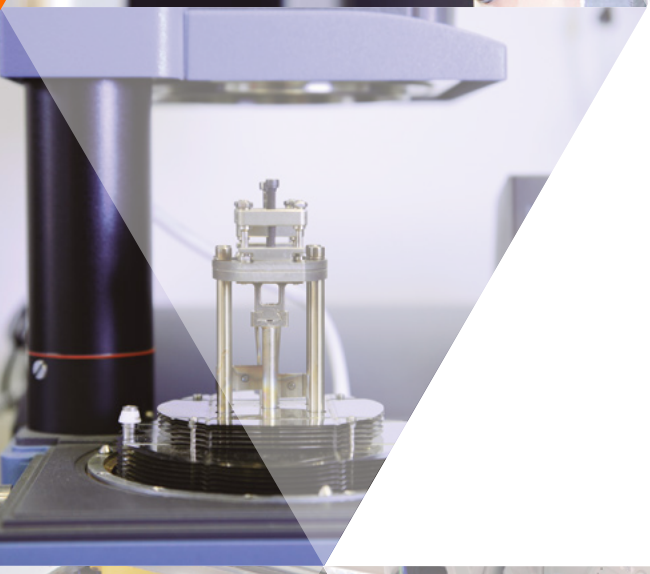
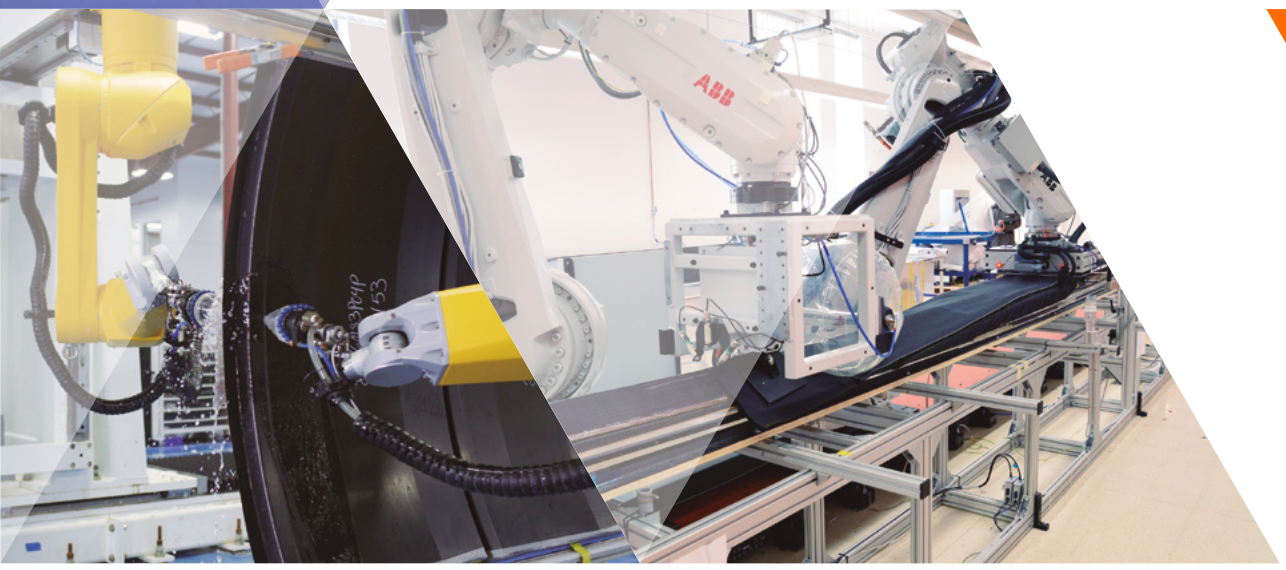




Applus laboratories

COMPOSITES

360º Testing & Engineering Solutions

Together beyond standards

Applus laboratories

Together beyond standards

EUROPE

Barcelona | Spain
Structural testing
Materials testing
Environmental, NVH & fire testing
CAD/CAE services
Engineering of test rigs and benches

Illescas | Spain
Materials testing
Prototyping
Composite samples manufacturing

Bremen | Germany
Materials testing

Dresden | Germany
Full-scale testing
Structural testing
Materials testing
Components testing

