Automated Fiber Placement Equipment

Company presentation

Coexpair Dynamics offers services to support its customers in the development of new aircraft structural composite parts based on automated fiber deposition machines. This includes the manufacturing of demonstrators and first parts prototypes in its Belgian facility (no serial production). Once the development is completed, Coexpair Dynamics extends its offer to the design and assembly of automatic deposition equipment needed in its customer factory for the part production, and based on Trelleborg Sealing Solution Albany (formerly named Automated Dynamics) technology.

Coexpair and Coexpair Dynamics facility in Namur (Belgium)

coexpair dynamics

SERVICES AND PRODUCTS

- **Equipment Architecture definition in collaboration with customer**

- **Aerospace Engineering Services**:
  - Studies (lay-up feasibility and analysis, risk assessment …),
  - Business case (RC/NRC analysis, manufacturing risk analysis, serial cost estimation,…)
  - Materials and process studies

- **Process Set-up to First Part Qualification:**
  - Process optimization,
  - Panels/tubes manufacturing for coupons testing,
  - Manufacturing of sub-components or demonstrators using (SQ)RTM.

- **Combination of automated fiber placement (AFP) with (SQ)RTM**

- **Trainings**

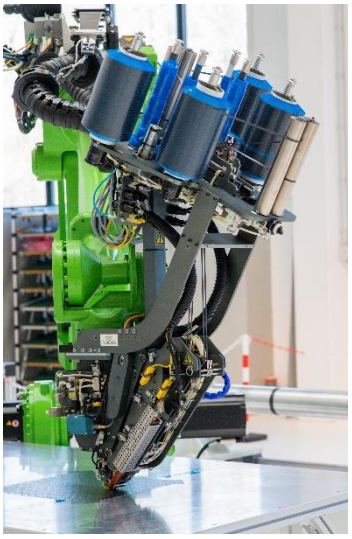
coexpair dynamics

INTEGRATION OF 3 KEY TECNHOLOGIES (1/2)

1. Automated Fiber Placement heads

TRELLEBORG

30 years' experience – **Wide range of products available at Coexpair Dynamics**



Thermoset head – 4x1/4"

Thermoset head – 1x3"

Thermoset head – 12x1/8"

Thermoplastic head – 1x1"

Thermoplastic head – 1x1/4"

Heating systems available:

- Hot gas torch
- Laser
- Heraeus Hmm3

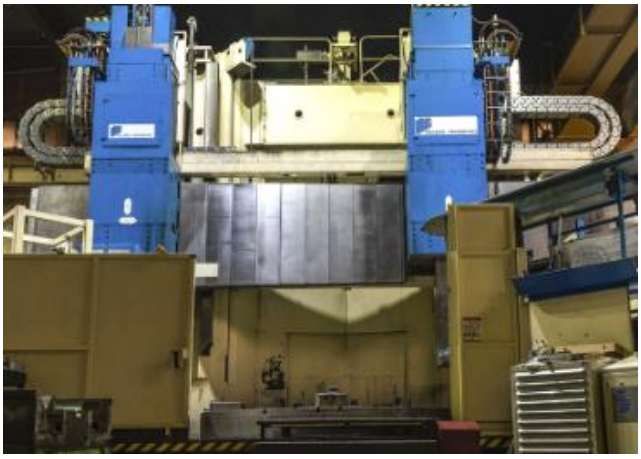
coexpair dynamics

INTEGRATION OF 3 KEY TECNHOLOGIES (2/2)

2. Gantry

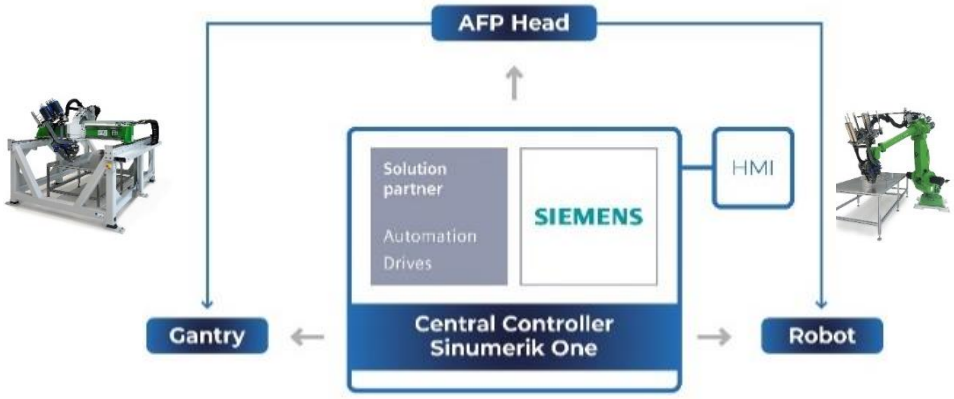
60 years' experience – **No size limit, the sky is the limit**

