



**NICK JAKSA**  
**BIA**  
**NORTH AMERICA**

**MARCH 17, 2022**



## GROUND VEHICLE

- Autonomous Vehicle
- Electric/ New Energy Vehicle
- Light Vehicle
- Heavy-Duty Vehicle
- Agricultural Vehicle
- Military Vehicle



## AEROSPACE

- Aircraft
- Rotorcraft
- Spacecraft



## RAILWAY

- Catenary Support Structures
- High-Speed Trains



## RENEWABLE ENERGY

- Wind Energy
- Photovoltaics Solar Energy



## CIVIL ENGINEERING

- Seismic Testing
- Structural Testing



## BIOMEDICAL

- Orthopedic
- Assistive Robotics



# A COMPREHENSIVE RANGE OF EXPERTISE



Ground Vehicle



Aerospace



Railway



Renewable Energy



Civil Engineering

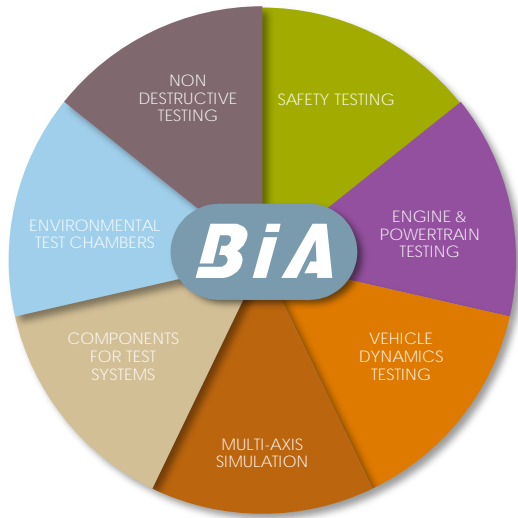
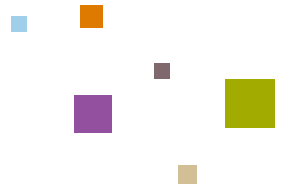


Biomedical





## PRODUCT PORTFOLIO



Universal Impact Simulation  
Acceleration/Deceleration Sled  
Roof Crush & Door Intrusion  
Seatbelt Anchorage  
Head & Seatback Restraint  
Laser-Speed Measurement Device  
Sled-Crash Facility



Transmission  
Synchronizers  
CV Joint  
Engine Simulation  
Electrified Powertrain  
E-motors  
Batteries  
Power Electronics



Steering  
Brake Dynamometers  
Shock Absorbers  
Kinematics & Compliances  
Multi-Poster Road Simulation  
Drive-In Test Chamber combined with a Four-Poster  
6 DoF Chassis Dynamometer  
Wheels & Wheel Hubs  
Rolling Resistance Measurement



Walk-In  
Drive-In Four-Poster  
Thermal Shock  
Customized Chambers  
EV/HEV Battery Test Chambers  
Solar Simulation



BMC800 Universal Controller  
UTM Control Software  
Servo-Hydraulic Components  
High-Performance & Flow Servo-Valves  
High Speed Dynamometers



Ultrasonic Scanning for Engine Parts,  
Aerospace Structures/Composites  
Eddy Current Inspection



**ART**  
Assistive Robotic Technologies

- Humanoid & Interactive Robotics
- Exoskeleton for 2014 Soccer World Cup Opening
- Assistance for Persons with Reduced Mobility



Hexawheel Road Simulator  
Vibration Simulation  
Mast Tables  
Biomedical Applications  
Suspension Air Spring  
Elastomer and Damping Components  
Pantograph Catenary Testing

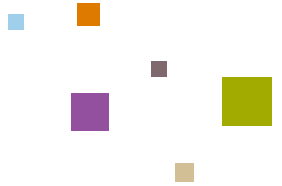


Seismic Simulation  
LBCB 6 DoF Loading Unit  
Single-Axis Seismic Table  
6 DoF Seismic Table  
Wind Turbine Loading System  
Pipeline Components Testing  
Helicopter Hub and Shaft Test System





## BIA WORLDWIDE



 **BIA West**  
[sales@bia-west.com](mailto:sales@bia-west.com)



 **BIA North America**  
[info@bia-na.com](mailto:info@bia-na.com)



 **BIA Germany**  
[info@biadeutschland.de](mailto:info@biadeutschland.de)



 **BIA Russia**  
[info@bia-ru.com](mailto:info@bia-ru.com)



 **BIA France**  
[contact@bia.fr](mailto:contact@bia.fr)



 **BIA Italy**  
[f.masera@bia.fr](mailto:f.masera@bia.fr)



 **BIA Climatic Test Technology Nanton**  
[info@bia-climatic.com](mailto:info@bia-climatic.com)



 **BIA Climatic Test Technology Shanghai**  
[info@bia-climatic.com](mailto:info@bia-climatic.com)

## Our Local Agents

 CHINA

Autotech  
Sales & Aftersales  
[lanminguo@autotechcorp.com](mailto:lanminguo@autotechcorp.com)