NORTH AMERICA

Detroit (MI) | USA
Materials testing

Ithaca (NY) | USA
Materials testing
Material parameters for CAE
Digitalisation solutions

Punta Gorda (FL) | USA
NDT services
Engineering of NDT equipment

Tallassee (AL) | USA
NDT services

ASIA

Shanghai | China
Materials testing

360° Testing & Engineering Solutions for Composites

FOSTERING EXCELLENCE & INNOVATION IN THE COMPOSITE MATERIALS INDUSTRY

SUPPORTING COMPOSITE PRODUCT DEVELOPMENT

- Testing: from coupons to full-scale
- Enhancing CAE simulation with accurate material parameters and CAE experts
- Engineering of custom test rigs to validate complex components' behaviour and durability

PROVIDING ADVANCED SERVICES & EQUIPMENT FOR QUALITY ASSURANCE

- Incoming inspection and process control testing for materials and parts
- Bespoke test benches and automated NDT equipments for complex contour parts

DEVELOPING MANUFACTURING TECHNOLOGIES

- A+ Glide Forming: an automated and continuous manufacturing process for CFRP parts with complex geometries

PARTNERING WITH YOUR INDUSTRY

Aerospace | Automotive | Railway | Wind power | Oil & Gas | Chemicals

FULLY ACCREDITED LABS FOR THE AEROSPACE SECTOR

Accredited Nadcap™

Non Metallic Materials Testing
Non Destructive Testing

ISO/IEC 17025

- Composite Materials Testing
- Environmental testing

AS/EN 9100

- For structural testing & engineering

Approved by the major aerospace manufacturers:

- Airbus
- Boeing
- Embraer
- Comac
- Rolls-Royce
- Safran
- GE Aviation
- Honeywell
- Lockheed Martin
- Sikorsky
- Gulfstream
- Honda Jet
- Bell Helicopter
- GKN Aerospace
- Other tier 1

