COMPOSITE TAILORED MACHINES

Made in ITALY

ELEA COMPOSITES

We know how

- Fiber Placement (AFP)
- Filament Winding (FW)
- Tow Preg
- Burst Test

- R&D Center
- Prototyping
- Testing Lab

INTERNAL R&D LABORATORY

ESEA COMPOSITES

–We know how–

ESEA is your partner for developing together new automated and advanced composite materials manufacturing processes, playing an active role in overseeing the entire process and handling various technologies for solutions in aerospace, defense, energy, H2, among many other industrial sectors.

Indeed, since its founding in 1980, more than 700 customized production and testing machines have been successfully installed and validated by ESEA's team.

ESEA positions itself as a global supplier in many countries all around the world, as for example in the USA, Japan, France, the United Kingdom, Germany, Sweden, Russia, China, India, Argentina, Korea, and many more.

ESEA produces high-quality **Tow preg** machines, **Filament winding** (FW) machines, **Automated fiber placement** (AFP) machines, and **Testing** machines also for H2 CPV (type IV and type V).

ESEA Group is headquarted in Cepagatti (Pescara), in a 15.000 square meter facility. It houses the mechanical, electrical, and software technical offices, as well as production, R&D, testing, assembly, and service departments.
In addition, ESEA has a service unit that supports Clients during on-site commissioning and remote assistance, also through the innovation of augmented reality.
The presence of 150 highly qualified members of its staff, combined with manufacturing skills and engineering leadership, plays a significant role in driving ESEA Group to success and will continue to do so for future achievements.

— We know how —

R&D LABORATORY

Our R&D Laboratory for composite materials is the place where innovation meets precision.
Our team is driven in the research and development of composite materials, as so through our R&D Lab we offer a wide range of tests to perform and processes to carry out for the creation & testing of products.
Indeed, our laboratory can be used by our Clients to perform both manual and automated production processes, using dry or pre-impregnated fiber.

This approach allows this way the creation of products and samples through hand lay-up or by using ESEA's advanced Filament Winding and Automated Fiber Placement (AFP) machines for rapid prototyping.

Additionally, our lab is equipped with a Tow Preg machine for the impregnation of dry fiber with different resin systems.
The proposed process ensures precise control of resin content, improving quality and performance properties of the final products.
The Tow preg spools, which are produced in our lab, can also be tested to determine material characteristics or used directly for laying.

Our team, qualified on the matter, is available to assist our Clients in developing and defining the characteristics of their production processes, providing customized solutions for every need.

We support our Customers at every stage of their process, from prototyping to final production, ensuring high-quality results and reducing time-to-market.