 CHINA

Team Testing Equipment  
Sales & Aftersales  
[info@ttechina.com](mailto:info@ttechina.com)

 INDIA

Megatech  
Sales & Aftersales  
[sales@megatechengg.com](mailto:sales@megatechengg.com)

 SOUTH KOREA

A&G Technology  
Sales Office  
[sjlim@hbep.co.kr](mailto:sjlim@hbep.co.kr)

 BRAZIL

ATC Consulting  
Sales Office  
[atc@atcconsulting.com.br](mailto:atc@atcconsulting.com.br)

 TURKEY

Star Teknik  
Sales Office  
[info@starteknik.com.tr](mailto:info@starteknik.com.tr)





# AUTOMOTIVE SAFETY TESTING

Impact Simulation

Roof Crush & Door Intrusion

Seat Belt Anchorage

Head & Seat Back Restraint

Laser-Speed Measurement Device

Sled-Crash Facility

Acceleration/Deceleration Sled



## VEHICLE SAFETY



- BIA is a widely recognized technology leader in the automotive safety including universal impact, front and rear collision shock, seat belt anchorage and head and seat back restraint simulation systems among other tailor made products developed by the company.
- BIA has recently increased his presence in the field by introducing a new technology for actual crash simulation (acceleration sled). BIA offers an unmatched range of forces up to 5000kN which is more suitable for heavy vehicles with batteries.

# VEHICLE DYNAMICS TESTING

- Steering
- Brake Dynamometers
- Shock Absorbers
- Kinematics & Compliances
- Multi-Axial Simulation
- 6 DoF Chassis Dynamometer
- Wheels & Tires



## VEHICLE DYNAMICS TESTING



- High-performance hydraulic simulation systems are part of BIA's portfolio for increasing number of vibration and reliability tests, as well as performance tests fully integrated into hardware-in-the-loop (HIL) simulation.
- Test systems related to ISO standard (tire, steering and brakes testing) as well in line with new requirement (wireless steering, autonomous driving, brakes testing)
- Solution can fit heavy-duty specimen (up to 70t).



# ENGINE & POWERTRAIN TESTING

Manual / Automatic Transmission

Transmission Parts

Synchronizers

CV Joint

Engine Simulation

Engine Parts

EV/HEV Motors & Batteries



## POWERTRAIN TESTING



- BIA has developed and manufactured a wide range of test benches in the Powertrain field, and especially for new energy vehicles.
- Its offer includes: transmission test solutions with exclusive high-speed dynamometers, synchronizers, dynamic gear change robot, CV joint testing for sedan to heavy duty truck.

# COMPONENTS FOR TEST SYSTEMS

BMC800 Universal Controller

UTM Control Software

Hydraulic Components

High Speed Dynamometers

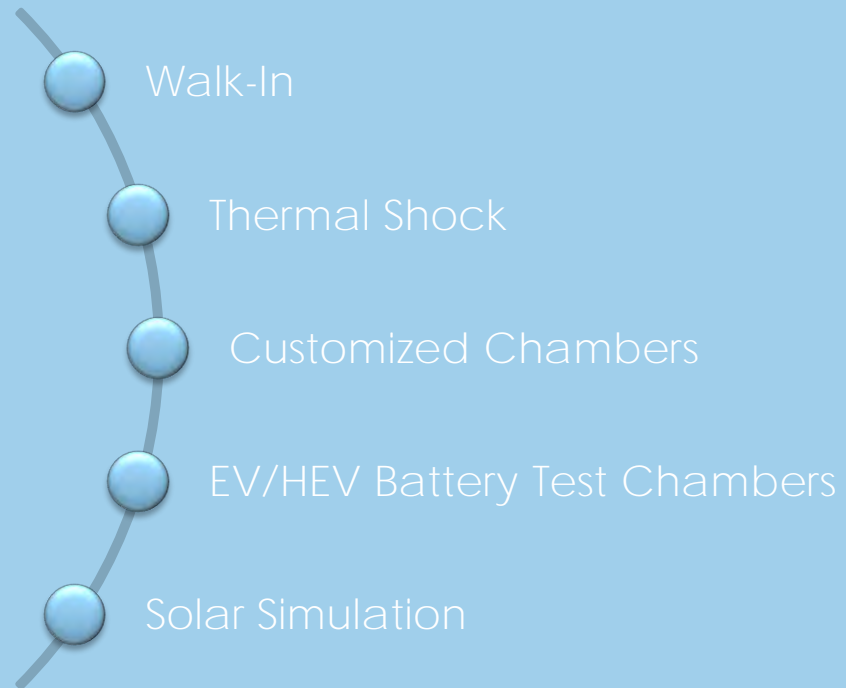


## COMPONENTS FOR TEST SYSTEMS



- BIA commercializes products which are results of 25 years of internal development and innovation for test bench application
- Components are servo-control, hydraulic components (actuators, high performance servo-valves) as well as high-speed motors for automotive and aviation component testing.

