

Ground segments  
Satellites  
Transversal competencies

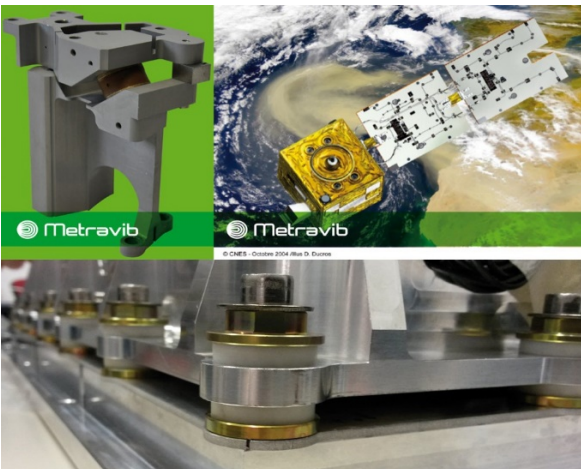


Metravib Engineering, a European leading company in vibroacoustic engineering, has demonstrated high expertise in design of passive and active solutions to minimize noise and vibrations, and deep understanding of related physics. Most of technologies used to attenuate shocks or solve vibration problems are based on mechanical and viscoelastic material solutions for damping, isolating or absorbing energy, possibly including metamaterials, as validated and recommended by Metravib.

## COMPETENCIES & CAPABILITIES

Launchers induce high acoustic levels, shocks and vibration that increase payload damage risk. On observation satellites for instance, instrument pointing accuracy may strongly depend on micro vibrations disturbance. Mastering vibration & acoustic parameters and providing effective solutions are thus key-factor for the success of any mission.

Metravib Engineering know-how includes design methodologies (computational analysis, heritage synthesis), software and mechanical solution development, experimental capabilities to supply qualified/flight proven solutions, and tight connection with material characterization (SPACEMAT, material database dedicated to space applications).



# METRAVIB ENGINEERING

## PRODUCTS & SERVICES

### Equipment protection (during launch phase and orbital life):

Micro vibrations Isolators (Soft mounts on metallic frame).

Shock attenuators (Viscoelastic rings at the interface with metallic support on existing standards, including adaptation to various needs in terms of frequency and performance).

Protection of ground sensitive structures facing most severe vibration and acoustic environment.

### Structure improvement:

Dynamic absorbers (Tuned system with damped stiffness + resonant mass).

Damped trusses (Strut insert on structure, introducing suitable damping effect).

Lightweight structures based on metamaterials technologies possibly enhancing shock reduction and vibration damping properties.

### Deployment mechanisms:

MAEVA Hinges (Self-motorized and blocking device qualified and approved on several flights).

### Software development:

Micro vibration calculation (in-orbit optical sensor performance qualification).

Vibroacoustic calculation (ASTRYD software: payload, onboard systems and components resistance to acoustic load).

## MAJOR SPACE PROJECTS & REFERENCES

- ELA4 (Launch Pad Vibroacoustic modelling)
- ESAIL Project - supply of deployment mechanisms
- IASI-METOP1 & 2 vibrations damping solutions (military)
- INTEGRAL, HERSCHEL PLANCK, METOP vibroacoustic calculations
- GAIA (MAIT TVIS microvibrations insulation)
- DUMSAT (suspended mass on metallic blades)
- SPACE BUS (Eurasiasat / Stentor Missions)
- ARD on Ariane 503
- ENVISAT (MERIS equipment damping)
- CASSIOPEE-MIR (CASTOR Experiment)
- MYRIADE Microsatellite platform - vibration damping issues (Demeter, Parasol, Picard, Spirale, Mistigri, Vnred)
- PROBA2, MICROSCOPE, TARANIS

## POINT OF CONTACT

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**TURNOVER** (ACOEM / METRAVIB) €100m / €12m

**WORK FORCE** (ACOEM / METRAVIB) 700 / 75

**SPACE TURNOVER** 2M€ (Aerospace & Defense)