Reserch & development partners

CIRA Centro Italiano Ricerche Aerospaziali

CETMA Centro di ricerche europeo di tecnologie, design e materiali

UNIVERSITÀ DEGLI STUDI DI SALERNO

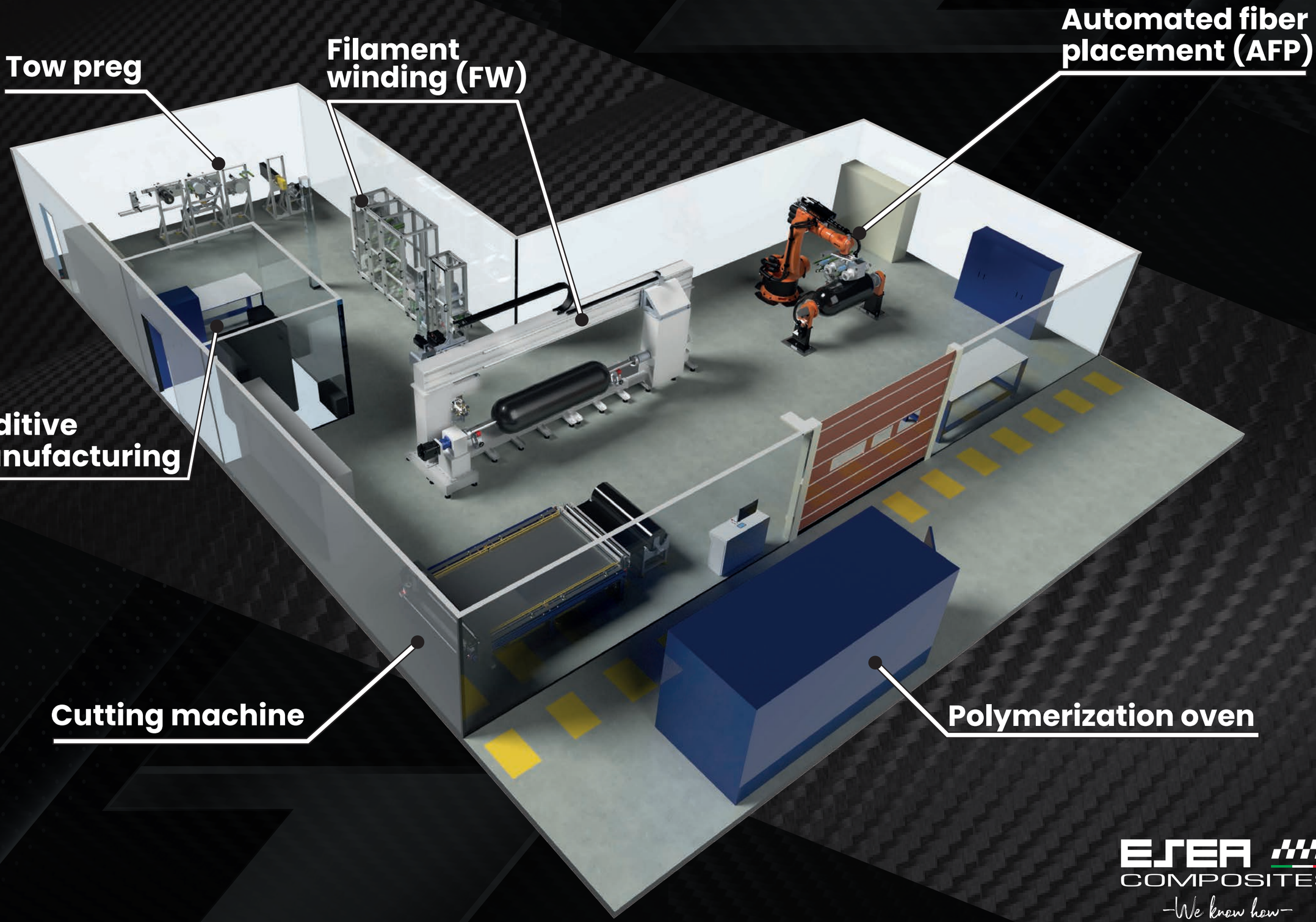
UNIVERSITÀ DEGLI STUDI DELL'AQUILA

TOR VERGATA UNIVERSITÀ DEGLI STUDI DI ROMA

SAPIENZA UNIVERSITÀ DI ROMA
Scuola ingenieria Aerospaziale

INTERNAL R&D LABORATORY

Layout



ELTEA COMPOSITES
-We know how-

INTERNAL R&D LABORATORY

Manual process

Hand Lay-up with dry or pre-impregnated fiber

This process consists of applying layers of resin and fabric, removing air bubbles between each layer, until the desired thickness is achieved.

3D Printing / CNC tool Machines

3D printing and **CNC tool machines** are used for the creation of complex molds and inserts from **thermoplastic materials, aluminum and steel.**

Preparation for polymerization

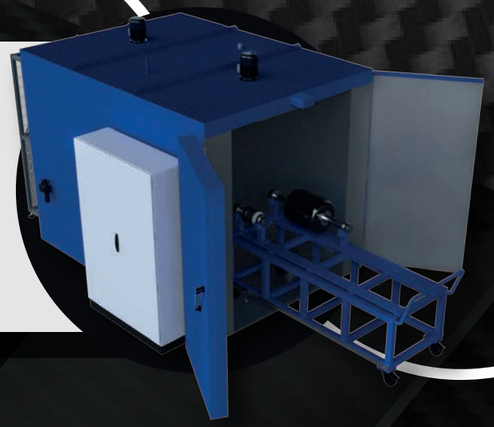
We are specialized in the curing cycles of composite materials up to **400°C**, with a full range of auxiliary materials to meet specific needs.

Vacuum infusion

The **Vacuum infusion process** consists of applying layers of **dry fiber** followed by the infusion of resin under vacuum

Polymerization in oven

The use of a high-temperature oven **(400°C)** allows the curing of composite parts with maximum performance.



Final Controls

At the end of the process, the composite parts can be tested through **non destructive testing (NDT)** such as:

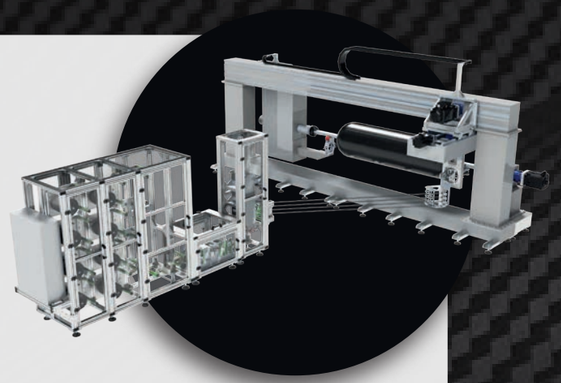
- Differential scanning calorimetry **(DSC)**
- Dynamic mechanical analysis **(DMA)**
- Thermomechanical analysis **(TMA)**
- Ultrasonic test

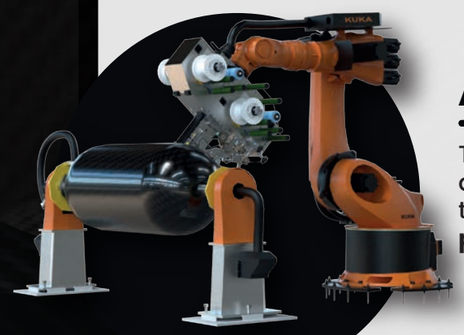
INTERNAL R&D LABORATORY

Automatic process

Filament winding (FW)

The Filament winding machine (FW) allows the production of pipes and **CPV (Composite pressure vessel)** tanks, with an external diameter up to 1 meter and a length up to 4 meters.





Automated fiber placement (AFP)

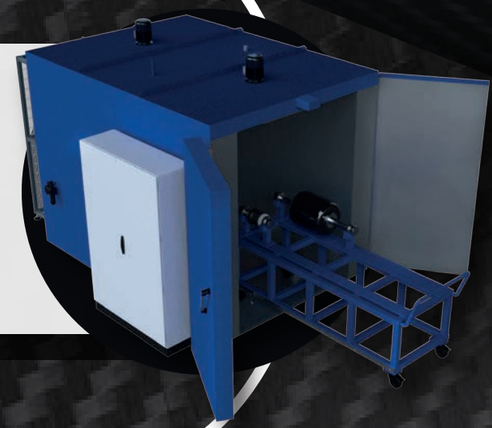
The **Automated fiber placement machine (AFP)** allows the lamination of complex parts, thanks to the presence of **6 axis robot** and **horizontal positioner.**

Preparation for polymerization

We are specialized in the curing cycles of composite materials up to **400°C**, with a full range of auxiliary materials to meet specific needs.

Polymerization in oven

The use of a high-temperature oven **(400°C)** allows the curing of composite parts with maximum performance.



Burst test

The automatic **Burst test machine** allows the design validation of mechanical properties of CPV tanks, due the burst test using water at room temperature in bunker.

