



**Power Electronic Systems  
Design and Manufacturing  
10W to 100kW**

# Key Player in Power Electronic Systems

Industrial actor in design and manufacturing of **customs power supplies** from **10W** to **100kW**

**AC/DC Power supplies**

**DC/DC Converters**

**DC/AC Inverters for motor control**

**BMS and battery chargers**

**15**

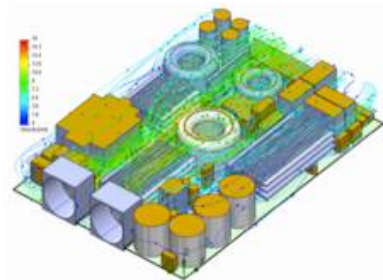
New products designed every year

**20 years**

Of industrial experience

**120 000**

Manufactured products every year

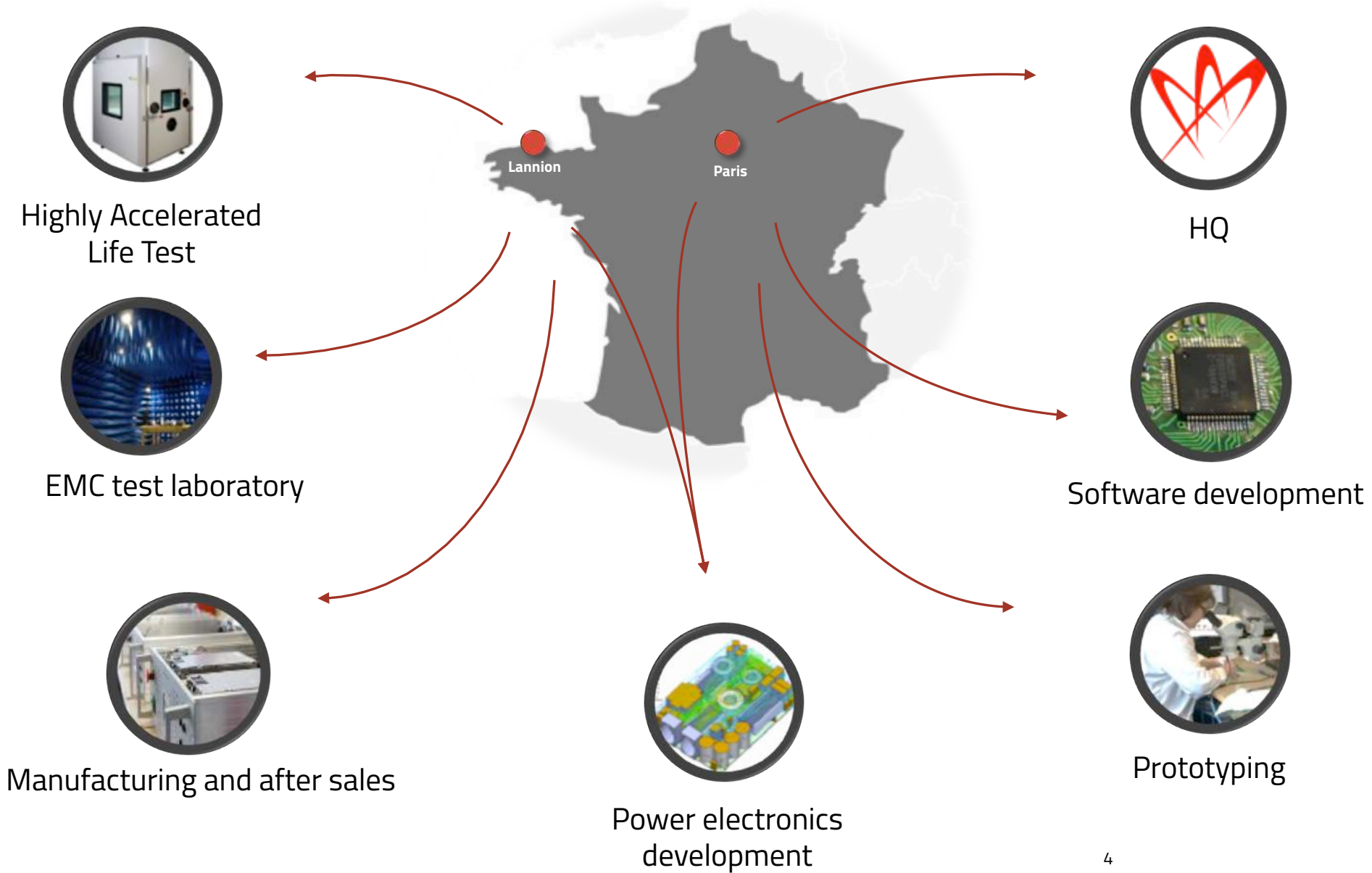


# Know-how and Expertise

Our core knowledge is focused on :

