

# S.E.R.E.M.E.

Since 1976,

EXPERTS in

**CUSTOMISED SHOCK**

**NOISE & VIBRATION**

**TEST FACILITIES**



Entreprise lauréate

FR RÉPUBLIQUE FRANÇAISE



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## **OVERALL DESCRIPTION OF SEREME ACTIVITIES**

SEREME core activity is design and delivery of vibration, acoustic and shock test facilities. Within this sector, SEREME main segment is the high-end segment which leads quite often to customised test facilities.

SEREME has selected as main strategical axis, the improvement of the quality of tests as overqualification of payloads is a huge source of overcosts yet under estimated by many End-Users.

SEREME has during the last 15 years invested more than 10% of its turnover in R & D. This investment has allowed SEREME not only to remain one of the European leaders in high-end vibration, shock and acoustic test facilities for Aero Space and Defence applications (and in some segments the European leader or even worldwide leaders) but to perform more than 50% of its activities outside European Union.

In each of its core business, SEREME has invested in the R&D of key components. It can concern vertical or horizontal hydrostatic bearings for vibration, noise generators for aerospace and defense RAC, noise generators for hydroacoustic, high-end table for microvibrations measurement table, pneumatic launchers... It is integrating also a brand new concept of 4 DOF and 6 DOF small vibration test systems.

This strategy has been extended to design and development of testing facilities dedicated to railways industry.

SEREME has obtained in January 2021 the label CNES SME (SEREME was the unique company in ground test rigs to obtain this label) and also became Entreprise Lauréate (Award Winning) of the French Recovering and Boosting Plan in the Space sector.

## **DYNAMIC**

This sector deals with all the disciplines of test laboratories, especially those concerned with vibrations, shocks and material characterisation. We come in at the very beginning, from the basic design of the laboratory (electrodynamics, electro hydraulics, pneumatic) and follow through with the design and supply of customised machines such as large guided slip tables and vertical expanders for satellites (ESTEC, INTESPACE, KARI...) and Defense (CESTA, ARIANE Group, MBDA), seismic simulators (CEA), crash test facilities, drop testers (FAURECIA, RENAULT, BMW, AUTOLIV), dual test benches (vibration/climatic) for the automotive and packing sectors, test equipment for the French Navy, horizontal and vertical shaking tables (NAVAL Group, CESTA, DGA), high and medium speed pneumatic launchers (CEA, ONERA, ARCELORMITTAL, THALES UNDERWATER SYSTEMS, CEA-DAM...), bridge's cable test rig, railway rolling fatigue test facilities (TIMKEN Europe...).

Our brief extends beyond the laboratory construction stage : we also take part in its operation with, for example, the design and supply of all the required fixtures for vibration test (adaptors, expanders, frames, dummy specimen, hydrostatic bearings...) or crash test (pallets, camera supports, trolleys...) as well as most of MGSE including tests clamp bands (AIRBUS D&S).

The structural weakness of the guidings of electrodynamic shakers has led SEREME to develop ten years ago a full range of hydrostatic bearings (vertical and / or horizontal) which allow to

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reach, with the lowest cross-talks, the highest performance levels required by Defence and Aerospace test laboratories. Up to now, these bearings are the most performant horizontal and vertical bearings. SEREME vertical slip tables introduced in 2019 are unique solutions worldwide due to these bearings.

SEREME has introduced 15 years ago a range of expanders in composite materials which have drastically increased the quality of tests (damping up to 4 %, homogeneity).

SEREME developments in railways testing facilities have answered to key requirements in fatigue testing of rollers up to 3000 hours or in maintenance test rigs of automatic subways which allows to delete the traditional test-ways of 1 km length with their associated night nuisances (MEL/Transpole with Spharea).

New SEREME hydraulic transportation simulators allow Customers to simulate full sequence of vibration sine and random and shocks up to 20 g for their pallets or boxes (DANONE, ESI Reims).

The performance of most of dynamic test machines is directly linked to the infrastructures to which they are fixed and we have therefore developed many cost saving techniques concerning reaction masses and decouplings.