Final Controls

At the end of the process, the composite parts can be tested through **non destructive testing (NDT)** such as:

- Differential scanning calorimetry **(DSC)**
- Dynamic mechanical analysis **(DMA)**
- Thermomechanical analysis **(TMA)**
- Ultrasonic test

OUR MACHINES

COMPOSITE TAILORED MACHINES

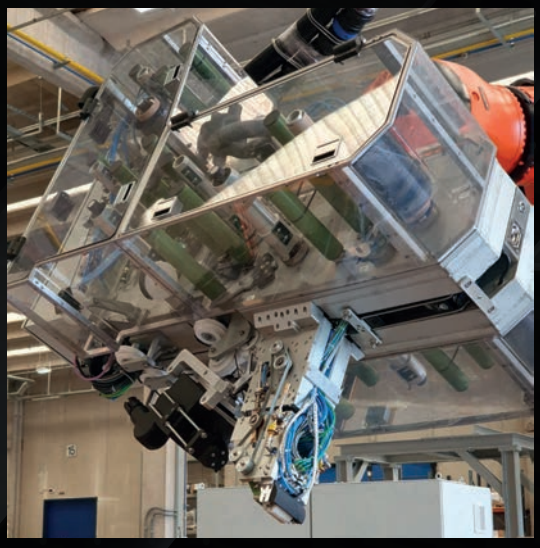
EFESTO

Automated Fiber Placement (AFP)

EFESTO stands out for its high productivity and quality in aerospace manufacturing.
This innovative AFP machine has been designed to optimize the ability to produce both convex and concave complex structures.

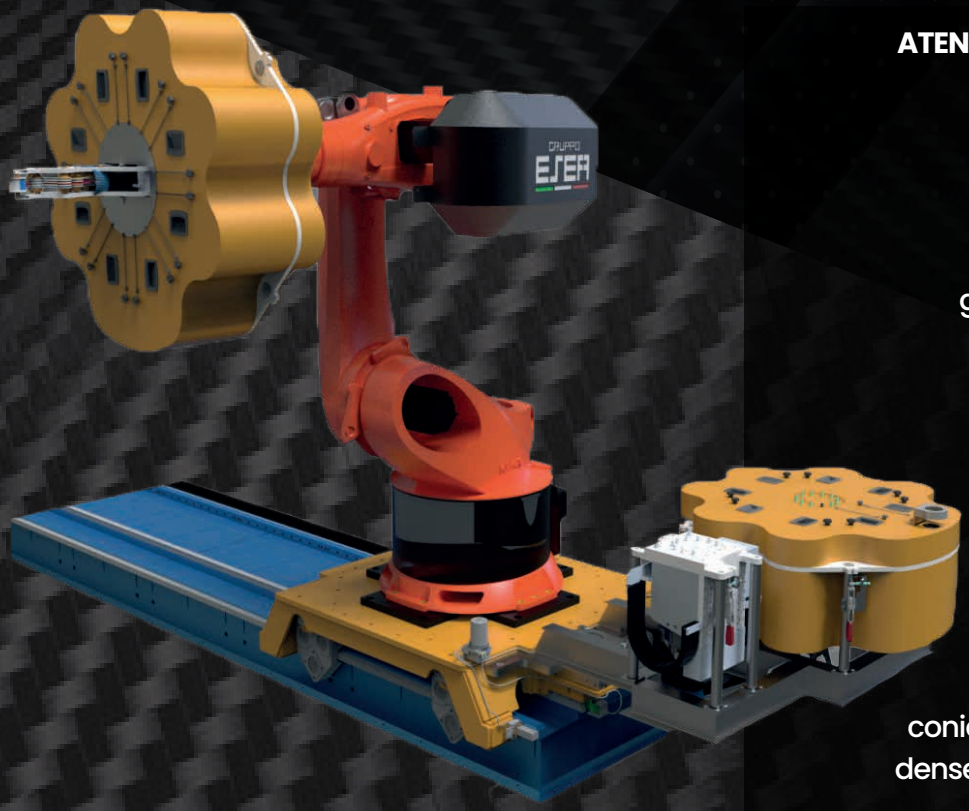
The intuitive and easy-to-use programming software allows the definition of customized trajectories for the production of advanced composite parts.
EFESTO improves AFP technology thanks to the following:

- The possibility of using slit tape or towpreg of different sizes
- The use of thermoplastic and thermosetting materials
- A rapid set-up
- A high deposition precision
- A high productivity reach



ATENA

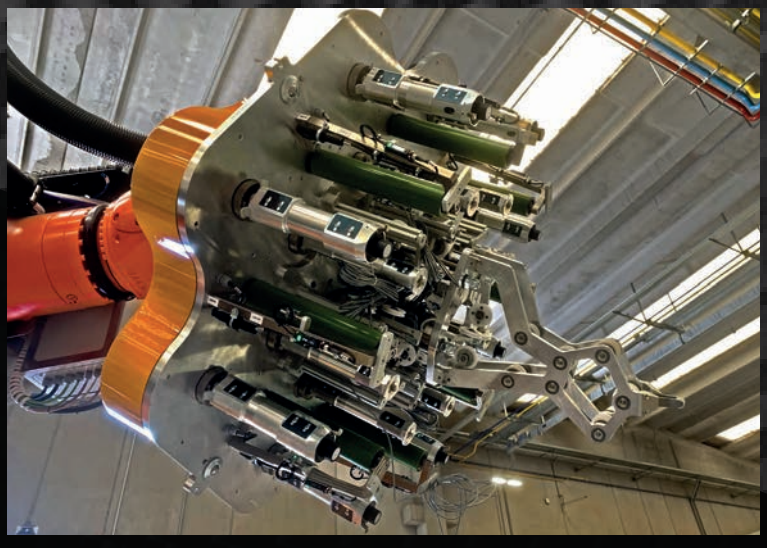
Anisogrid Filament Winding (FW)



ATENA is used to manufacture complex shapes and high-quality parts.

