ROYAL MILITARY ACADEMY (RMA)

Ecole Royale Militaire – Département de Mécanique
B-1000 Brussels | BELGIUM
T. +32 (0)441 40 97 | F. +32 (0)441 41 00
benoit.marinus@rma.ac.be | www.rma.ac.be

The Environmental Mechanics and Mobility Applications (EMMA) research group of the Royal Military Academy is conducting research in the domains of advanced mobility and dynamics (green propulsion and platform dynamics), mechanical and environmental engineering (vibrations and hazards in flows), as well as applied robotics (collaboration strategies, sensor-platform integration, close-in and stand-off detection). All with a strong emphasis on aeronautical research questions that are investigated using state-of-the-art multi-disciplinary numerical simulations or experimental measurements.

The EMMA research group is organized around three units:

- advanced mobility and dynamics dealing with green propulsion by rotors and propellers including aeroacoustics, gaseous jet injection, flight dynamics of helicopters and UAVs, and propeller aircraft design,
- mechanical and environmental engineering ranging from smoke containment and fine-dust dispersal, to noise propagation issues and vibration testing or control, as well as virtual vibrations and simulation,
- applied robotics for high-risk applications and challenging environments handling autonomous vehicles with a particular emphasis on collaboration strategies in swarms of heterogeneous platforms operations, sensor-platform integration, close-in and stand-off detection and decision

Research and development questions are dealt with a strong multi-disciplinary background and using state-of-the-art numerical simulations or experimental measurements which serve as the base for horizontal cross-fertilization. Several simulation packages are available for High Performance Computing. Next to a BELAC - ISO 17025 accredited vibration test facility with controlled climate, experimental facilities include several low-speed tunnels completed with a wide variety of measurement systems based on: Particle Image Velocimetry, Light Induced Fluorescence, Laser Doppler Velocimetry, Hot-Wire Anemometry, Infrared Thermography, Ultrasonic Anemometry and classical anemometry. Optimization techniques (genetic, adjoint, or gradient) are called in whenever necessary.

Fixed and rotary-wing unmanned systems are also available with different sensor suites.