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Abstract:

One of the goals of our research is to evaluate, simulate and develop tele-control and autonomous navigation capabilities for a single or multiple vehicles for security applications. The work will be demonstrated on different mobile platforms (indoor and outdoor) (ROBUDEM). The different capabilities will be integrated in a single framework based on CORBA middleware. Finally other research on specialized mobility in unstructured terrains includes the study and development of alternative propulsion systems like legged robots (AMRU-1 to AMRU-5)

Detailed research information:

International projects:

- (1) EDA-NMRS (European Defence Agency) Networked Multi-robotics System, project aiming combined manned/unmanned missions in Dirty, Dangerous and Dull environments (Germany, Italy, Spain, Sweden and Belgium): The technical aim of the study is to demonstrate via simulation the benefits of a networked multi-robot system performing autonomously coordinated operations. Besides guidance, navigation, control and multi-robot coordination, sensor system, communication and human-machine and command & control machine interface aspects have to be considered.
- (2) VIEW-FINDER (FW6 EUR project). The VIEW-FINDER project develops robots and an advanced base station for inspection of a crisis area: a common industrial fire ground where chemicals may have been released or worse, an area in the aftermath of an explosion. The primary task of the robots is to gather data on the condition of the fire ground, and is provided with on board cameras and a wide array of chemical sensors. The data and images are sent to the base station, where they are processed and connected to geographical information collected from a web of sources; thus providing the command of the operation with in situ data. The information can also be forwarded to the relevant forces dealing with the crisis (e.g. fire fighters, rescue workers, police). Our department focuses on the Behaviour based navigation of an outdoor platform

(ROBUDEM3), the visual SLAM and the reconstruction of the 3D environment through structure from motion techniques. This study will be extended to CBRN-E threats.



example: THEODORE

- (3) HUDEM (National and IARP Project): in close cooperation with partners of a IARP Working Group, we focused on the design and development of mobile tele-operated carriers of detection sensors National Projects.

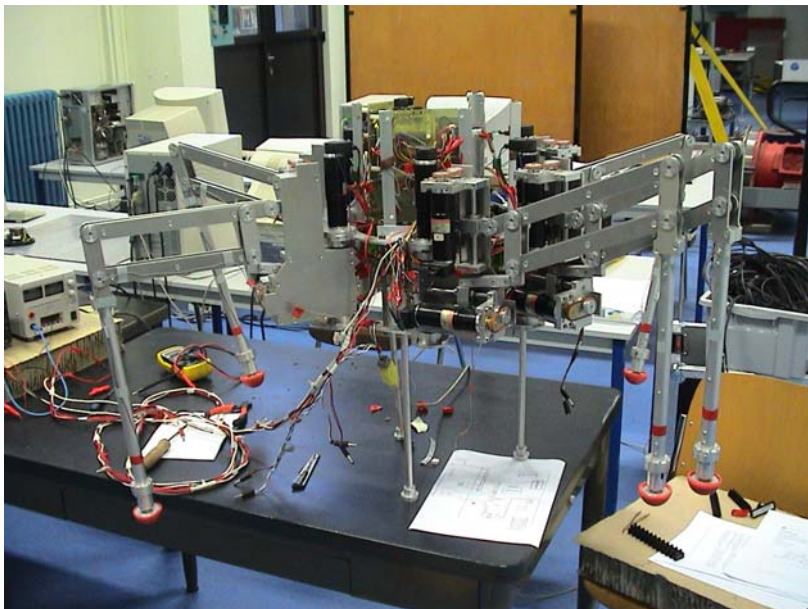


example: ROBUDEM-HUDEM

- (4) Multi-legged robots: this R&D focus on the kinematic and dynamic control of six-legged robots (AMRU series).



AMRU-1 has been equipped with a metal detector for humanitarian de-mining.



AMRU-5 has been controlled from a Neuro-fuzzy algorithm while a new adaptive control has been entrusted to the Polytechnic faculty of Mons (Dept Mechanical Engineering). Mini-legged robots are regularly designed by Erasmus students, in close cooperation with the Technical University of IASI, Romania.