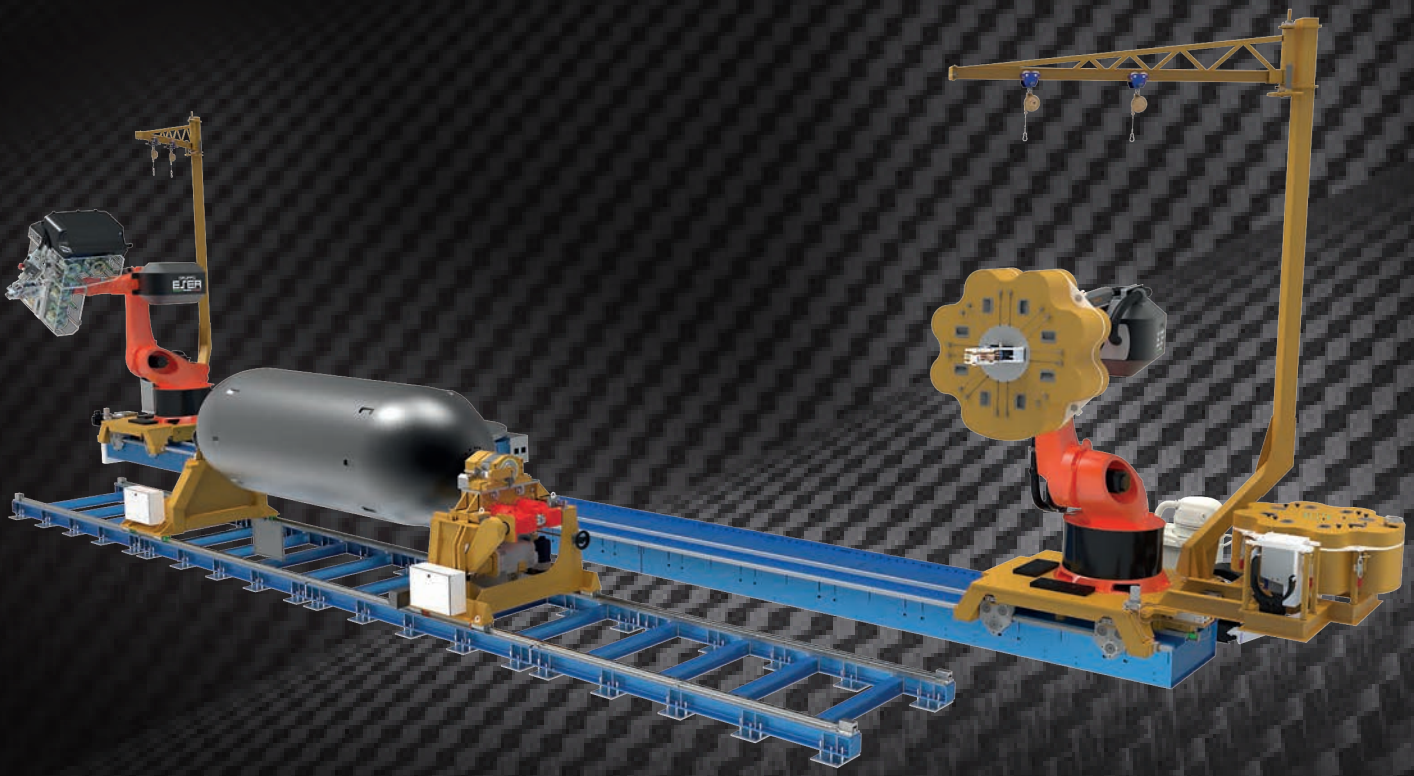
ESEA's robotic filament winding technology guarantees the minimum stress of the towpreg during the laying. **ATENA** is suitable for the production of anisogrid composite structures present in rockets.

Anisogrid structures are shaped as cylindrical or conical shells and consist of a dense system of unidirectional composite helical, circumferential and axial ribs.



ARES

AFP - FW - MILLING Machine

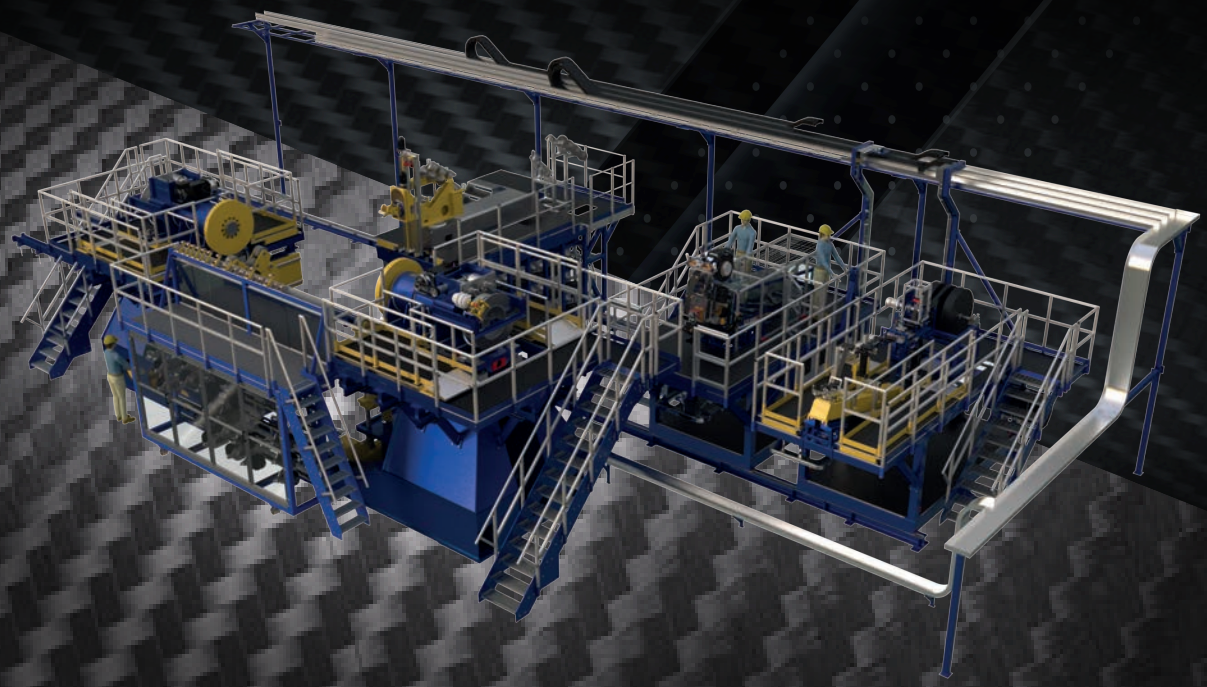


ARES is the result of the fusion between **EFESTO + ATENA + robotic milling technology** in one machine for the production of composite cryogenic vessels for aerospace applications (type IV and type V).

