector is going through changing times with the introduction of electric vehicles. ONA's technology is a major contender in this sector thanks to all the competitive advantages that our machines provide to these manufacturers' production processes. A clear example of this is the trust that the world's leading electric vehicle manufacturer has placed in ONA with the purchase of two of our units: the AV130 wire EDM model and the first ONA IRIS T10 machine that we introduced onto the market.

This leading electric vehicle automotive company is one of the key drivers of the world's transition towards sustainability in the sector thanks to its electric cars. During this process of change, the manufacturer has changed its way of producing. Its goal is to optimise its manufacturing process, reducing the number of parts necessary to manufacture the bodies of its cars. "This new car body production system reduces production time, operation costs, manufacturing costs, factory size and, consequently, its operating costs. Tool and »

The automotive electric vehicle sector takes advantage of all the benefits of ONA's technology for its manufacturing production processes.



equipment costs are even reduced", the company says.

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Stepping up to help them meet this goal is ONA and its models of large-scale machines, including the ONA AV130 and ONA IRIS T10. "We manufacture the larges scale wedm and die-sinking machines of the market." We offer unprecedented flexibility to adapt each unit to each customer's individual needs thanks to its modular design. In addition, the ability to incorporate a dual head into the machine reduces production time in half, increasing production process profitability enormously.



TECHNOLOGICAL LEADERSHIP

\ONA IRIS T10



Double head for the most advanced die-sinking EDM machine.

This customer has been the first to incorporate one of the new ONA IRIS model units into its facilities, benefiting from the most advanced technology on a die-sinking EDM machine.

Earning the trust of a manufacturer as important as this one was based on three key points:

- First, the **ONA IRIS** machine has a simple, intuitive, and easy-to-use interface with a large number of **digital tools** incorporated to simplify handling for any user.
- Second, it has a **powerful graphics engine.** The user can create all of the simulations it needs to test possible results before launching the project.

This way, the user has absolute control over the manufacturing process, easily making changes until the desired result is obtained. And all of this while the **ONA IRIS** machine is in full production with another project.

• Lastly, the ONA IRIS machine integrates the market's most powerful generator, that is 100% digital, configurable, and programmable. This highperformance, smart digital generator can reach 400 Amperes of intensity, the most power on the market. More power means more productivity.

On top all this are the advantages that double head machines provide production processes. The incorporation of a second head The AV130 wire EDM machine and our new double head ONA IRIS T10 model guarantee manufacturing process optimisation, reducing costs and thereby improving profitability.

controlled by independent CNCs to the ONA IRIS model makes the unit acquired by the sustainable car manufacturer a highly profitable solution: 50% savings on erosion time and up to 200% productivity. » The automotive company also acquired our new ONA AV130 model, the market's largest wire EDM machine. With mechanics designed to provide maximum performance for pieces weighing up to 10 tonnes, the AV130 model provides results with excellent reliability, even working autonomously. In addition, our 100% ecological filter without added waste and negligible maintenance costs is entirely aligned with their eco-design and sustainability philosophy. With this, the world's first 100% ecological filtration system, **ONA** is providing one of the most economical and environmentally-friendly solutions on the market.

The goal of getting more profit out of the body manufacturing process is met thanks in part to **ONA** and all of the possibilities our machines provide. We are experts in EDM, demonstrated by our innovative technology.

Main application: Production of very large aluminum casting molds.



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ADDITIVE MANUFACTURING

The university sector chooses Addilan to provide a metal additive manufacturing system to industrial sectors with a high technological component.

An important university centre has acquired the Addilan V0.1 machine for WAAM additive Manufacturing with the aim of producing large parts in different metal alloys. This will allow them to reach industries it was not possible to work with using their previous polymer technology manufacturing. A work philosophy based on proximity to the customer, along with the provision of advice throughout the process, is one of the advantages that makes Addilan stand out in comparisor with the competition.

ΛΟΟΙΙΛΝ

WAAM additive manufacturing technology allows them to create parts in different metal alloys and of larger dimensions.

