

DEVELOPMENT OF PAYLOADS FOR UAVS AND AUTONOMOUS VEHICLES

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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: Onboard Payloads | Embedded Systems for Autonomous Flight | Advanced Sensing | Image and Data Processing | AI

Research Focus:

Research in this area focuses on the development of autonomous UAV systems, including the design and integration of advanced onboard platforms equipped with state-of-the-art sensing technologies and AI-based image and data processing capabilities. These payloads are applied to a wide range of applications, including wildfire prevention and detection, ecosystem monitoring and management, high-resolution mapping, and real-time target tracking. By combining autonomous flight, advanced sensing, and intelligent data analysis, this research line aims to provide innovative solutions to environmental, industrial, and societal challenges.