The robotic milling technology is based on a high-performance electro mandrel, assembled on an external linear axis.
This type of technology allows to produce machining operations such as drilling, slotting, threading etc.

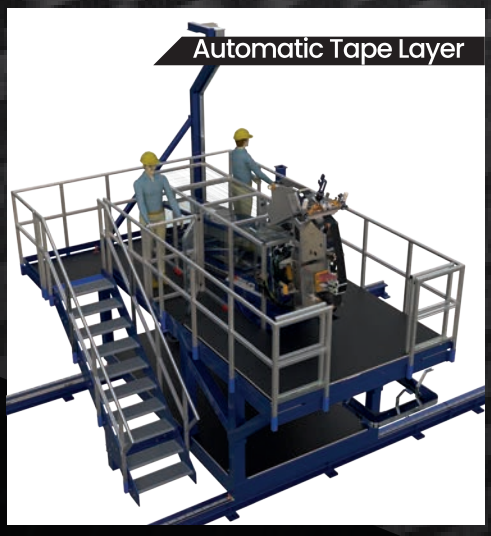
ZEUS

Filament winding, Automated Tape Laying (ATL) and Tape winding machine



ZEUS is a cartesian machine to produce composite structure for aerospace applications.
This advanced machine is designed to integrate multiple manufacturing processes on the same parts, ensuring efficiency and precision in production.
The machine's capabilities include: **Filament winding** (with 30 spools), **Tape Winding**, **Automated Tape Laying (ATL)** with different bandwidths of UD tape.

By combining these processes into a single machine, it is possible to streamline the process, to reduce lead time and to improve the quality and performance of the products.
This integration also allows greater customization and adaptability in the manufacturing process, according to the specific needs of different aerospace applications.

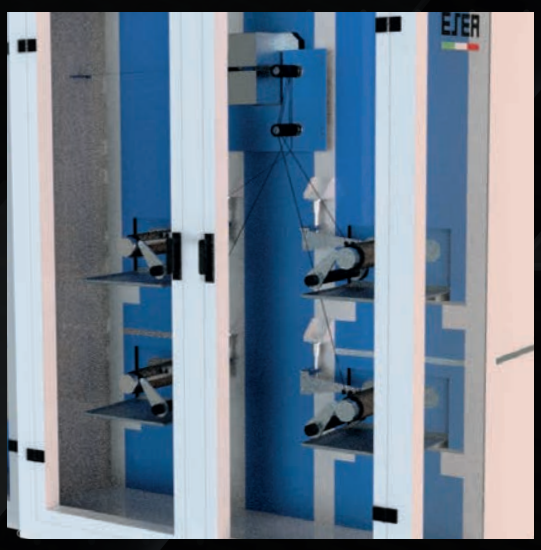


POSEIDONE
Tow Preg

POSEIDONE is able to process different thermosetting resin systems with high viscosity, to produce high quality tow preg, at a maximum speed of 200 m/min (3,3 m/s).

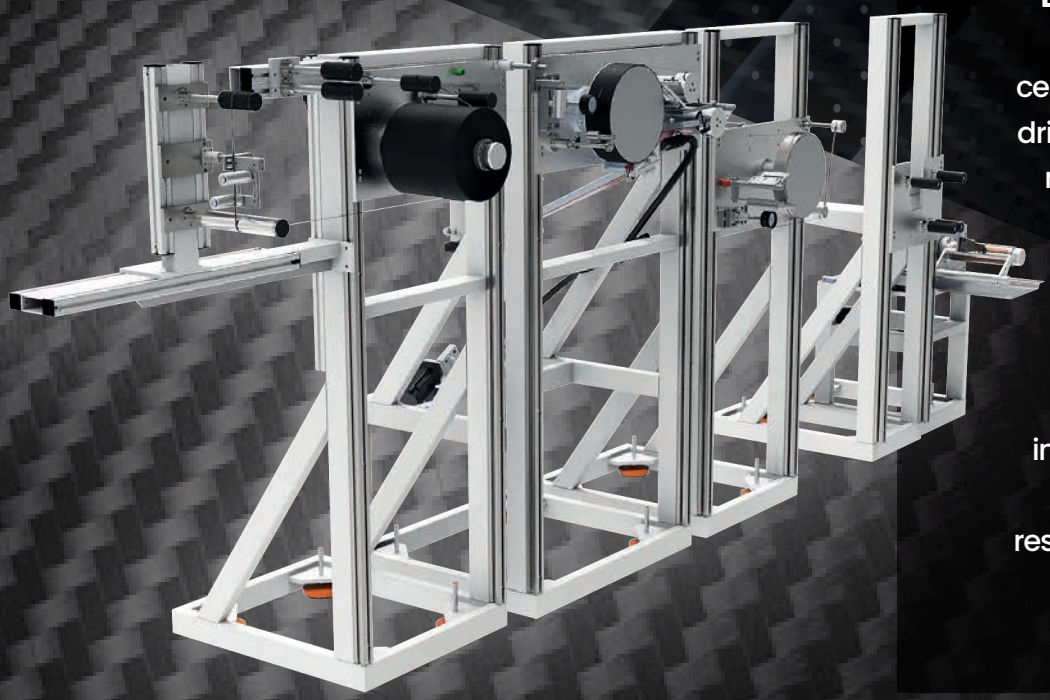
ESEA's impregnation technology guarantees a constant resin content with deviation of less than ± 0,4%.

POSEIDONE is a modular machine, which can also be tailored to guarantee different production rates (from 1 to 8 spools).