# ENVIRONMENTAL TEST CHAMBERS



## ENVIRONMENTAL TEST CHAMBERS



- BIA has developed an extensive range of custom-designed chambers, dedicated to automotive testing, including: climatic four-poster, climatic multi-axial table, climatic emission lab in wind tunnel, full spectrum solar simulation as well as rain chambers
- These chambers can simulate a wide range of environment conditions and can fit heavy-duty specimens (up to 35t)



# IN-LINE TESTING

Aerospace NDT  
Ultrasonic Scanning

Aerospace NDT  
Eddy Current Inspection

Engine & Powertrain  
Gearbox Inspection



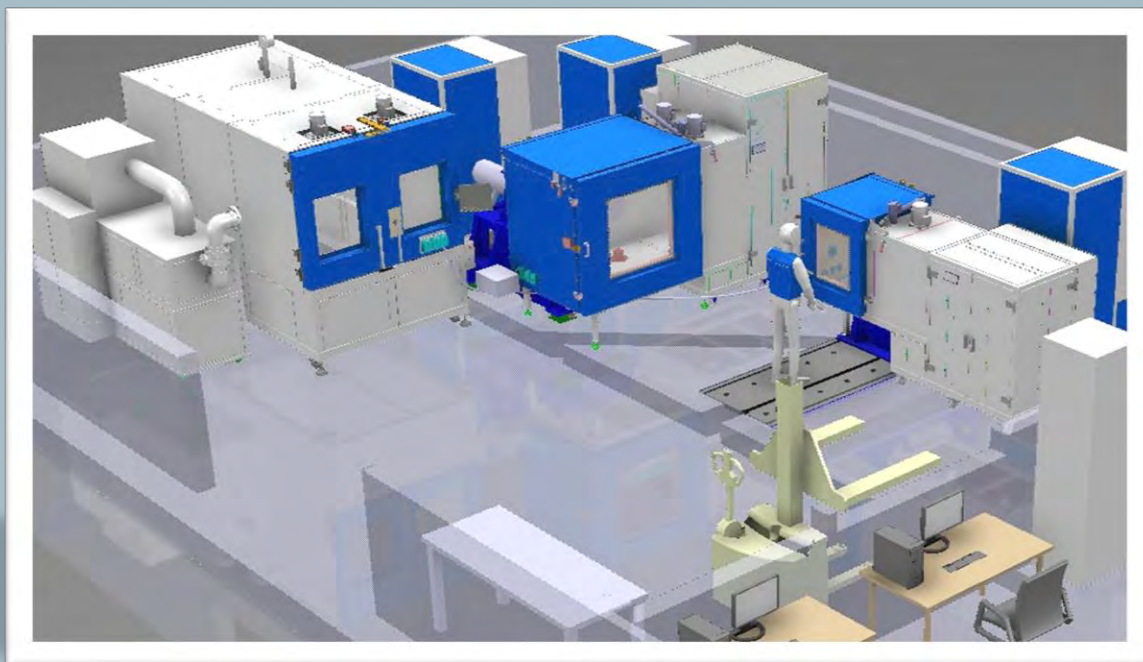
## NON DESTRUCTIVE TESTING

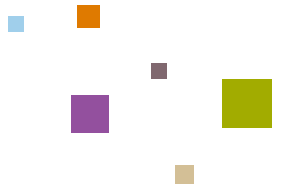


BIA has mainly designed two aerospace non-destructive engine testing systems:


- (i) Ultrasonic Scanning used to detect flaws and material defects on engine parts and complete panels as well as
- (ii) Eddy Current Inspection used to control surface quality, to detect flaws and to develop parts maintenance

## BIA ELECTRIC VEHICLE TEST LAB





# AUTOMOTIVE SAFETY TESTING

- 
- A vertical line with circular markers, each containing a number from 1 to 7, positioned to the left of the list items.
- 1 Impact Simulation
  - 2 Roof Crush & Door Intrusion
  - 3 Seat Belt Anchorage
  - 4 Head & Seat Back Restraint
  - 5 Laser-Speed Measurement Device
  - 6 Sled-Crash Facility
  - 7 Acceleration/Deceleration Sled





- Modular Design: A common base and up to 12 impactors
  1. Pedestrian Upper Legform
  2. Pedestrian Complete Legform
  3. Pedestrian Headform
  4. Guided Head/Impactor
  5. Body Block
  6. Pendulum
  7. Interior Head Impactor
  8. Knee Impactor
  9. Linear Impactor
  10. Ejection Mitigation
  11. Flex-PLI Legform
  12. aPLI Legform
- Servo-hydraulic technology with closed-loop control of the speed
- Over 75 worldwide references since 1998





