

PhD in Aerospace Engineering


Research Title:

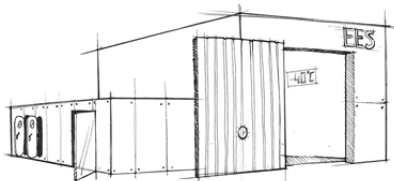
Design and testing methodologies for UAVs under extreme environmental conditions: a research activity in the south Tyrolean innovative research facility for the development of next generation unmanned aerial vehicles.

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Contact	http://www.eurac.edu/it/research/health/moumed/Pages/Infrastructures.aspx
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Context of the research activity	<div></div> <p>Eurac Research is a private multidisciplinary research centre located in the heart of the Alps in the multilingual region of South Tyrol. Our researchers come from all parts of the globe and we are active in a variety of scientific fields related, for example, to topics like mountain, health or energy. Today, one of the most important challenges for Eurac Research is the future NOI – Nature Of Innovation, technology park of Bolzano/Bozen. The idea behind a technology park is to “connect companies, researchers and students so that innovation can thrive”. In direct connection with the most relevant local research institutions (Eurac Research, Free University of Bolzano, etc.) different new laboratories will start their operations, organised in four research areas: green, alpine technologies, food and automation.</p> <div></div> <p>The most important laboratory in the field “Alpine Technology” will probably be the Extreme Environment Simulator (EES): a multi-purpose generator of climatic scenario. More in detail, EES will be able to simulate different conditions such as temperature, humidity, atmospheric pressure up to 9000m, rain, snow and wind.</p> <p>The possibility to simulate very different scenarios (“...from Sahara to Mount Everest...”) represents its most important strength and, to our</p>
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	<p>knowledge, its uniqueness in the international panorama.</p> <div data-bbox="547 302 943 481">  </div> <p>The simulator is a climatic hypobaric chamber specifically designed for both human occupancy and long duration tests. Originally thought as a facility for medical/physiological experiments, the use of the simulator in completely different fields, including industrial testing, is now considered as an appropriate add-on. In particular, Eurac Research is interested in opening a completely new research line in the field of UAV – Science.</p>
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<p>Objectives</p>	<p>The PhD program will be part of an ERDF¹ project (<i>“DronEx: creazione di un servizio di sviluppo tecnico per droni testate per il funzionamento in condizioni ambientali estreme”</i>), recently acquired by Eurac Research.</p> <p>The main goal of the project is to define, plan and execute a set of tests aimed to characterise how different drones can operate under different environmental and climatic conditions. Multifactorial tests will include variables such as temperature, rain, snow, wind, humidity, atmospheric pressure, plus potential combinations of multiple factors.</p> <p>In addition to the Politecnico di Torino, local companies active in the field of UAV are partners of the project. The PhD candidate will coordinate many activities of the project and interact with all project partners.</p> <p>Role of candidate:</p> <ul style="list-style-type: none"> - Contact point between EURAC and PoliTo to develop, together with vendors, a navigation system for UAV in closed environments - Create new specific competencies and know-how in EURAC in the field of drones navigation in closed environments, plus the field of drones flight capability in extreme environmental conditions <p>Estimated research contribution:</p> <ul style="list-style-type: none"> • Participation in the definition of technical specifications of the navigation system in closed environments • Participation in vendors’ scouting • Research and analysis of the state of the art regarding current UAV specifications and limitations • Support the adaptation of the chamber (hardware and software) to allow the desired test protocols to be realised • Definition of testing protocols (in cooperation with industrial partners) • Execution of testing sessions (in cooperation with industrial partners) and their follow-up with Eurac • Dissemination of the scientific results of the project • Contribution to marketing activities (identification of possible additional users/partners, communication tools, etc.) • Assessment of guidelines for testing and certification procedures
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¹ European Regional Development Fund

	<p>(in collaboration with certification authorities and manufacturers)</p> <ul style="list-style-type: none"> • Definition of benchmarks for drone operation in extreme alpine environments • Evaluate the potential for crossover into similar applications in arctic environments (oil and gas, search and rescue missions).
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Skills and competencies for the development of the activity	<p>Skills Communication, judgment, initiative, resilience, teamwork, attention to detail, flexibility and problem solving</p> <p>Competencies</p> <ul style="list-style-type: none"> • Education: Technical university degree • Education and/or experience in UAV science or related fields • Education and/or experience in user requirements analysis • Basic knowledge of automation and data acquisition • Basic knowledge of Project Management processes and environment • Good knowledge of Microsoft Office suite • Good command of the English language • Good command of Italian and/or German language is essential <p>IMPORTANT: availability for long-term stay in Bolzano (weeks / months, according to the needs of the project) is required.</p>
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