- ✦ The latest generation of power electronics topologies to provide **high efficiency**
- ✦ Embedded real-time software to compute digital control of power converters, allowing **communicating systems**
- ✦ Production line management, providing **perfect product quality** at **optimized costs**
- ✦ **20 years of industrial experience** in the field of power electronics for the benefit of our customers

# Organization



# Our Markets



# Our main Customers



# Quality Management

- ✦ Our electrical design services has a wide expertise in the field of electrical safety and EMC compliance requirements
- ✦ We have a Quality Management System **ISO9001** and **EN9100** (aerospace standards) certified
- ✦ We design CE marked products for European market, CCC mark for China and UL mark for the USA





# **A complete Offer for Power Electronic Systems Design and Manufacturing**

Industrialization

Qualification

Production

After-sales



## Among our Power Conversion expertise :

- ✦ Power electronics
- ✦ Real-time embedded software
- ✦ Mechanical and thermal management
- ✦ In-house prototyping and products qualification

**Cost** and **industrialization constraints** are taken into account at the very beginning of the design and all along the development process



# Qualification

Known standards: **EN60950**, **EN60601** (medical), **EN61010** (measurement equipment), **DO160** (aeronautics), **MIL STD** and **AECTP** (defence), **EN50155** (railway), **ISO 6469** (Electrical vehicle), **UL marking**, **CE marking**



HALT Equipment



Faraday Cage



Automated qualification equipment

**1** HALT Equipment  
Highly Accelerated Life Test

**1** Faraday cage  
Anechoic chamber

**1** EMC Laboratory  
EMI Receivers and generators

**6** Qualification benches  
Automated test benches

**108** Products

 Certified

# Industrial Production

- ✦ **Quality management** through a control of the qualification processes and the final testing procedures for all products
- ✦ **Costs control** through close negotiation on every significant component
- ✦ **Delivery time management** through procurement and manufacturing planning of each batch to ensure on-time delivery



**80**

products running in production

**10<sub>p</sub> to 20<sub>kp</sub>**

Annual parts per reference

**10**

Standardised test benches

# After-Sales Service

- ✦ After-sale service under warranty in accordance with our clients conditions
- ✦ Implementation of **tailor-made after-sales** services (e.g., long period warranty, specific maintenance in operational conditions)
- ✦ Management of **component obsolescence**: depending of our customers expectations, monitoring and partial or total re-design of the products
- ✦ Monitoring of standards and technologies evolutions





# **A wide range of products from 10W to 100W**

AC/DC Power Supplies

DC/DC Converters

DC/AC Motor Control

Battery Management Systems



# AC/DC Power Supplies

## Aeronautics

270V<sub>AC</sub> ; 400-800Hz  
with three-phase Input

## Railway

115V<sub>AC</sub> – 230V<sub>AC</sub> Input

## Telecom

85V<sub>AC</sub> – 300V<sub>AC</sub> Input

From 100W to 100kW

Isolated or non-isolated topologies

Module, rack or open frame

CAN or SPI remote monitoring and diagnostic

- Current harmonics complying with ABD100 / DO160 up to 800Hz
- Embedded software complying with DO -178 DAL D
- Embedded environment

- CEM EN55011 – A Class
- Cooling by natural convection

- Stationary environment
- Cooling by convection or conduction
- Very high efficiency



# DC/DC Converters

## Aeronautics

## Railway

## Telecom

## Automotive

28V<sub>DC</sub> and 270V<sub>DC</sub> Buses

Embedded network  
Railway (24V to 110V)

48V<sub>DC</sub> Bus

High voltage input  
up to 950V

From 10W to 30kW

Isolated or non-isolated topologies, unidirectional or bi-directional

Module, racks or open frame

Cooling by natural convection, forced, or liquid

- Qualification according DO-160
- Compliant EN50155 / STM-E 001
- High power density
- Harsh environment (temperature, vibration)
- Monitoring by CAN bus



# DC/AC Motor Control

## Automotive, trucks, industrial robotics

Input voltage up to  $400V_{DC}$

From 20W to 20kW

Space vector control

Management of different sensor types:  
Synchro-resolvers, Hall effect, Potentiometer, optical encoders

Synchronous, asynchronous and reluctance motors

- Communication by CAN bus
- Torque, speed and position control
  - Harsh environments





# Battery Management Systems

## Aeronautics

Output from  $400V_{DC}$  to  $600V_{DC}$

From 1kW to 100kW

Energy embedded: up to 500kJ

Storage technology: Batteries (Lithium-Ion), Supercapacitors

Self-diagnosis and cell balancing

Charge and discharge management according to the different storage technologies

Communication by CAN bus, I<sup>2</sup>C

Qualification according to DO-160  
Optimized Weight

## Telecom

Buses of Telecom Network Input  
from  $48V_{DC}$  to  $54V_{DC}$

Stationary environment



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