- aPLI Legform
- Pedestrian Upper Legform
- Pedestrian Complete Legform
- Pedestrian Headform



aPLI Legform



Pedestrian Upper Legform



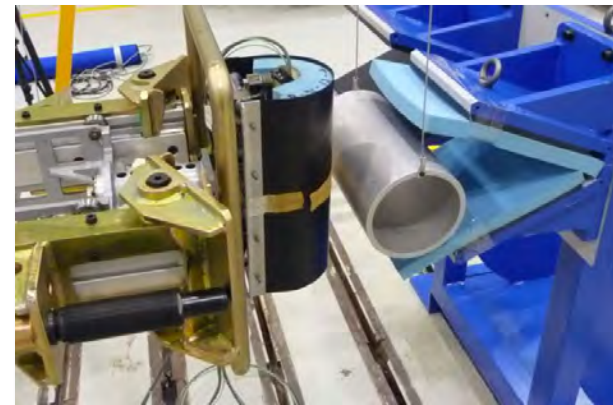
Pedestrian Headform



Pedestrian Complete Legform



- Dynamic calibration device
- Static calibration device







- Guided Headform
- Body Block



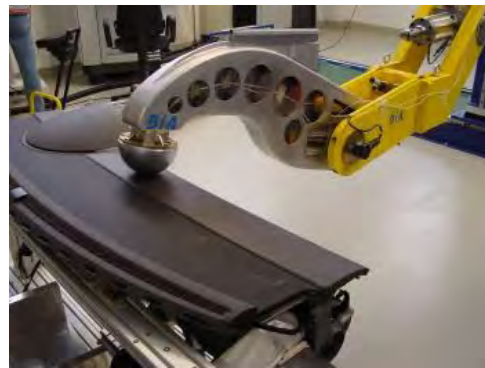
Guided Headform



Body Block



- Pendulum



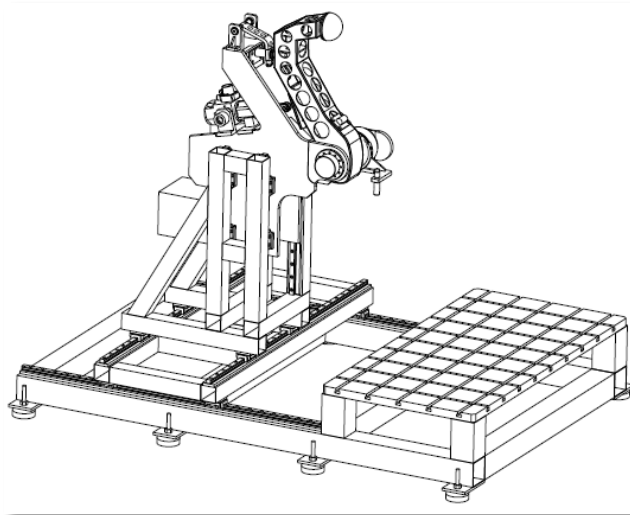
Pendulum on Dashboard



Pendulum



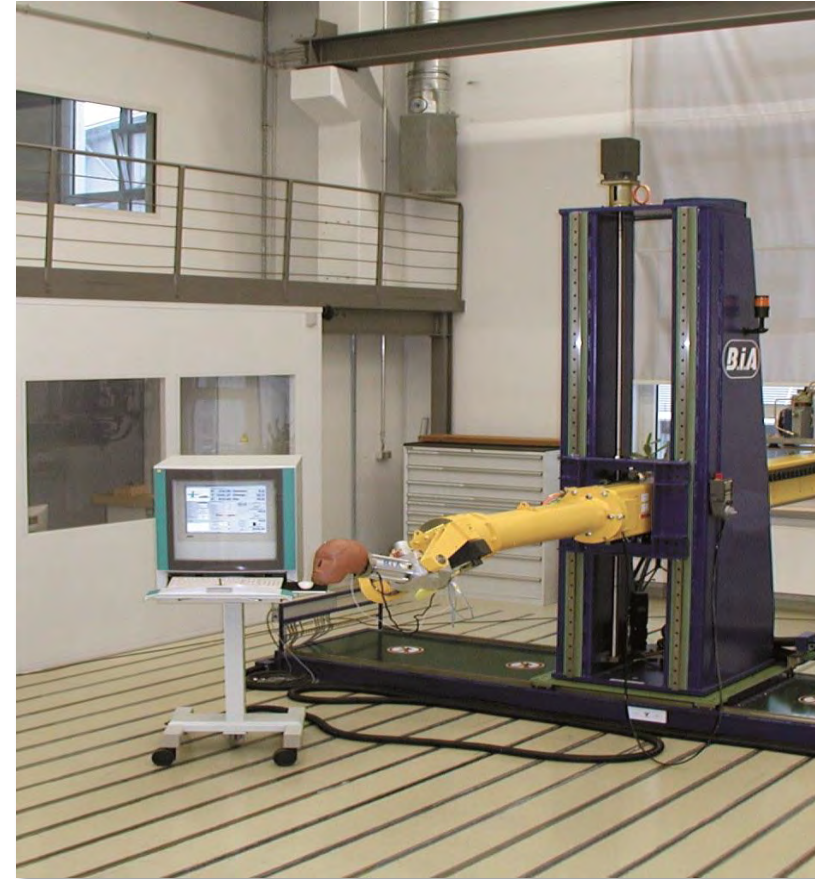
- Head rests
  1. Manual adjustment
  2. High natural frequency
  3. Hydraulic system
  4. Closed-loop control
  5. Anti rebound (optional)