Well known for the design and manufacture of large scale of boring and vertical lathes.



3. Numerical controller

The Sinumerik One, which is a digital-native CNC (Computer Numerical Control) system, stands as the forefront CNC system, tailored for highly productive machine tools. It represents a fundamental shift in how CNC systems interact with the digital world.



STANDARD EQUIPMENT SE-2 / AFP 4 x ¼” ROBOT and ROTARY AXIS

- Last generation of numerical control command of Siemens: the Sinumerik One;
- 6 axis robot having 3000 mm range;
- Tow configuration: 4 x ¼” thermoset prepreg tape;
- Spool size: 3” inner diameter, 11” long;
- Motorized backing film;
- Independent tows control systems;
- Vortex cooled feed chamber;
- Hot gas torch system;
- Minimal length of a placed fibre: 75mm;
- Head compliance: 30 mm;
- Regulating of roller compacting force, until 45 kg;
- 22’’ colour touchscreen HMI;
- Floware AFP SCADA software

Rotary Axis :

- Max. length of the lay up tool: 2100 mm;
- Max. diameter of the lay up tool (spindle mode): 850 mm (on 1900 mm length);
- Max. tool weight: 500 kg;
- Spindle mode: until 2 revolutions / sec

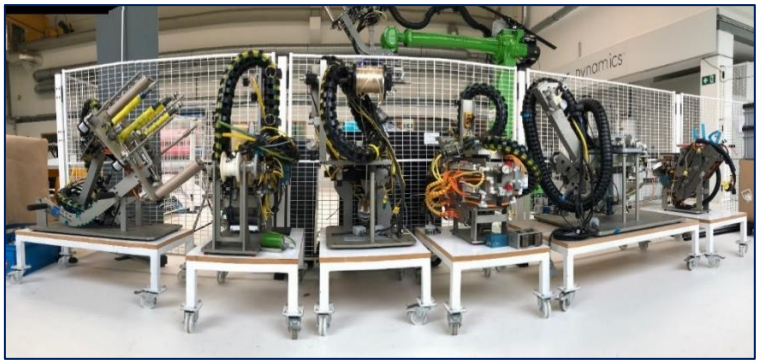
coexpair dynamics

STANDARD EQUIPMENT SE-1 / AFP 4 x ¼” GANTRY

- Last generation of numerical control command of Siemens: the Sinumerik One;
- 3 axis gantry with lay up area of 2400 x 1000 mm;
- Tow configuration: 4 x ¼” thermoset prepreg tape;
- Spool size: 3” inner diameter, 11” long;
- Motorized backing film;
- Independent tows control systems;
- Vortex cooled feed chamber;
- Hot gas torch system;
- Minimal length of a placed fibre: 75mm;
- Head compliance: 30 mm;
- Regulating of roller compacting force, until 45 kg;
- 22’’ colour touchscreen HMI;
- Floware AFP SCADA software.
- Possibility to integrate **ROTARY AXIS**