The research work carried out by universities has always brought improvements to the industrial sectors. Within its approach based on continuous improvement, the university centre has acquired the Addilan V0.1 machine for WAAM additive manufacturing. Linked to sectors





such as the naval and aeronautics sectors, this university carries out its research work in different areas of knowledge closely related to the environment in which it is located. The university sector is well aware that the WAAM additive manufacturing technology can optimise its production processes, allowing them to provide specialist services to industrial sectors with which they were unable to work before.

Proximity to the customer, the provision of technological advice and the company's expertise are the key factors that have led to the trust placed in Addilan.

ADDITIVE MANUFACTURING



Proximity to the customer.

If you ask them why they decided to trust in Addilan for the purchase of their new machine, their response is perfectly clear: "The main difference between ADDILAN and the competition is without any doubt their proximity to the customer, the technological advice they provide and the expertise demonstrated throughout the process, always collaborating in the search for the most appropriate solution to each issue that arises." The university notes that the outstanding advantages of the ADDILAN V0.1 additive manufacturing model include "its plasma technology, the inert atmosphere and its own process control. These have been key factors in our choice".





Expanding horizons.

The university is currently working with polymer technology as an alternative to conventional manufacturing methods and materials. The acquisition of the Addilan machine allows them to offer an additive manufacturing system in metal with materials such as steel, titanium alloys, superalloys and aluminium alloys. In addition, with WAAM technology the part is generated at a higher speed, which allows large parts to

be manufactured in a short time. Manufacturing times are therefore reduced, improving the profitability of production processes.

The opportunity to create parts in different metal alloys and of larger dimensions has allowed them to broaden their horizons and provide specialist services to industrial sectors with a high technological component where polymer technology did not meet the demanding requirements. The multiple advantages that this first Addilan machine incorporates into their production processes has also led to them assessing the possibility of working in what will be new fields for them, such as the hybridisation of materials. »

ADDITIVE MANUFACTURING

PVS MOLDES:

PVS MOLDES trusts in our Laser beam powder bed fusion metal printing technology.



The Portuguese cast manufacturer has recently incorporated the Alba 300 metal 3D printing machine into its facilities. The company needed a solution to manufacture complex casts that are impossible to produce by other means. The Alba 300 model uses Laser beam powder bed fusión metal printing technology to create complex three-dimensional pieces. A perfect solution from ONA and SamyLabs, with its machine developed entirely with unique technology.

Founded in 2001 by its current manager, Vitor Paulo de Sousa, the Portuguese company is exclusively dedicated to manufacturing casts. In 2017, the Grupo PVS Portugal was created as a result of a merger between PVS Moldes and MRS Plastics. Currently located in a small town in central Portugal, its more than 4,800 m2 facilities have the most advanced cast manufacturing technology. Knowledge, innovation, service, and assistance are the values that PVS noted as ONA's competitive advantage. says Vitor Paulo de Sousa, current manager at PVS.

They offer comprehensive solutions from conception, design, and engineering, to piece production with all required tests, even working on pre-series production. Its goal is always to find the best solution for the customer in as little time as possible. To do so, contact with the customer is key so that the cast design can be drafted with the required specifications at all times. \gg

Laser beam powder bed fusión metal 3D printing technology to produce complex pieces with perfect finishes that are impossible to manufacture any other way.

Alba 300: Laser beam powder bed fusion technology to create complex three-dimensional pieces.

PVS Moldes came to us with a clear purpose; to optimise their cast manufacturing processes using technology that would manufacture sold, threedimensional pieces from a 3D design using metal 3D printing.

Together with SamyLabs and their Alba 300 metal 3D printing machine, we at ONA had the solution. The Alba 300 model uses Laser beam powder bed fusion technology (Selective Laser Melting) to create small yet complex pieces by adding laser-fused metal dust. With this machine, PVS Moldes can manufacture complex casts with excellent finishes that cannot be manufactured with traditional production processes. In addition, the pieces can be created in a wide variety of materials, such as steel alloys, inconel, (nickel-chromium alloy), cobalt, and stainless steel, for example.

Metal piece made with Laser beam powder bed fusion technology.



The Alba 300 machine has been fully developed by the SamyLabs and ONA team, from the laser system control and lamination software to the last mechanical and electrical detail. Compared with the competition, its major competitive advantage is its own lamination software. This will allow the Portuguese manufacturer to rework different printing process parameters, which is impossible with other brands' models.