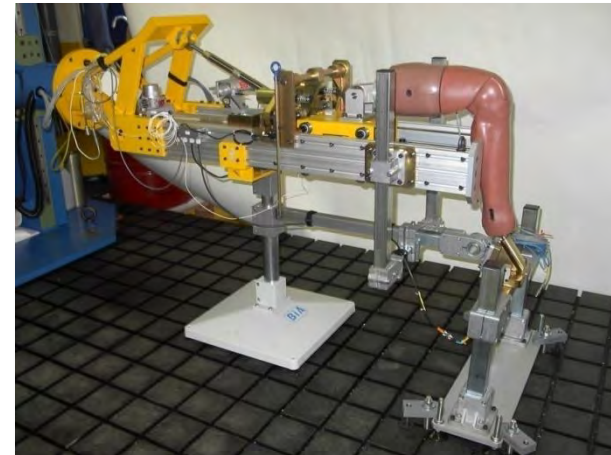
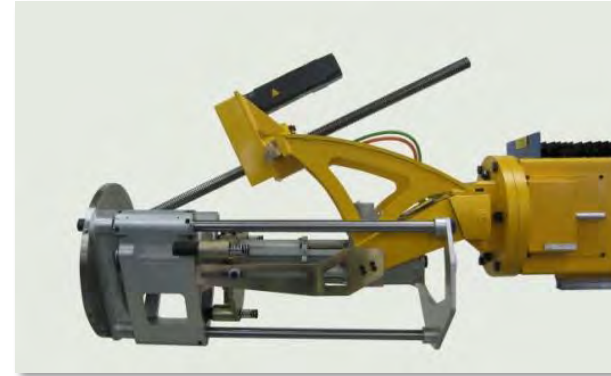


- Convenient positioning in confined space
- Transparent headform to easily and accurately position the impactor on target





- Additional R&D Tests
  - Knee Impactor
  - Linear Impactor for airbag tests
  - High-Energy Linear Impactor





- Ejection Mitigation FMVSS 226







- Complementary to BIA Universal Impact Test System
- Can be used on
  - BIA's existing test systems
  - Test equipment dedicated to head tests
  - Retrofit of existing systems (Pneumatic, Bungee, Electric, ...)
  - New integration







- Roof crush and door intrusion combined in one test system
- Tri-axial force measurement
- Up to 250 kN applied force and 1500 mm intrusion stroke
- Roof crush test at 0° angle



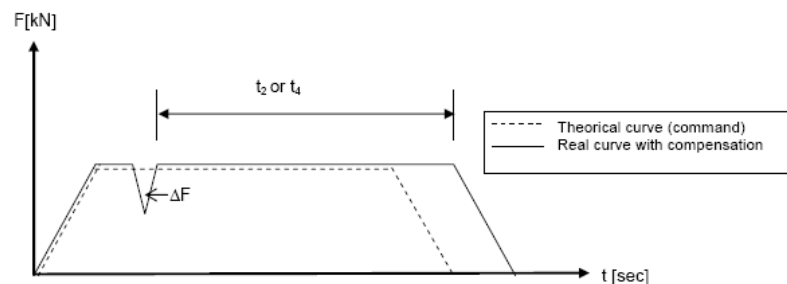


- 9 Axis
- Up to 50 kN force / 1000 mm for each cylinder
- Compact and noiseless hydraulic supply system
- Advanced control mode (force compensation in case of failure to avoid waste of prototype)



### Force compensation in case of failure

This function is very useful in case of any failure in the anchorage sub-system. To avoid the waste of the corresponding test, the control system is capable to compensate the test duration, so that the correct force level is applied during the expected time.



# HEAD & SEAT BACK RESTRAINT

FMVSS 202A, CMVSS 202, ECE R17/R80



- Head and seat back restraint in one test system
- Up to 3 seats simultaneously
- Full electric actuators
- Laser system for head position adjustment







- High Accuracy Speed:  $<0.2\%$  in all case
- Display Resolution: 0.01 km/h
- Max. Distance between transmitter and receiver: 10m

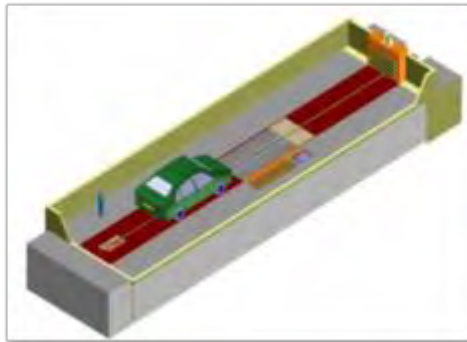






Short sled for bumper testing (up to 40 kph)

- An innovative catapult using belt technology
- Releasing of the car within one meter from the crashing point
- 14 meters long
- 10kN traction force