ACTIVE PARTICIPANT IN RESEACH PROGRAMMES

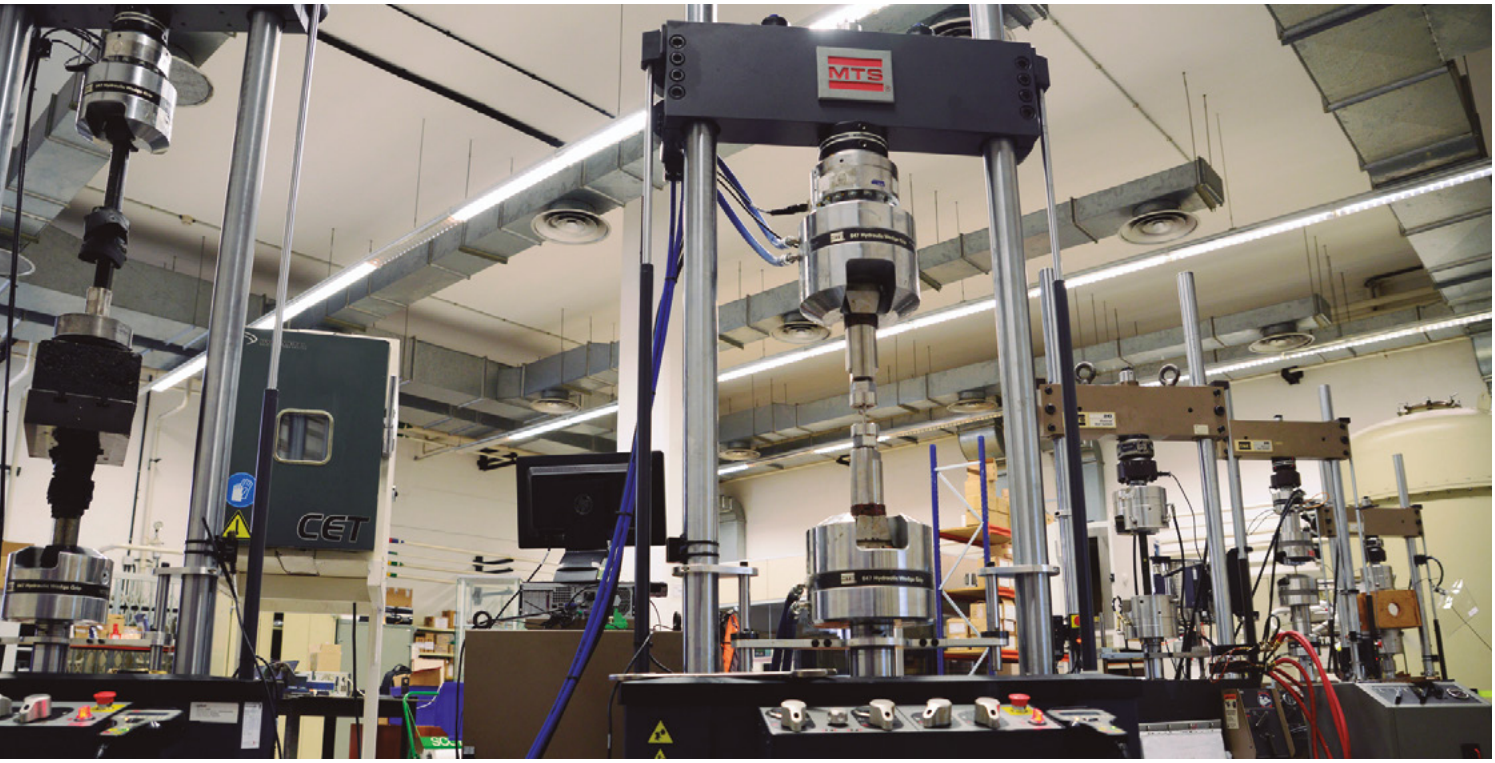
Clean Sky

HORIZON 2020

Together beyond standards

Composite Materials Testing

A NETWORK OF LABORATORIES IN EUROPE, NORTH AMERICA & ASIA



Accredited for a large scope of mechanical test methods

MECHANICAL TESTING

- Tensile
- Compression
- Bearing
- Shear
- Flexural
- Drum peel
- Fracture toughness
- Impact
- High strain rate
- Fatigue
- Temperatures from -196°C to +1200°C

SAMPLE PREPARATION

- Composite samples manufacturing
- Test samples machining and preparation
- Tabs bonding
- Samples conditioning

STRUCTURAL & FAILURE ANALYSIS

- Macro and micrographic examinations
- Behaviour in environmental conditions/ corrosion
- Surface treatment testing
- Failure analysis

PHYSICAL–CHEMICAL TESTING

- Thermal analysis
- Physical analysis
- Rheological analysis
- Chemical analysis

NON–DESTRUCTIVE TESTING

- Manual & automated NDT
- UT techniques

FROM MATERIALS CHARACTERISATION TO QUALITY ASSURANCE

SUPPORT IN R&D AND ENGINEERING

- R&D programs
- Raw materials qualification
- Materials characterisation
- Materials qualification

QUALITY ASSURANCE

- Materials incoming inspection
- Materials & products production control
- First part qualification / Initial sample homologation
- Periodic re-homologation tests

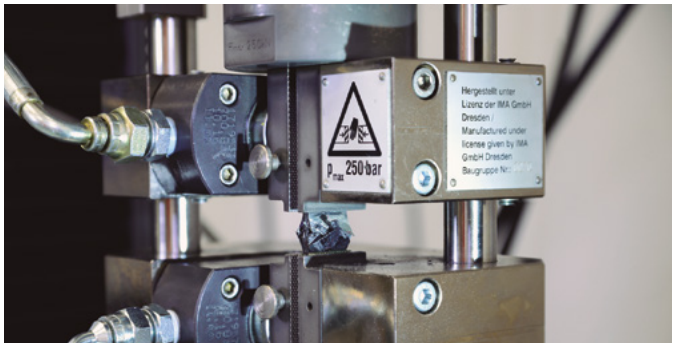
GET THE RIGHT MATERIAL DATA FOR YOUR CAE AND OPTIMISE YOUR PRODUCTS' DESIGNS AND SIMULATIONS