This would not be the first ONA model acquired by PVS Moldes. Their facilities already have several of our wire and die-sinking EDM machines. "ONA's value over the competition is clear: its ample knowledge, promotion of innovation and, of course, its comprehensive service and continued assistance", the Portuguese cast manufacturer confirms.



SamyLabs and ONA, a smart alliance.

SamyLabs is an engineering firm founded in 2016 with the aim of developing metal 3D printing machines with Laser beam powder bed fusión technology, and is the first Spanish company to develop a 3D printer with this technology. Choosing ONA as its industrial partner was key to bringing its 3D printing machines to market. ONA's ample experience in manufacturing and sales was key to SamyLabs' success, and allowed to company to focus exclusively on developing the technology.



NEW ONA IRIS.

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\Connect A COMPLETE AND UNIQUE CONNECTION.

The ONA IRIS offers you digital tools designed to improve your experience and multiply your possibilities as a user. Its tools include improvements in terms of data download and transfer, external connections, security, integration with other software, and remote process management. In addition, the ONA IRIS can integrate our Security Pack; a system that allows for the creation of an administrator, the configuration of different profiles, limiting the modification or deletion of files, as well as blocking external access or logging machine work and run times. All with the goal of safely and simply managing all of your project's sensitive information.

Without question, ONA IRIS will help you easily and safely administrate your processes, even remotely.



TECHNOLOGICAL DEVELOPMENTS

NEW ONA IRIS.

The die-sinking EDM revolution is here.

n this edition we are presenting the ONA IRIS, our new die-sinking EDM range that is revolutionising the EDM market. Three key aspects make the ONA IRIS our most advanced machine to date; an unprecedented integration of digital tools, its powerful graphics engine together with an easy-to-use touch screen, and its 100% digital, configurable, and programmable generator.



NEW ONA IRIS.

\Simulate THE POWER OF SIMULATION.

The ONA IRIS means getting out in front of what's coming. With our new range, you will have absolute control over your project and will be able to ensure that what you see is what you get in a simple, intuitive, and practical way. Thanks to its powerful graphics engine, you will be able to simulate processes before executing them, verify results, and change the configuration as necessary, all while the machine is in full production of another job.

Its large touch screen also allows for use in tablet mode and, together with a user-friendly interface and digital JOBS manager, your project management experience will be significantly improved.



Powerful 3D graphics engine unique on the market.

ONA IRIS has the first CNC on the market that visualises the real execution of a die-sinking EDM job in 3D. The CNC imports the 3D models of the part and the electrodes, and the 3D graphics engine represents the execution.

ONA IRIS allows the programme to be simulated in 3D, checking the machining position for each With Smart IRIS Desktop, you will be able to use the CNC simulator from your computer

electrode without the need to

execute programmes in anti-

collision with real movement.

While the machine is working,

the CNC allows a new job to

be simulated in 3D before it is

Remote execution of a CAD/

CAM (VNC client in the ONA

- 3D simulation of a job to be

The ONA IRIS CNC also displays

3D models of parts and electrodes

(STEP, IGES, VRML, BREP, etc.).

in a wide variety of file formats

3D rendering of the

execution in progress.

Tasks can be executed

simultaneously:

IRIS CNC).

executed.

executed.



Easily view and manage your project.

Thanks to the digital JOBS manager with user-friendly interface, you will be able to manage everything from simple programmes to complete manufacturing orders. All the information necessary to process an EDM job can be contained in the JOB, including its priority in the JOBS queue.

On the other hand, the large touch screen and the ability to use it in tablet mode will facilitate the management work of any task. Plus, thanks to Smart IRIS Desktop, you will be able to use the CNC simulator comfortably from your desktop computer. » NEW ONA IRIS.

Win THE CERTAINTY OF WINNING.

The ONA IRIS means getting the best results, thanks to its generator, being the most powerful on the market (400A), and 100% digital, configurable, and programmable. Plus, the generator has an Expert System that allows the erosion process to be optimised to the fullest. This translates into major improvements in productivity, perfect precision with finishes,





Perfect results on corners and edges thanks to special control points system.