Audi Sled Crash



- To realize crash tests on seats and components
- Programmable deceleration



Sled for Seats





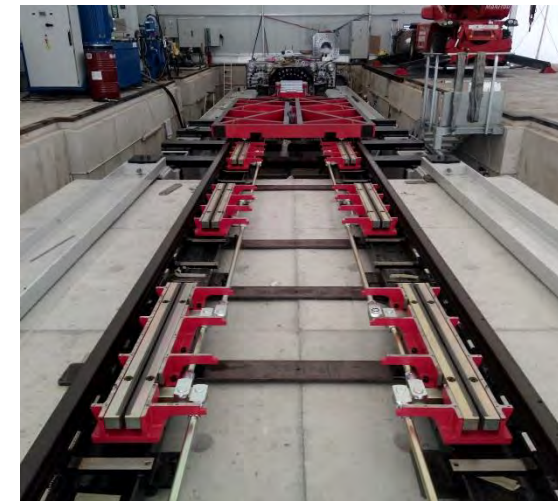
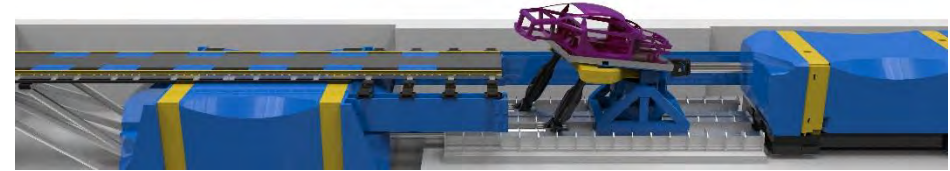
- Highly integrated design and reduced footprint
- Optional negative g accelerations
- Equipped with on-board post pulse braking module
- No wear nor consumable parts
- High pulse resolution and high repeatability





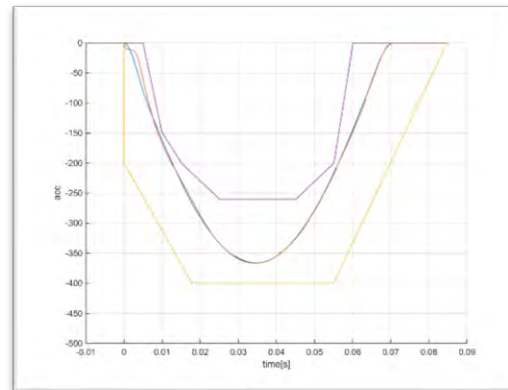
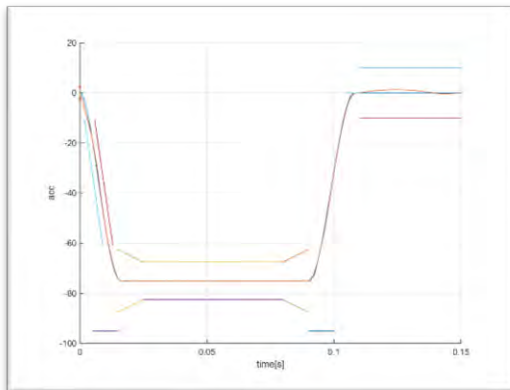


- Modular system and adaptable to evolving international regulations.
- Fully servo-hydraulic system using integrated fast response valves technology
- No consumables, low maintenance
- Innovative numerical control strategy with real-time closed-loop control in parallel with real time system modelling
- Modular design for multistep implementation from horizontal to horizontal + pitch + yaw





- 250 kN servo-hydraulic decelerator test system
- Closed-loop controls to compensate mass or speed errors
- ECE-R100 mechanical shock/crash simulation
- Half-sine
- Mechanical integrity/crush



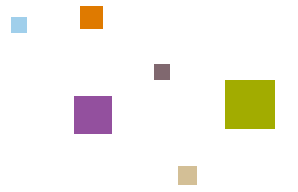
## BUMPER FOR VEHICLE PARTS FMVSS 581, CMVSS 215, AR ALLIANZ



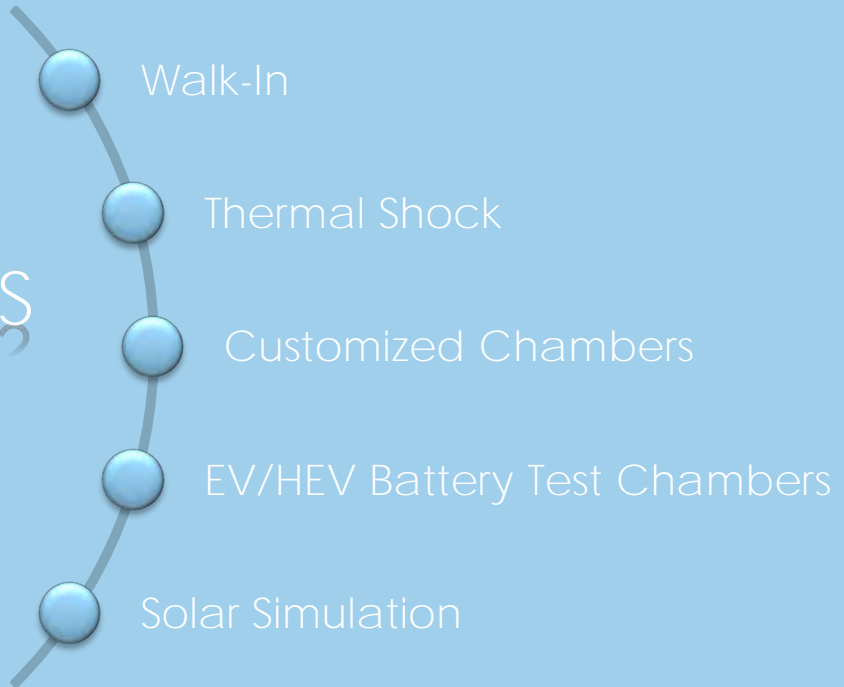
- Speed up to 20km/h
- Adjustable weight from 600kg to 3.5t
- Constant pendulum radius with vertical height adjustment (300mm)