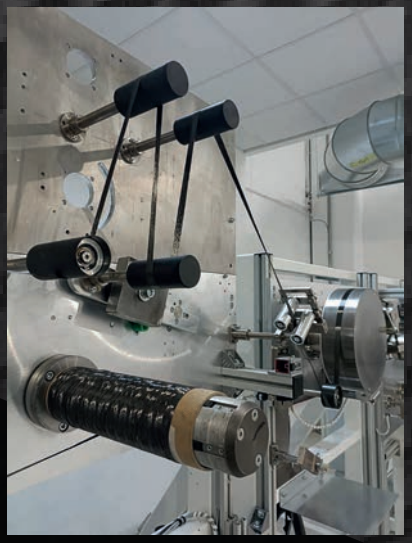
ERMES

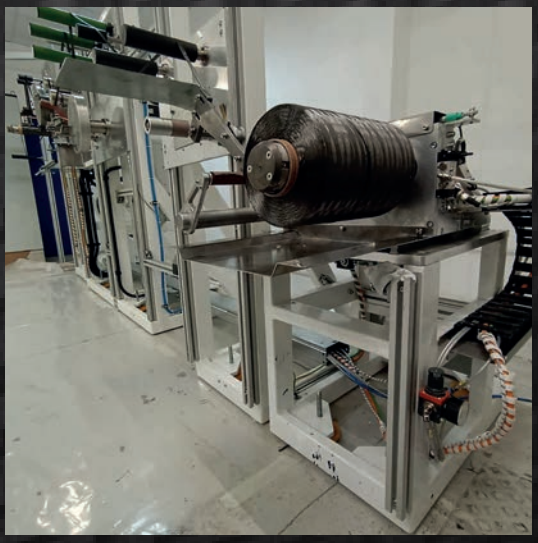
Tow Preg - Lab Scale



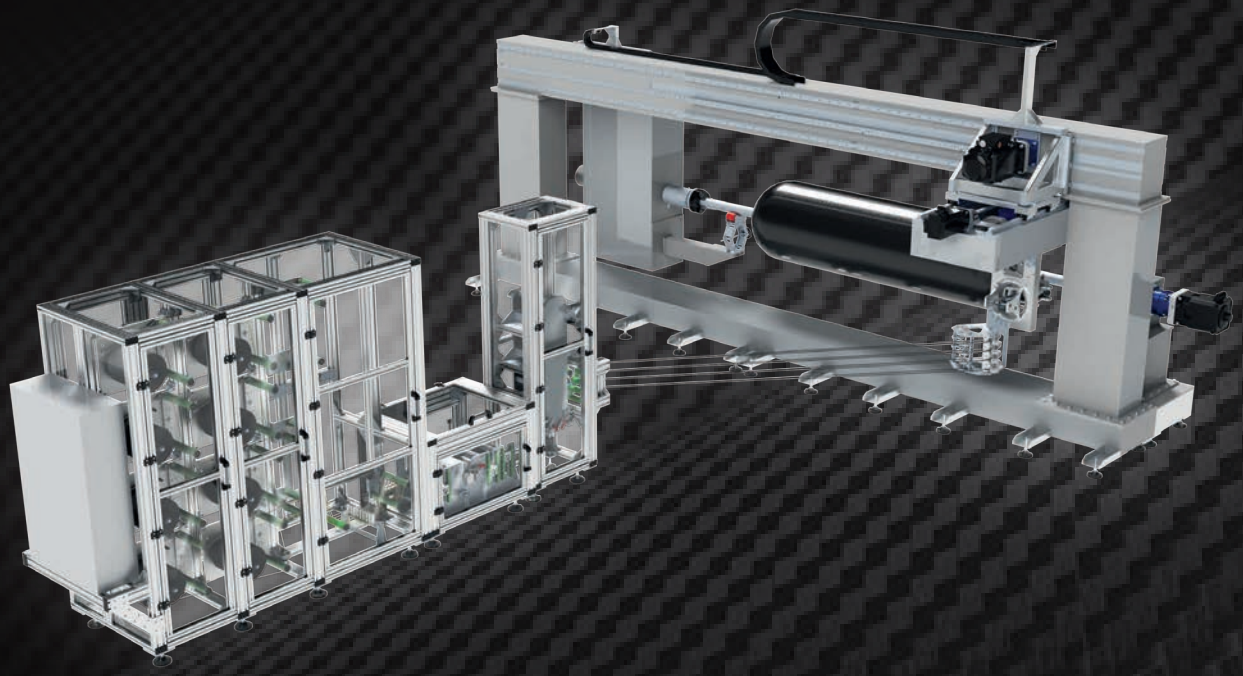
ERMES is made available to universities, research centers, and companies to drive innovation with novel resin systems, in order to produce tow preg.

ERMES ensures high-quality tow preg through advanced impregnation technology that achieves uniform resin distribution, due to an integrated reverse roll system.