We have designed and/or built hundreds of seismic masses from 500 kg up to 3000 tons (AIRBUS D&S, ARIANE Group, AUTOLIV, CEA, NAVAL Group, DGA, ARIANE Group, ESTEC, FIAT, IBM, KARI, KGS, MESSIER BUGATTI, MBDA, PSA, RENAULT, SAFRAN D&S, THALES, ENSET, etc...), decoupled using suspensions, or as often as possible special civil design of anchoring avoiding the investment in a suspension and a concrete pit (UTAC, PSA, TNO, AUTOLIV, SAFRAN,...).

The suspensions can be either standard (spring boxes, air cushions, elastomer, "Isomode", cables dampers) selected according to the performances required, or made of a known medium for slowly generated speed (sand beds...). Thanks to these developments the customer does not have to worry about the mechanical/civil engineering interface which is totally handled by SEREME.

According to Customer requirements, we also supply control systems for SEREME test solutions, these systems are adapted by us from commercially available softwares or developed internally when none COTS is available.

Microvibration is a niche market dedicated to space for which SEREME has developed solutions which merge dynamic and thermal vacuum constraints (ESA-ESTEC, BISEE).

## **ACOUSTICS**

SEREME design and delivers:

- Acoustic test facilities dedicated to generate noise seen by article in test during its most stringent conditions (space, defence, aeronautics).
- Acoustic test facilities dedicated to allow End-User to measure the noise (or the absorption) of the article in test (automotive, building, railways or aeronautic),

For these applications, we have produced high-end acoustic sources for Space activities or Navy activities.

Among our applications :

- Reverberating Acoustic Chambers for satellites (138 to 156 dB)
- Reverberating Acoustic Chambers for human rating spacecrafts (150 to 160 dB)
- Reverberating Acoustic Chambers for aerospace equipments, launchers parts, fairings
- Noise generators (Sermod LF, MF, HF, VHF) up to 175 dB
- Progressive Wave Tubes (PWT) up to 170 dB
- Reverberating chambers standard or with high level performances (coupled or single) for automotive or building industries
- Semi Anechoic or Anechoic chambers
- Testing facilities equipped, according to requirements, with totally anechoic or semi-anechoic chambers (with a very low cut-off frequency)
- Upgrading of existing test facilities to bring them up to the level required for acoustic testing (aero acoustic, hydro acoustic...)
- Customised test rig for hydro acoustic
- Aeroacoustics facilities

The ergonomics and especially compatibility of handling, HVAC, lighting solutions with acoustic performances are essential in the final result. When necessary we equip these test chambers with test benches such as roller benches (light or heavy vehicles), shaft lines to drive rotary machines (motors, gear boxes ...), hydraulic activities.

In automotive, building and railways industries, these solutions have also to comply with very stringent technical specifications especially concerning residual noise levels (whether airborne or transmitted) within the test chambers. It is imperative that residual noise does not influence measurements. The same is true for any other extraneous sound sources (such as ventilation) in these chambers. Efficiency is now as important as performance.

To comply with the high performances required for new acoustic test chambers, SEREME has developed the integrated design solutions for acoustic, civil and mechanical design.

Among the end users of SEREME acoustic test solutions are ADD, ARIANE Group, AIRBUS D&S, CAST/BISEE, NAVAL Group, IAI, ISS Reshetnev, KARI, JAXA, LAVOCHKIN, RKK ENERGIA, SBIK Astana, THALES ALENIA SPACE, in Aerospace and/or Defence, FAURECIA, FIAT, PSA, RENAULT, AUTONEUM, VALEO in Automotive, ALCATEL, CABASSE, HENKEL, in dedicated products.

