

## THERMOELASTIC ANALYSIS AND CERTIFICATION OF SPACE SYSTEMS

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**Research Group:** Aerospace Technology Research Group

The Aerospace Technology Research Group (ATRG) is a multidisciplinary research team bringing together expertise in telecommunications, aerospace, mechanical engineering, and computer science. Our origins date back to 2007 with the launch of the Xatcobeo CubeSat, and since then, we have deployed and operated five satellites. Leveraging a strong multidisciplinary approach, the group has extensive experience in mission analysis and design across a broad spectrum of scenarios, from Low Earth Orbit (LEO) missions to lunar and planetary exploration. ATRG is also actively engaged in several dual-use technology initiatives that bridge space and defense applications. Currently, the group participates in more than 12 projects with a combined budget of €58.43 million, of which €2.79 million is directly managed by ATRG. Our research activities are organized around five main lines: Thermo-Mechanical Engineering, focused on the analysis and verification of aerospace structures and systems; UAV Solutions, exploiting unmanned aerial vehicles to address societal challenges; Artificial Intelligence, applying advanced techniques to solve complex aerospace problems; Systems Engineering, aimed at achieving excellence in the design, integration, and operation of space projects; and Satellite Communications, developing reliable, high-data-rate space links and their applications.

**Keywords:** Thermoelastic Analysis | Telescope Design | Satellite Platform Certification | Component and Subsystem Validation | Vibration Testing | Thermal-Vacuum Testing

### Research Focus:

Preliminary telescope design and the thermoelastic assessment of structural deformations induced by the space environment. This analysis is essential for both Earth observation and deep-space missions, ensuring high measurement accuracy and long-term system reliability throughout the mission lifetime. The research line also includes the certification of satellite platforms through vibration and thermal-vacuum testing, which replicates the mechanical and thermal conditions experienced during launch and in orbit. In addition, comprehensive mechanical and thermal testing is performed to validate the behavior of components and subsystems under extreme operational environments, ensuring robust performance and mission assurance.