The generator is also entirely configurable and can be personalised to suit each customer. Its technology is efficiently adapted to different present and future applications, and is also compatible with previous versions.

Plus, the ONA IRIS range's design is modular and versatile. It can

corners, and edges, and if that wasn't enough, it also means the machine's lifespan is increased, as it ensures each component's greatest performance and use.

Its large touch screen also allows for use in tablet mode and, together with a user-friendly interface and digital JOBS manager, your project management experience will be significantly improved.

include a second head, which

means time is reduced by 50%,

increasing productivity by 200%

and offering a total of more than

40 possible combinations. You can

configure your own unit according

to your needs with pieces up to 25

tonnes.

JOIN THE ONA IRIS REVOLUTION

In short, all these qualities ensure the best and most profitable result possible for all types of applications, in a way that is safer and easier. Because opting for the ONA IRIS means opting for a new way of doing EDM, as well as continued advancement and improvement. It means opting for success in your future projects.

Join the ONA IRIS revolution.



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TECHNOLOGICAL DEVELOPMENTS

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NEW AD-RANGE

The market's most competitive compact wire machines; affordable, reliable, and precise.

Our complete new catalogue of wire EDM units includes the AD mode, a high-production machine that will revolutionise the market: low-cost precision and profitability. The AD25 and AD35 models of ONA's newest model have been on the market for nearly a year. Its highly competitive price point and high performance make it a smart buy for those looking to make their production processes more profitable.

At ONA, we continue working to develop solutions that help our customers obtain the highest degree of profitability. With the AD EDM range, our goal is to offer the best product within everyone's reach.

That is why creating a machine that guarantees the best precision at the best price is so important to us. We did it! At ONA, we have manufactured the market's most competitive compact wire machine. This is a great opportunity for anyone that wants to introduce EDM technology into their production processes. >>>

ONA

Make production processes more profitable with the AD25 and AD35 models, guaranteeing maximum precision at a low cost.

ONA \ WE ARE EDM

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There are no tradeoffs. The best price and finishes together with ONA's best assistance service.

Profitability and precision at a low cost.

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Experts know that the main goal of EDM is to obtain the best results, keeping it as simple and affordable as possible. ONA's AD25/35 range guarantees all these factors. Its affordable price point and high reliability manufacturing parts are complemented by its simple operations and the highly intuitive nature of all ONA's units.



A CNC with the most advanced technology, with a Windows-style operating system and the ability to control 5 axes.



Guaranteed Reliability.

At ONA, we believe that the reliability of our parts is one of the most important aspects when it comes to designing new units. This time is no different. Our goal of providing a low-cost solution had to be entirely aligned with the demand for developing a precise model with perfect finishes. Among other benefits, the AD25 and AD35 machines offer:

- A CNC with the most advanced technology, with a Windows-style operating system and the ability to control 5 axes, 4 of them (X, Y, U, V) simultaneously.
- Its expert EDM system incorporates the ease of automated handling that guarantees the machine's maximum performance in each work phase.
- Technological tables developed for precision cutting with total reliability. Verticality precision of 5 microns with a cut + 1 check.
- The best finish with great precision in the piece's critical points (corners and circles) thanks to automatic control of erosion parameters and lateral unload for checks.

An automatic wire curvature point compensation system that ensures maximum precision for pieces with conical geometries. This new mechanism makes the user's work incredibly easier since precise conical pieces can be made entirely automatically.

• And of course, low maintenance costs and excellent performance thanks to its low energy consumption.

ONA IN ITS PUREST FORM.

With the AD25 and AD35 units, there are no trade-offs. You will get the most profit out of your production processes, manufacturing at a lower cost with ONA's guarantee and our best customer support service. Only once all our highly-demanding tests are passed, and the production process you've requested is verified will we proceed to install and commission the machine at your facilities. At ONA, we will be there to assist you for the long haul, when and where you need it, anywhere in the world.



ONA EDM MAGAZINE

TECHNOLOGICAL DEVELOPMENTS

Script Programming; smart adaptive machining.