# ENVIRONMENTAL TEST CHAMBERS





# BIA CLIMATIC RANGE OF PRODUCTS



## STD Product Range



T&RH



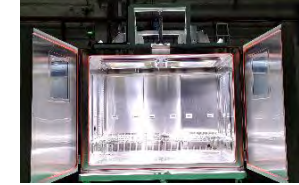
COMPACT



BATTERY TEST



ESS



SOLAR



HORIZONTAL  
THERMAL SHOCK



VERTICAL  
THERMAL SHOCK



CHILLER & ACU



CORROSION



VIBRATION

## Customized Product Range



DRIVE-IN



AIRBAG



SPECIAL T&RH



IR & SOLAR WALK-IN



COMPACT WALK-IN



POWERTRAIN &  
EMOTOR



TWINS BATTERY  
& EX-PROOF



WALK-IN VIBRATION  
& ALTITUDE



EMISSION, COLD START  
& VOC



MAST & FOUR POSTER





### BENEFITS OF WORKING WITH BIA CLIMATIC



#### Customization

Fully customizable approach, from 0,1 to 5,000 m3 testing chambers

#### Know-How

Full control of the environmental simulation testing – temperature, humidity, solar, IR, altitude, corrosion, vibration, rain, dust, etc.

#### References

More than 2,000 chambers delivered to our WorldWide Customers in collaboration with the main players of the testing field

#### Range of Products

Customized Climatic, BT EV Chambers, AirBag Chambers, ESS, Solar Simulation, IR, Chassis Dynamometer, Walk-In Climatic, Vehicle Cold Start, Bid size climatic vibration, VOC, MAST, 4Poster, Wind Tunnels, Sand & Dust, Rain, Emotor, PowerTrain, Twins, etc.

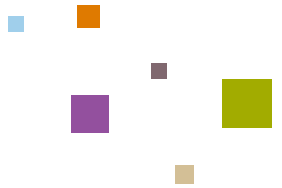
#### Continuous Support

Local Presence by means of owned BIA Group Companies in order to be close to our reputable customers on every phase of the supply from sales to project management, from installation commissioning to service and maintenance





## BIA CLIMATIC CUSTOMIZED SOLUTION



**DRIVE-IN**



**AIRBAG**



**TWINS**



**SOLAR WALK-IN**

Complete Testing Solution Range  
Automotive, Electronics, R&D University, Defense