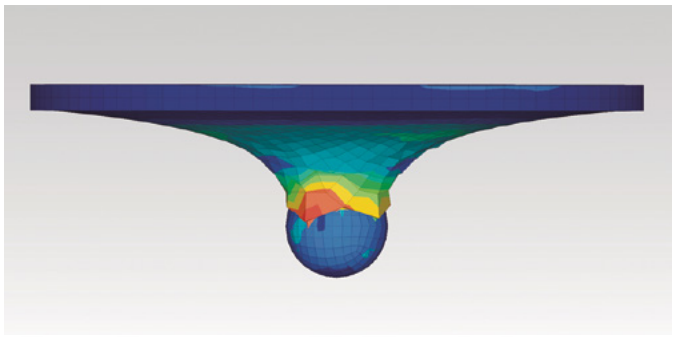
TRANSFORM TEST REPORTS INTO CAE-READY FILES

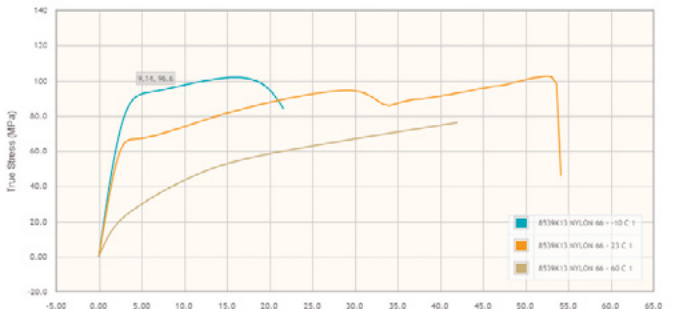
- Material testing based on software requirements
- Material model selection and parameter conversion
- CAE-ready material files
- Compatible with major CAE softwares: ALTAIR, ANSYS, AUTODESK, DASSAULT SYSTEMES, SIMULIA, ESI GROUP, LSTC, MOLDEX 3D, MSC-DIGIMAT, SIEMENS, SOLIDWORKS

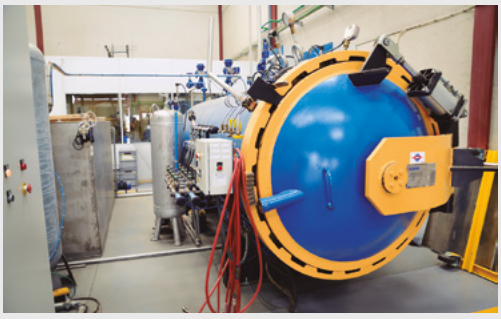
AN ENGINEERING TEAM WITH EXTENSIVE EXPERIENCE IN COMPOSITES FOR CAD/CAE DESIGN

- Parts design
- CAE analysis
- Correlation of test results with models









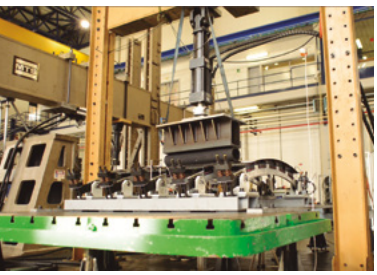
PROTOTYPING SERVICES

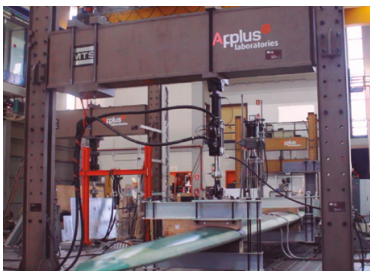
Manufacturing processes:

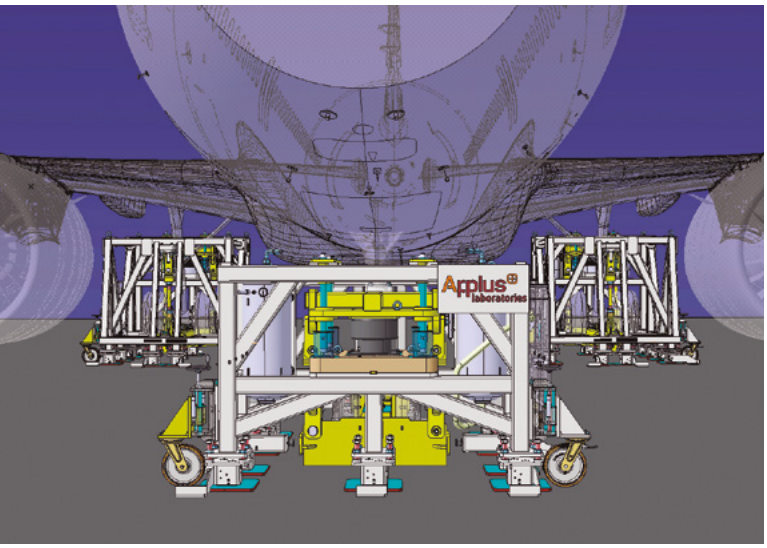
- Autoclave
- RTM and Infusion

CNC machining (including dimensional validation)

Components & Structures Testing







STRUCTURAL TESTING: FROM COUPONS TO FULL-SCALE

Large and versatile facilities:

- Uniaxial static and fatigue tests on universal hydraulic machines up to 15 MN
- Multiaxial static and fatigue tests on structural elements on a 12 m x 12 m strong floor
- Testing under controlled thermal conditions, from cryogenic temperatures to high temperatures

State-of-the-art technology for data acquisition and test monitoring:

- Instrumentation with numerous data acquisition channels
- Advanced metrological equipment and digital image correlation (DIC)
- Impact equipment to induce controlled structural damage
- Online tools for remote monitoring and data post-processing (eTesting)

BESPOKE TEST RIGS & BENCHES TO VALIDATE COMPLEX APPLICATIONS

Applus+ testing expertise is used to develop turnkey test solutions for complex components

- Test rigs for one-off or static tests
- Test benches in-service conditions for fatigue and endurance tests
- Design of tooling and facility-handling machinery
- Machines integration into existing facilities to increase customers' testing capabilities
- From component testing to full-scale solutions
- Complete product certification (CE / UL)

MULTI-TECHNOLOGICAL CAPABILITIES FOR ENVIRONMENTAL TESTING

- Corrosion tests (SST, CCT)
- Climatic & accelerated aging
- Shock, noise & vibration
- Fire testing
- Combined tests

Automated NDT Machinery

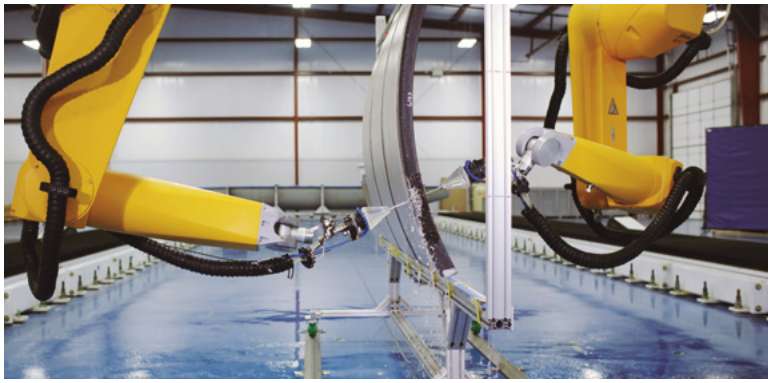
State-of-the-art customised automated NDT machines:

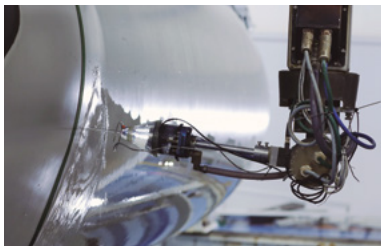
- Robotic systems
- Gantry systems
- Immersion tanks, feed-thru systems
- Options & accessories: turntables, automatic tool changers, part scanning fixtures, reusable transport & storage tools

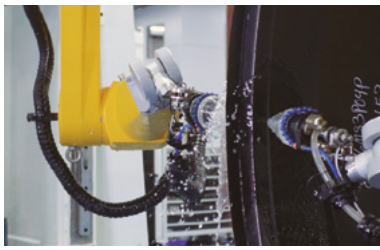
High accuracy machinery capable of inspecting large and complex components:

- Multiple part inspections simultaneously
- Multiple complex geometries tracked simultaneously on the same part in a single coordinate system
- Fully integrated common software platform for robotic systems, mobile configurations, UT, Volumetric PA, X-Ray

Co-location of NDT machinery & personnel





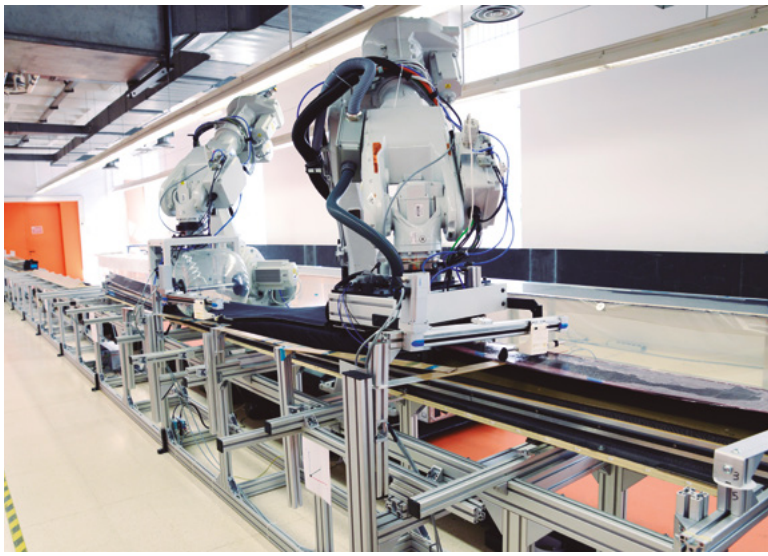


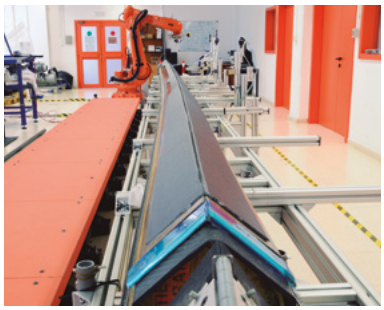
Robotic and gantry systems

Manufacturing: A+ Glide Forming

A stringer manufacturing process to provide a versatile, high-productivity and low-investment forming solution that overcomes the major drawbacks of alternative forming technologies.

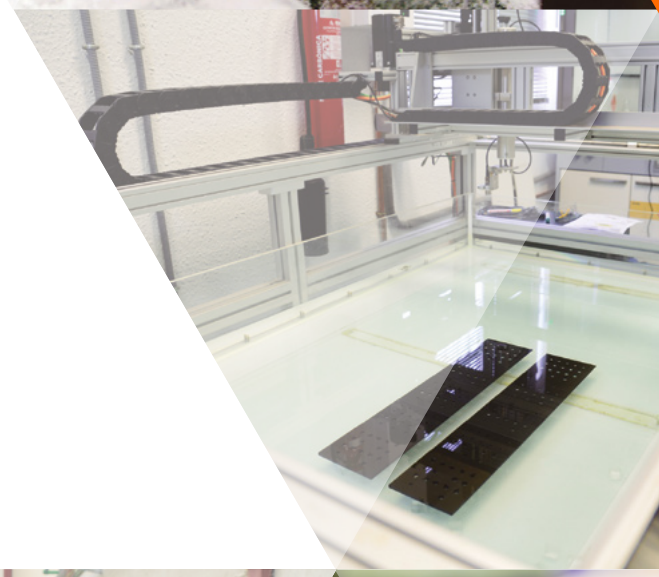
- A unique solution capable of forming high-quality, complex-contoured stringers of different sections and curvatures on a single automated machine
- Forms directly from full-thickness flat stacks
- The wrinkle-free forming process works continuously from end to end at an average forming speed of 10 mm/s
- Highly flexible: A single machine can produce different geometries by simply changing the forming tool
- Applicable to different composite materials: thermoset prepregs, thermoplastic prepregs and dry preforms for RTM





A+ Glide Forming technology

Applus laboratories



COMPOSITES

360º Testing & Engineering Solutions

www.appluslaboratories.com