From our passion for EDM comes our obsession with incorporating constant improvements into our machines that optimise production processes and improve finish quality. An example of this is our Script Programming tool. A high-grade programming language that allows for the creation of smart programmes. Projects can be modified during the process to react to changing conditions, thereby guaranteeing piece quality. It is yet another of ONA's competitive advantages, making all of our customers' manufacturing processes more profitable.

Smart machining through dynamic programmes.

All of our models have the option of including an additional package with our Script Programming smart programme creation tool. What advantages does this provide to our customers' production processes? Mainly improving production in terms of time and, above all, improving piece manufacturing quality. This system can check if the pieces' values meet those demanded during the process. If they don't, it takes proper action to correct them during the execution process.

This new adaptive machining concept is based on the ability to react to changing conditions. Script Programming benefits from the application's knowledge and experience, and translates that into dynamic programmes capable of addressing changing conditions, rules, and variables. The more knowledge it has about the manufacturing process, the more competitive it will be. The possibilities offered by Script Programming are infinite.

None of this is possible with conventional programming, which is appropriate for pre-planned, static procedures where no changes are expected. >>

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ONA Script Programming: Competitive advantages.

Advantage 01

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Create personalised setup cycles.

Allowing setup operations to be carried out as defined by the user, thereby providing cycles that are adapted to each piece type.

Advantage 02

Execute actions conditioned by a series of premises.

Allowing for process programming to be modified during execution. Without this option, the piece machining instructions are defined beforehand and cannot be changed. Thanks to Script Programming, we can redefine the rules, adapting them to the process's variable conditions during its execution. For example, if the electrode has been used 5 times (the value can be changed), we can make an electrode change. If it has been used fewer times, we can continue using the same electrode.

Advantage 03

Programming with variables:

 Allowing for strategies to be designed with variables. This way, the same programme can be used for different piece references by simply modifying some of the variable values.

- This allows the user to save information while executing the programme with a personalised work report and file with the machine's records or log.
- The machine and user can interact during the execution process to verify specifications, or assign new values where necessary.

Advantage 04

Create personalised dialogue boxes.

Allowing a set of variables to be grouped so that they can be reused later simply by calling up a function. This way, errors are avoided and the programme size is reduced.

Advantage 05

View each user's specific values during the programme's execution through control variables.

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VAR	Svar	AS O	DOR								
VAR	Svart	ASC	NOOR								
VAR	\$uco	ord A	S RE/	42							
	-		-								
VAR	SVCD	06Q A	S REA	4L							

/* Memorize actual position in OFFSET table */ Svar = get_position(MACHINE) MEMO OFFSET 3 default/ofs X Svar X Y Svar,Y U Svar,U V Svar,V Z Svar Z OFFSET 9 /* Move to a stored point in traverse a table */ Svar = get_trav(Sefault/sr,MACHINE) TRAV X Svar X Svar Y U Svar U V Svar V Z Svar Z

/*Check Verticality */ Svcoord = get vert(V, VERT) Svcoord = get vert(V, VERT) Svar = get_position(MAC/ENU) F (Sucoord = Svar,U) AND (Svcoord = Svar,V) DSPLAY Verticality CAC TRAVU US verticality CAC

/* Move to a stored point in traverse a table */ Svar = get_offset(defaalt.ofs:MACHINE.0) IF (\$varf.0 = \$var.0) AND (\$varf.V = \$var.V) TRAV X0 Y0 U0 V0 Z0

DISPLAY "Error"

Define a variable

VARvariable, name AS typener versible, name – Vilue tybevar: NYL REAL STRING of CDDR Program syntax correct



The Script Programming tool is particularly suitable for companies with a large number of qualified personnel that need to design truly complex programmes, and for small companies that want to make personalised programmes with ONA's support.

We at ONA make a complete technical manual available to our customers with full explications and practical examples. In addition, our ONA ACADEMY provides courses that are adapted to the different levels of knowledge of our customers' personnel.



NEW TENDENCIES

\ONA Smart Services

n short our only commitment is to ensure that you get the best out of our machines, improving the production processes of your business, and ensuring the profitability of your project. Our road to do so is offering you the product upgrades, the digital solutions and the support you and your project need. And all offered with the quality you deserve and just more than 65 years of experience could grant.