**POWER TRAIN**



**E-MOTOR**



**WALK-IN VIBRATION**

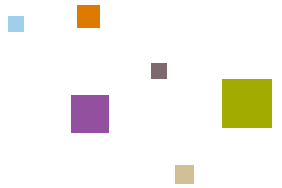


**COMPACT WALK-IN**





## BIA CLIMATIC CUSTOMIZED SOLUTION



**RAIN**



**WALK-IN CORROSION**



**IR**



**EMISSION, COLD START**

**Complete Testing Solution Range**  
**Automotive, Electronics, R&D University, Defense**

**MAST & FOUR POSTER**



**BATTERY TEST LAB**



**INTEGRATED BIA – BIA CLIMATIC SOLUTION**



**Elastomer Test**



**Shock Absorber Test**





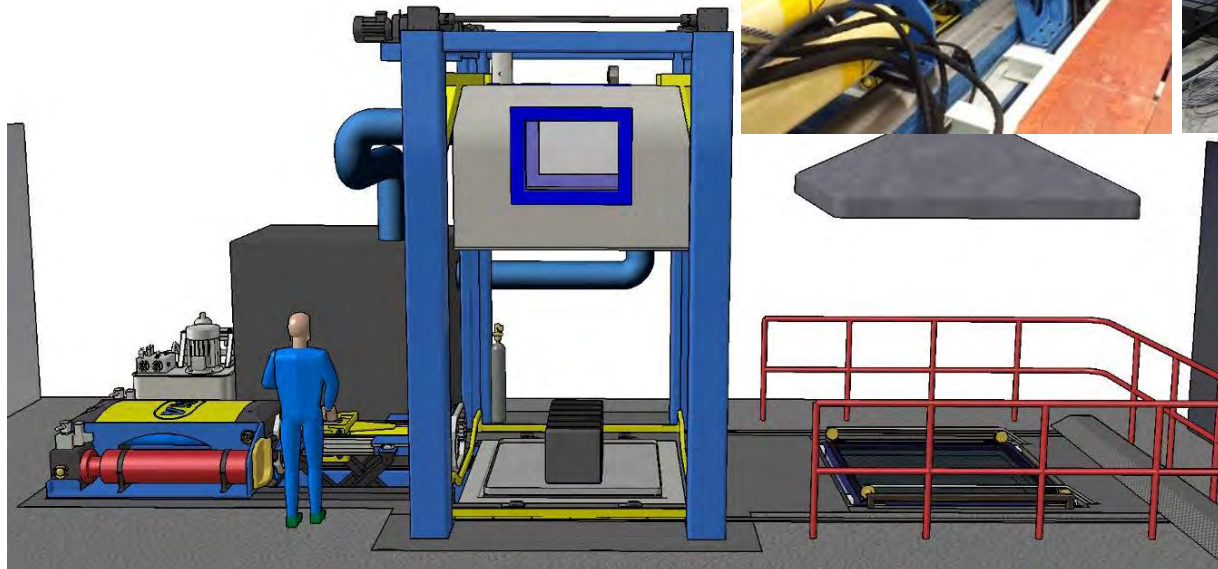
# BIA CLIMATIC THE POWER OF INTEGRATION

## BATTERY SHOCK TEST

- **Volume** : 5 m<sup>3</sup> (testing box)
- **Temperature** : [-20°C; +60°C]
- **Temperature rate of change** : 0,5°C/min heating and cooling

### Specific features :

- Max Force: 500 kN
- Max Speed: 22m/s
- Max Battery size: 1,2 x 0,8 x 0,8 m
- Eucar Level 7



**2016 – COMMISSIONED**



**STRONGER  
TOGETHER**







# BIA CLIMATIC FOCUS ON SAFETY BATTERY TESTS SOLUTION



## COMPLETE SOLUTION FOR BATTERY TESTS

- ✓ Fully customizable solutions from Cells, Modules, to Battery Packs
- ✓ From level 1 to level 6 Eucar accessories available
- ✓ Ex-Proof configuration on request available
- ✓ Fire Extinguishing system according to battery type (Water Mist, Immersion, CO2, etc.)
- ✓ Capability to contain heating/firing up to 900°C for 10 mins
- ✓ Battery Test Chamber and Cooling Battery Exchanger in ONE INTEGRATED SYSTEM

Battery Test Chamber

+

Battery cooler  
(Liquid Circulation Chiller)



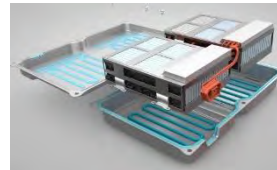
**ONE INTEGRATED SYSTEM**



### Battery Cells Solutions



### Battery Modules Solutions



### Battery Packs Solutions





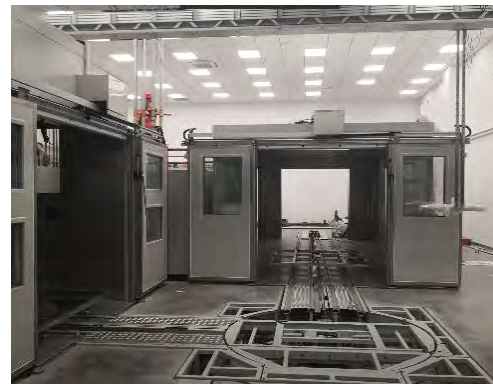
## BIA CLIMATIC FOCUS ON SAFETY AIRBAG SOLUTION

### DASHBOARD CAR TEST LABORATORY

- Volume : 2 x Walk- IN chambers 50 m3 each
- Temperature : [-40°C; +150°C]
- Rate of change: 3°C/min

#### Specific features :

- Turn-Key Solution of the complete Laboratory
- Sliding doors opening in less than 10 sec
- Turning Table
- Fully automated system, one sole control software
  - Chamber cycling
  - Chamber soak
  - Sliding doors
  - Sliding Table
  - Turning Table
  - Lighting system



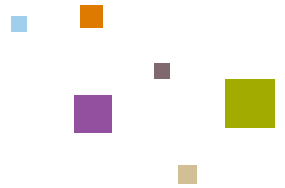


## COMPLETE AIRBAG TEST LABORATORY

- Volume : 5 chambers (2 x airbag test + 3 x cabinets)
- Temperature : [-40°C; +150°C]
- Rate of change: from 3°C/min to 15°C/min

### Specific features :

- Turn-Key Solution of the complete Laboratory
- Sliding doors opening in less than 10 sec
- Fully automated system, one sole control software
  - Chamber cycling
  - Chamber soak
  - Sliding doors
  - Sliding Table
  - Fast Cameras
  - Lighting system







## BIA REFERENCES





...Thanks for your attention...



[www.bia.fr](http://www.bia.fr)

Nick Jaksa, Managing Director  
BIA North America  
+1 248 790 8327  
[n.jaksa@bia-na.com](mailto:n.jaksa@bia-na.com)