

## Reliability

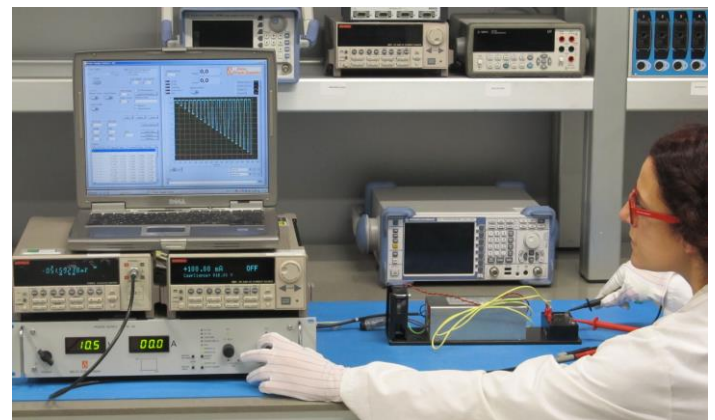
Reliability is the ability of an apparatus, machine or system to perform its required function during the specified period under given conditions.



The electrical systems of an automobile must pass a series of tests to certify their validity and demonstrate that they will meet all the functionality and safety requirements.

### Parameter measurement and monitoring

- Voltage, current, L, R, C, S-parameters
  - Contact resistance
  - Insulation resistance
  - Dielectric rigidity
  - CAN parameters
- Resistance to electrical charge
  - Usual, non-usual, pulsed power supply...
  - Resistance to slow variations of power supply
  - Re-initialization test
  - Resistance to micro-breaks in power supply
  - Starting profile
  - Resistance to short-circuits
- Resistance to climatic loads
  - Storage under high and low temperatures
  - Operation under temperatures
  - Climatic cycles
  - Thermal shock (air-air, air-water...)
  - Salt spray
  - Solar radiation
- Resistance to mechanical load
  - Vibrations
  - Mechanical shocks
  - Abrasion
  - Free fall
- Resistance to chemical loads
- IP codes



### Standards:

- ISO 16750
- PSA B21 7110
- Renault 36-00-808
- VW 80 000
- BMW GS 95024



## Reliability laboratory equipment

- Power supplies
  - High current power supply (up to 400 A)
  - High speed power supply (suitable for ISO 16750-2)
  - High precision current sources
  - Manufacturers: Delta, Grelco, Sorensen, Hameg...
- Data acquisition systems
  - Sampling frequencies of up to 2 MHz
  - Channels of U, I, T, IEPE,  $\frac{1}{4}$ ,  $\frac{1}{2}$  and full bridge, encoder inputs...
  - CAN
  - GPS
  - Manufacturers: HBM, NI, Agilent, Yokogawa, IMC, ALMEMO...
- Digital multimeters: Agilent, Fluke...
- Nanovoltmeter: Keithley 2182A
- Multitester: Metrel MI2094
- RF Generator: R&S SM300
- Oscilloscope: LeCroy Wavwjet 324
- Stress test bench for buttons and knobs
- Audio-stress bench



## Projects

**INGRESS-EGRESS:** Design and building of an anthropomorphic buttocks form for the simulation of the vehicle entry and exit process. Ref.: INCITE 09DPI018CT.

Funding: Xunta de Galicia (Galician Regional Government) and ERDF.

**NANOCIT:** Design of high added value products based on carbon nanostructures and polymer resins.

Ref.: IAP-600100-2008-26.

Funding: Gobierno de España (Spanish Government) and ERDF.

**NANOCONTROLLER:** Research and development of a new composite based on a CNT reinforced polymer which detects and quantifies structural damage by means of surface electrical conductivity measurement on car parts.

Ref.: INCITE 09TMT004CT.

Funding: Xunta de Galicia (Galician Regional Government) and ERDF.

## Linked areas

The reliability laboratory works closely with the following laboratories:

- Climatic laboratory
- Acoustics and vibration laboratory
- Fatigue and durability laboratory
- Engine laboratory
- Materials laboratory (textiles, plastics and electrical cables testing).