Therefore, and based on their real value, we have classified our wide range of services in four main categories; productivity (Smart Productivity), connectivity (Smart Connect), consultancy (Smart Consultancy) and maintenance (Smart Care).

Trust in ONA and make an smart choice.

PRODUCTIVITY

\ SMART CONSULTANCY

Smart Productivity

t's not about producing, but about being productive. We offer a wide range of digital services and software solutions to increase the performance and productivity of your machine; improvements in terms of traceability, supervision, access, programming etc.

SMART TRACK

SMART SECURITY

The smart track CNC functionality generates an Automatic report for every part, containing real time WEDM process information. The collected manufacturing data identify the behavior of the machine when manufacturing a component and defines a signature feature behind the traceability concept.

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The users of the machines want

to have as much control over the machine as possible, however, there are times when the customer wants to segregate the work and be sure that critical files will not be changed in the machine. They may also want to create or modify some files in the machine and not allow the operator to change them in order to avoid human mistakes. This goal is achieved with the Security Pack. The Security Pack creates two user levels: restricted user and supervisor user.

We make your machine smarter, and therefore, more productive!

SMART CONTROL AND SUPERVISION

The control and supervision protocol allows third party software developers to easily integrate the ONA machines into their workshop, and make them collaborate with other robots, magazines and automation systems.



Smart Connectivity

Say yes to connectivity but in a smart way. Take advantage of data storing in the cloud and secure non-stop performance thanks to our remote assistance service.

It's time to connect your machine to the world.

SMART CONNECT

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A cloud platform for monitoring services with the aim of improving ONA customers' processes and the performance of ONA products and services.

With ONA Smart connect the collected manufacturing data identify the behavior of the machine when manufacturing a component and defines a part signature concept that could be analyzed with a more holistic perspective for the actual manufacturing process.

111 Traceability Time line 1h Jobs outlook --Multi-device ---Inter-operability প SAVVY Infraestructure

ONA (Dashboard Alarms & Events



TELESERVICE

Remote access to the CNC machine in real time through the ISL online tool. We will get a live display of your machine control in order to solve problems immediately. The ISL Online tool is a software that meets strict security requirements.

REMOTE ASISTANCE

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Through a collaborative tool based on augmented reality we will provide real-time remote technical assistance to help you diagnose the problem and guide you in the resolution of the incidents in your machine.











MASTER



Smart Consultancy

The part that changes everything. Our experience and knowledge acquired over 70 years, at the service of your project, to understand it, advise you, ensure its success and of course, train you in the use of our products, to make sure that you get the best return on your investment.

ONA ACADEMY

Knowledge in EDM processes makes the difference when comparing us to competitors. At ONA we are willing to share our knowledge with our customers. Therefore we offer general or customized training courses designed by our expert team, held in our Excelence Center or in your facilities.



70 years of expertise turned into the best counseling.

BUSINESS SUPPORT

We are an expert advisor for complete solutions in the field of erosion and we put our knowledge at the disposal of your new projects covering all aspects of your business.

APPLIED ENGINEERING

We provide the knowledge and experience of our team of experts to optimise the different key parameters of the manufacturing processes. We work together with the customer to develop alternative work flows to help make the most of each application; shorter processing times, cost reductions, surface quality improvement...



Smart Care

ntelligent assistance, because we're there wherever you need us and whenever you need us. Because we check your machines to prevent future failures. Because we have the spare parts you need at the price you need. And because we are able to update your machines to ensure their long-term profitability. We like taking care of everything you care about.

ONA HEALTH CHECK

Our approach to maintenance: avoid the appearance of problems and consequently increase the availability of the machine.

We offer a preventive maintenance service and a subsequent report indicating the possible improvements that will optimize the performance of your machine.

As optional services we offer: geometric verification, laser calibration and leveling of the machine.



RETROFITTING

Keep your machine updated. We offer software and CNC updates, generator upgrade, repair/replacement of components (ballscrews, bearings, ...).

ONA MARKET

Approved consumables and top-quality original replacements delivered in 24 hours thanks to our wide network of distributors around the world.



Check the rest at the SMART SERVICES catalogue www.onaedm.com/services

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PEOPLE

An expert team of specialists focused on your needs. Working hand in hand, with the diligence and flexibility you require and with the expertise and precision that more than 65 years in the world of EDM give us.

