



INNOVATIVE DAMPER CONCEPTS

Solutions for damping vibrations

The FUI INCAS project aims to come up with technological solutions for damping low-frequency [0-100Hz] vibrations in sensitive on-board equipment incorporated into complex mechanical ensembles (e.g. aircraft and space vehicles). This major project has benefited from the close ties between one of Carnot Ingénierie@Lyon's labs (MATEIS INSA Lyon CNRS) and an innovative SME (AVNIR ENGINEERING), which is a member of its technology transfer circle.

Carnot Ingénierie@Lyon Institute

Scientific / technological breakthrough

The research has helped to design, prototype and validate innovative vibration isolation and damper technologies – one elastomer-based and the other using metal cables – on the TRL6 operational demonstrator, by focusing on optimising non-linearities, dispersion and mass. These technologies were developed to tackle specific problems being encountered by ArianeGroup (damping vibrations on the satellites attached to future launchers) and Safran Helicopter Engines (damping vibrations in the piping of helicopter engines). Another part of this project focused on damping vibrations in the upper stages of future launchers using lightweight, stiff and damping, co-continuous, multi-scale hybrid composite materials.



Competitive advantage for the economic stakeholders

The products developed have proven very promising for the project's industrial stakeholders and they will help ArianeGroup to maintain its competitive edge as prime contractors for future European space launchers. The latest test campaign performed by AVNIR Engineering has convinced Ariane Group programme managers of the usefulness and technological maturity of these solutions. Similarly, shortening cycles and cutting down on development costs is a crucial issue for Safran as it launches its new range of turbomachines. The dynamic vibration absorbers concept has proved very promising and will be deployed on helicopter engines. As regards longer-term innovation, incorporating a vibration damping function into the materials used to make satellite carrier structures is a major challenge whose manufacturing feasibility needs to be studied.

Partnership

- **AVNIR ENGINEERING** is specialised in aeronautical/mechanical engineering and energy.