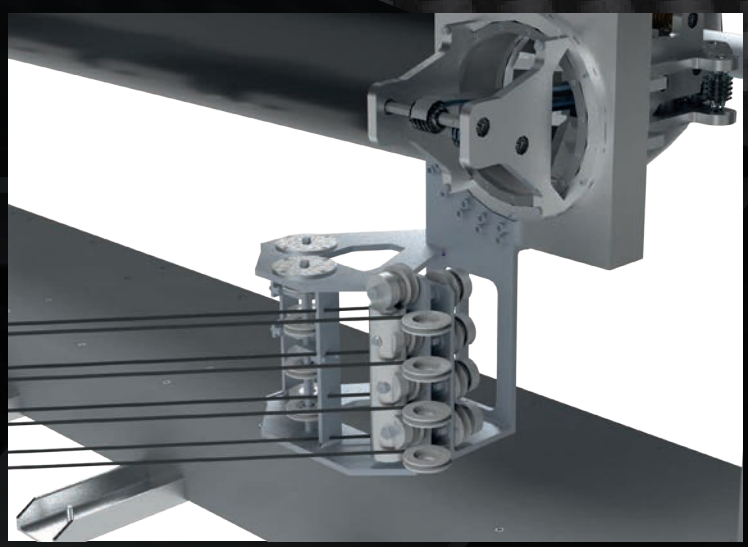


APOLLO
Filament winding

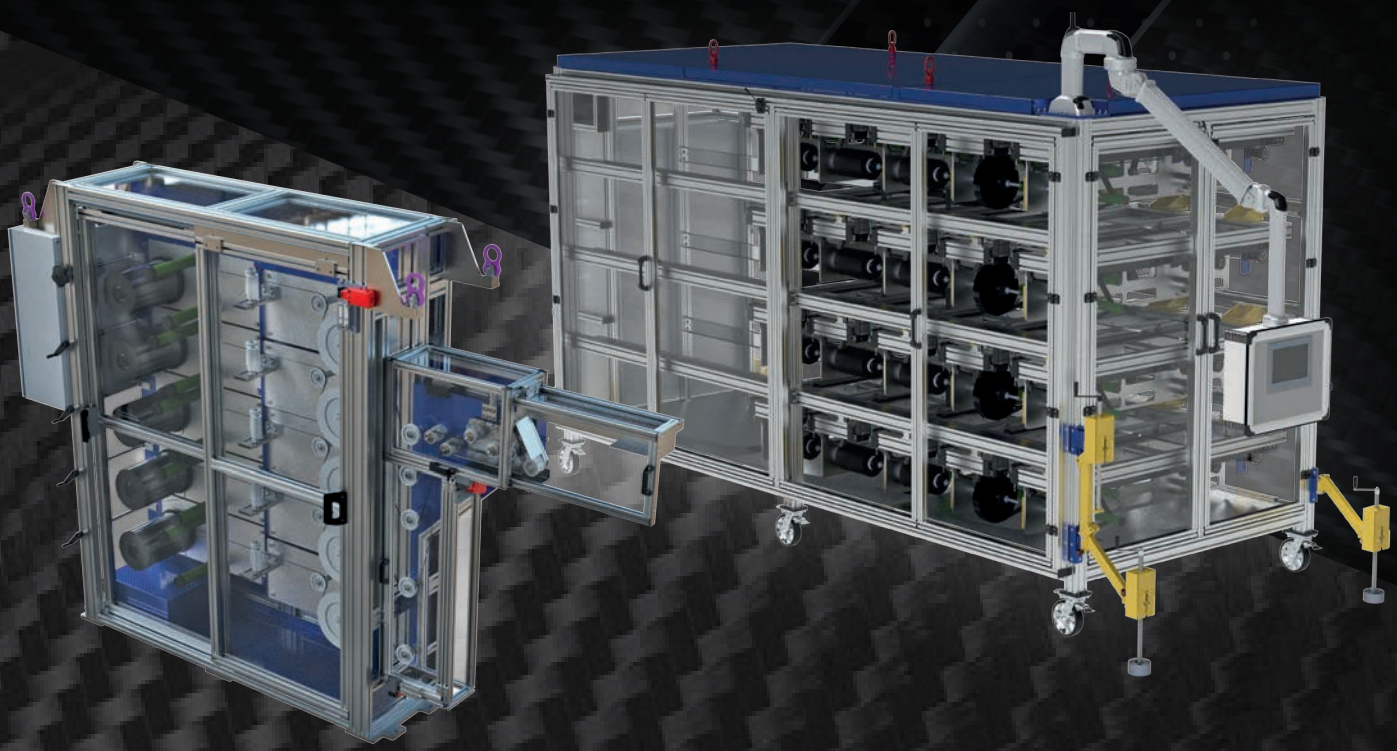


APOLLO is designed for the manufacturing of CPV tank, with a creel of 8-spool system, it combines wet winding and tow preg winding in one machine.
Optimized for the production of tanks of various sizes and shapes, **APOLLO** allows accurate control of winding angle and fiber tension, ensuring uniform laying.

Equipped with 5 axes and an advanced deposition end-effector, **APOLLO** guarantees high-quality lay-up and minimizes surface or structural defects.
The intuitive interface enables real-time monitoring and adjustment of winding parameters, ensuring reliability and operator safety throughout production.



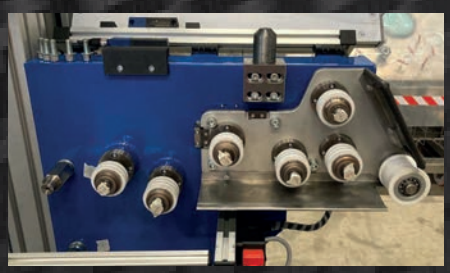
CRONO
Delivery System



CRONO is a standalone creel for the integration in existing machines.

Suitable for unwinding of Tow-preg, dry fiber, different materials as carbon fibers, aramid fibers, glass fibers (on cores), optical fibers, and monofilaments.
Soft unwinding process with S-Wrap.

Additionally, **CRONO** is equipped with an extraction system for dust containment, ensuring a safe and clean environment.



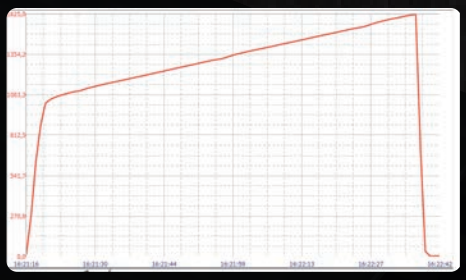
DEMETRA
Burst Test Machine

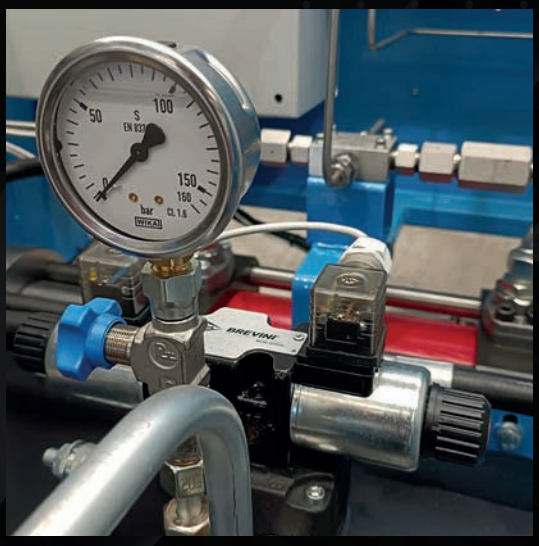
DEMETRA is designed for carrying out **"Burst test" activities on composite pressure vessels (CPV)** using water.