INNOVATIVE AFP MACHINES BASED ON CUSTOMERS NEEDS

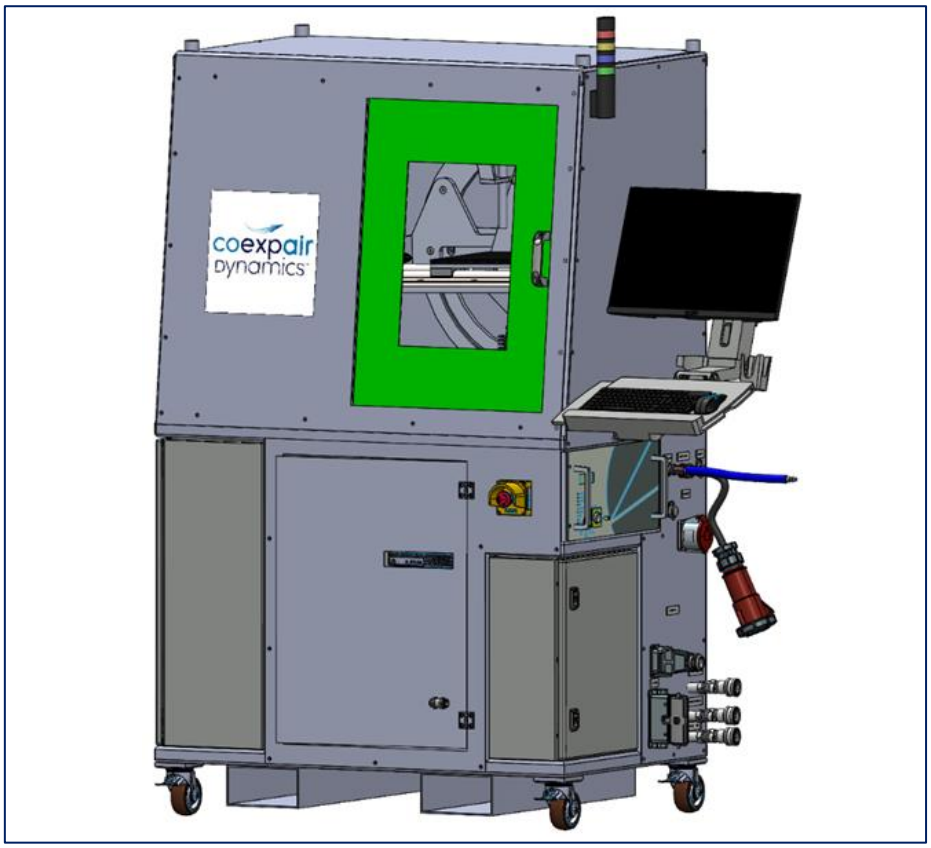
- Last generation of numerical control command of Siemens: the Sinumerik One;
- 22'' colour touchscreen HMI;
- Floware AFP SCADA software.
- Processing head options:
    - 1, 4, 8, 12, 16 tows head;
    - Laser, pulse light heating options;
    - Ultrasonic trim;
    - High tension winding;
    - Automated quick change.



coexpair dynamics

LABORATORY EQUIPMENT

TURNKEY COMPACT HEAT TEST BENCH



State of the Art technologies, integrated in a compact equipment, for material characterization at elementary level for composite process development.

Mapping of the heat distribution in composite laminates based on different heating sources.

- Sample size: 300 x 300 mm.
- Observation speed: 100 mm/sec.
- Heating sources : 2kW laser, pulse light, infrared, hot gaz torch, …
- Data acquisition via infrared camera, thermocouples and optic fibers.
- Siemens control hardware.

This test bench integrates all components (user friendly HMI, control units, data acquisition system) and brings precision and safety.