## **HOW CAN WE HELP?**

- ✓ LUMP SUM TURN KEY CONTRACTOR (design, supply and installation)
- ✓ BASIC AND DETAILED DESIGN
- ✓ ENGINEERING CONTRACTOR
- ✓ TECHNICAL ASSISTANCE / FEASIBILITY STUDIES
- ✓ CONSULTING



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Within the framework of Phase A, the SEREME project aims to develop new small and medium range multi-axis vibration systems operating at high frequencies. They will allow to reduce the development time and to optimize the dimensioning of sensors, electronic cards, boxes or electrical cabinets subjected to a vibratory environment.



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Extrait du communiqué de presse

Dispositif « Appels d'offres thématiques » : dans le cadre du dispositif dédié aux technologies d'avenir duales présentant un risque technique important ou permettant de maintenir des compétences nationales jugées critiques (dit « Appel d'offres thématiques »), ce sont plus d'une vingtaine de projets qui ont été sélectionnés. Ces projets sont pour la plupart portés par des PME et des ETI et des premiers contrats ont d'ores et déjà été signés avec : EREMS, COMAT, MUQUANS, NANOXPLORE, **SEREME**, SODERN, STEEL ELECTRONIQUE et SYRLINKS.

Cabinet de Bruno Le Maire  
p16/09/2021

[Extract from the press release](#)

*"Thematic call for tenders" program : More than 20 projects have been selected under the "Thematic call for tenders" program, which is dedicated to future dual technologies that present a significant technical risk or enable the maintenance of national skills deemed critical. Most of these projects are led by SMEs and ETIs, and the first contracts have already been signed with : EREMS, COMAT, MUQUANS, NANOXPLORE, **SEREME**, SODERN, STEEL ELECTRONIQUE and SYRLINKS.*

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The SME label is awarded for a term of 3 years  
by Centre National d'Études Spatiales  
to the company  
**SEREME**

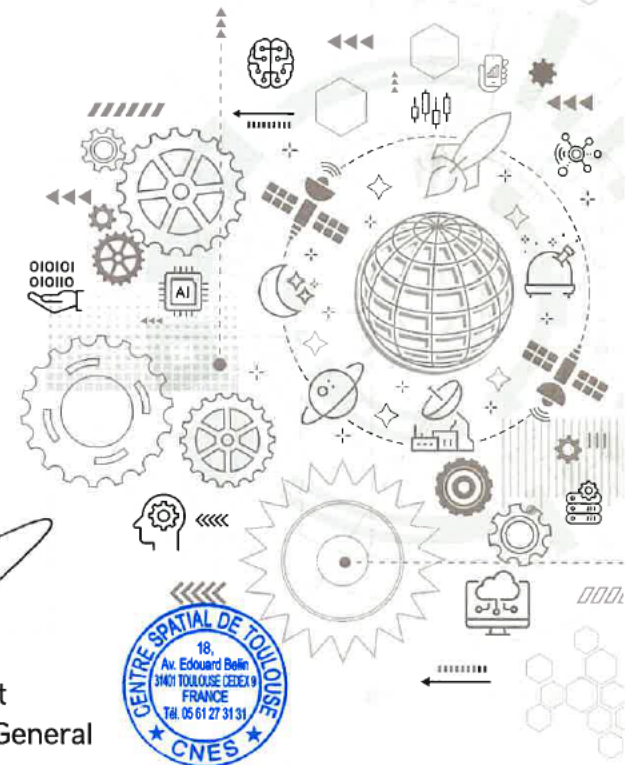
For:

**Ground Test Facilities for Satellites and Launchers**

- Microvibration measurement and test solutions for satellites 500 kg/3 500 kg compliant with TVAC conditions
- Large Vibration Test Facilities (horizontal or vertical) for satellites (low crosstalk, high over turning moments)

Toulouse, 19 JAN. 2021

  
Lionel Suchet  
Associate Director General



The SME label awarded by CNES underlines the excellence of a key SME space supplier in developing products or providing space services. Use of the label and logo is limited to services covered by this certificate, and the aforementioned scope of accreditation must be specified. This label in no way constitutes certification or an assessment of the Holder's ability to provide other services, and CNES shall not be liable under any circumstances for difficulties the Holder may encounter in executing said services.