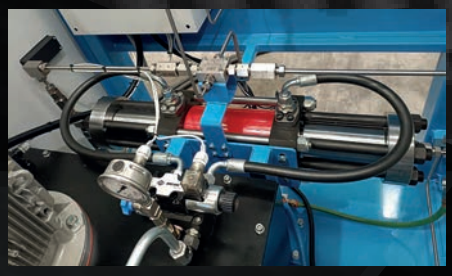
The equipment is easily transportable and can be used for CPV tanks up to 1000 liters, as it can also pressurize the vessels up to 2500 bar.

APPLICATIONS:

- Burst testing of composite pressure vessels
- Qualification and homologation of composite pressure vessels







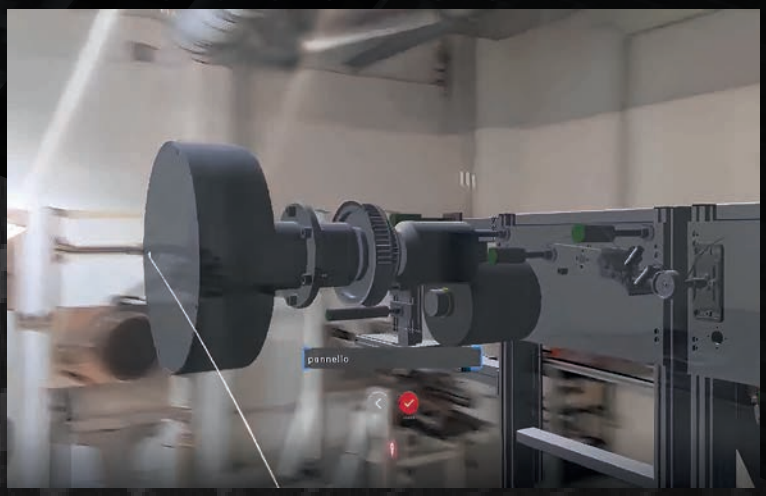
AUGMENTED REALITY

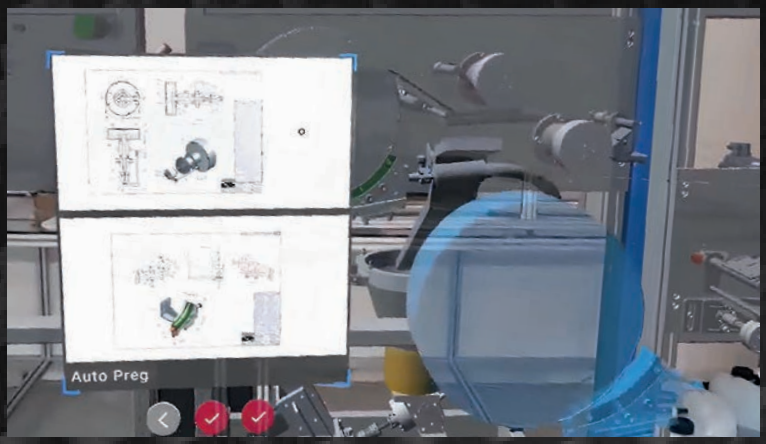
ESEA integrates cutting-edge technologies to be able to offer our Customers a first-class remote maintenance and assistance service.

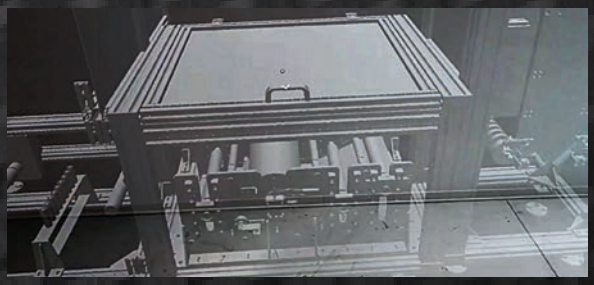
Thanks to **Augmented Reality (AR)**, operators can receive direct and complete on-field, keeping their hands free to carry out tasks in complete safety.

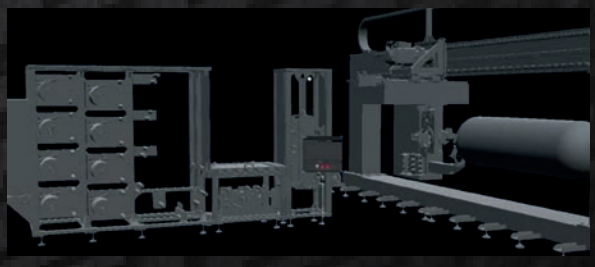
AR technology allows the operator to view instructions and maintenance data, directly on their smartglasses, making operations more efficient and reducing downtime.

With remote assistance the problem-solving process has been drastically simplified, allowing our customers to communicate directly with our experts through an interactive channel. This means greater productivity, less operational downtime and higher quality support.









National and Europeqn projects

Ministero dell'ambiente e della Sicurezza Energetica

In collaboration with: ROMA TRE UNIVERSITÀ DEGLI STUDI

Ministero delle imprese e del made in ITALY

PROGETTO
SIDRO

SIDRO project aimed at the development of "Innovative technologies for the storage and transport of hydrogen"

PROGETTO
LAMBDA

The **LAMBDA-M project** emerges as a significant innovation in the aerospace sector, aiming to create a large self-deploying reflector.

PROGETTO
AUTOCOMP

Innovative solutions for compression, moulding, induction welding for thermosetting and thermoplastic composite materials.

GRUPPO ESEA SINCE 1980
We know how

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