coexpair
dynamics

SOFTWARE 4.0 IMPROVING MACHINES QUALITY

Floware™

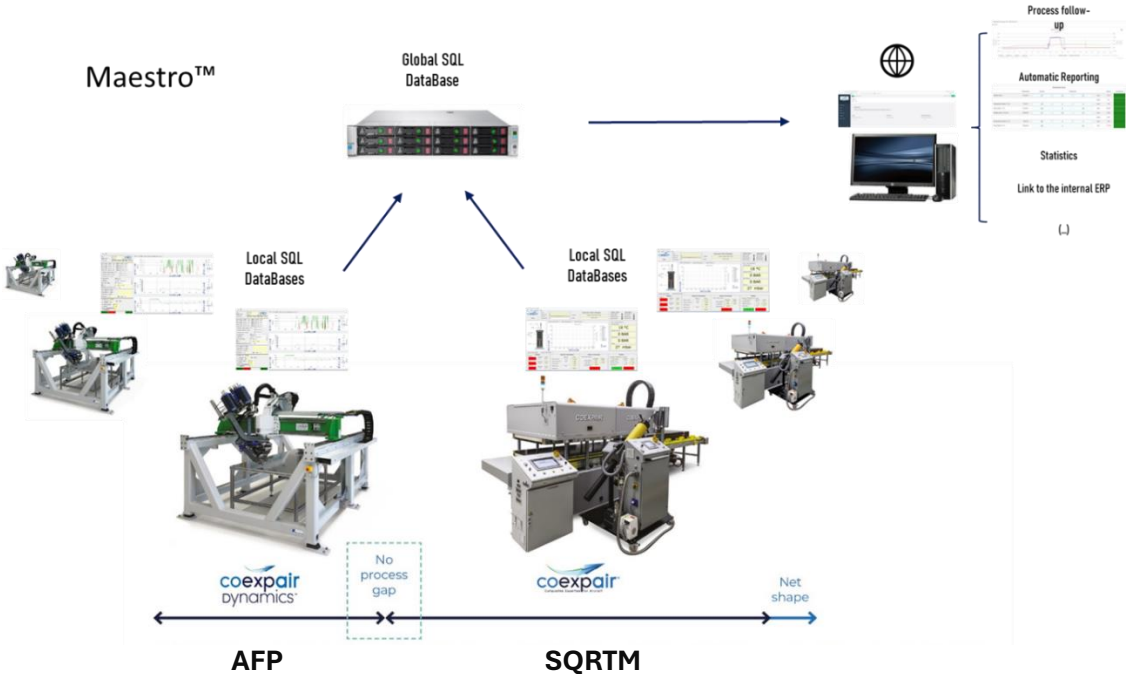
Computer for Data Collection (pressure, temperature, speed, …) – CSV file

Maestro™

Maestro is a SCADA system that aim to centralize all production data to generate extra value from them.

Centralization of all production data allows to analyze multi-workstation data such as all operated injections with a mold across presses.

QA validation, automatic reporting, KPI and communication to ERP.



coexpair dynamics

BENEFITS

- **Quality and Reliability**
- **Robust & Accurate platform** based on Siemens components
- **Process & Manufacturing R&D with onsite production initiation**
- **Engineers “hands on” composite development**
- **Support to Design for Manufacturing, Business Cases, Analysis and Design.**
- **Development of process within aerospace requirements**

UNIQUE TO THE MARKET

- **Joint automation ATL/AFP with RTM/SQRTM**
- **Combination of Material & Process skill with Composite Architecture skill**
- **Full access to control system of equipment**

coexpair dynamics

LOW COST INVESTMENT FOR ADVANCED AFP EQUIPMENT

Sale
of the motion and control platform

Standard:

- 6 axis robot system
- High accuracy 3 axis gantry system

Bronze:

- High accuracy 4 axis gantry system

Silver:

- High accuracy 6 axis gantry system

Gold:

- High accuracy 6 axis gantry system
- Safety cell

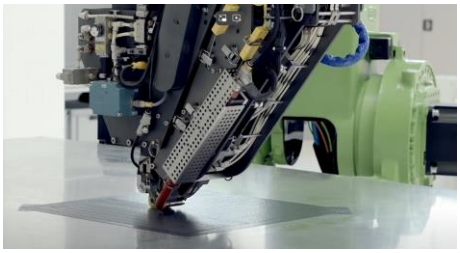
Rental
of various heads

Automated fiber placement head:

- Thermoset 4 tows ¼”
- Thermoset 1 tow 3”

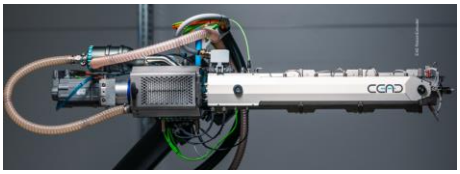
Available heating sources: hots gaz toch, pulse light system and laser system.

- Thermoplastic 1 tow 1” with dual laser system



Trimming head:

Additive manufacturing head:



coexpair dynamics

PARTNERSHIP

TRELLEBORG

Solution partner

Automation

Drives

SIEMENS

EXCELITAS TECHNOLOGIES®

Noblelight

coexpair dynamics