ONA IS HUMAN CAPACITY.



TECHNOLOGY

Everything that comes with being pioneers in EDM, more than 70 years of experience and our commitment to developing our own technology, have enabled us to always provide you with the perfect and most profitable solution for your project. Our secret: combining the expertise of our two key departments; applications and R&D&i.

ONA IS TECHNOLOGICAL CAPACITY.



PROFITABILITY

Yes, we give you the solution you need, but we strive to also make it the most profitable solution. Your success and long-term profitability is the cornerstone of each one of our proposals; offering you the most reliable solution with the highest profitability.

ONA OPTIMISES YOUR INVESTMENT.



Profitability

ONA

PROFITABILITY

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HUMAN CAPACITY

TECHNOLOGICAL CAPACITY

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ONA CULTURE

\ONA from 2000 - 2010

Unprecedented flexibility. The multiple possibilities of modular machines position us as leaders in large machines.



The turn of the millennium meant the consolidation of ONA's international expansion. Our major competitive difference is founded on a strategy aimed at high segmentation based on product differentiation. Understanding the customer and adapting ourselves to their needs, offering them personalised solutions that help optimise their production processes. During this time, we brought our new NS EDM machine series and our AF wire range to market, both with a revolutionary modular design that lets the customer configure their large-scale machine.

Personalised solutions adapted to each customer

ONA's capacity for personalisation is one of the competitive advantages of which we are most proud. Behind this factor lays the extensive work of our sales team and R&D department. Whenever a project requires particular specifications, ONA's R&D department takes on the task of analysing the order to offer the customer an entirely personalised machine.

We at ONA began specialising in small manufacturing runs and large machines years ago. So much so

that we manufactured the world's largest wire EDM machine (the ARION K1000) in 1999, which expanded the wire EDM range of applications to larger and more complex tasks.

At ONA, we understood how to work with our catalogue, adapting it to the specific needs of our customers. Our success consisted (and continues to consist) of the collective work of all the company's fundamental areas involved throughout the manufacturing and implementation process: production, technical assistance service, sales, and R&D. ≫

Development of a modular design that allows for large machine configuration according to the customer's specific

needs.

Consolidation of international expansion and benchmark EDM supplier for the energy and aviation sectors.

Modular design for large machines.

In this decade, we brought to market the new NX die-sinking EDM series and our AF wire EDM range. The NX die-sinking EDM models allow limitless work in 3D for the first time. In addition, we at ONA took a step further with a new machine concept based on industrial eco-design, where simplicity and efficiency came first with a high degree of automation.

The AF wire EDM range is keeping up the pace. Of note are its high-speed and high-precision cutting, allowing for 0.2 um Ra finishes to be achieved. Plus, low maintenance costs are guaranteed thanks to ONA's patented AquaPrima ecological filtration system.

Both models were developed with the innovative modular design that lets the customer configure their own large-scale machine. This unprecedented flexibility positioned and continues to position us as a global leader in large-scale machines. The modular design allowed us to deliver to our customer not just any EDM machine, but the EDM machine they needed. Today, our machines have more than 70 modular configurations, including both wire and die-sinking EDM units. Delivery times are similar to those of standard models, and we do not add on any additional charges.



ONA as a benchmark for strategic sectors such as energy and aviation.

All of these contributions to ONA EDM helped us consolidate our international expansion that had begun a decade before. During this time, reknowned customers and global leaders trusted in ONA to improve their production processes with our EDM machines.

The possibilities that the double head models introduced to manufacturing processes, and the development of turnkey projects, were fundamental to ensuring that sectors such as energy and aviation now see ONA as their ideal partner. Both sectors became strategic for ONA, and the percentage of its sales continue to increase year after year.



Modular design The large-scale series

uses a modular design to allow many configurations.



configure, with a great

flexibility, the machine that meets his exact requirements.



Pre-built axes modules. Prebuilt axes modules to drastically reduce machine assembly time.



Tailor-made machine. Customers can get a

tailormade machine at the same price and delivery time as a standard machine.



POSSIBLY THE WORLD'S BESTEDM CHOICE

\People \Technology \Profitability

www.onaedm.com