

## ELROB - EUROPEAN LAND-ROBOTS TRIALS

Yvan Baudoïn

Emeritus Professor of the Royal Military School  
International CBRNE Institute: EKC Manager<sup>1</sup>

From 24 to 27 September 2018, on the 'HAINAUT Security' site, located in BAUFFE (Mons, close to CHIEVRE airport and CASTEAU NATO headquarters), will be held the annual competitions to demonstrate the capabilities of mobile robots in realistic scenarios. In 2011, this competition, devoted exclusively on Research and Development, brought together six European teams focusing on applications related to civilian security missions, on the site of the Belgian Defense Demining Service, in a wooded area. In 2016, the Austrian Ministry of Defense, supported by the NATO EOD Center of Excellence, managed the ELROB tests entrusted to twelve European teams, focusing on the essential military applications: recognition of potential dangers in urban sites, transport conveying of equipment, search and rescue of victims, detection of explosive devices and mine neutralization.

2018 will see the execution of these same scenarios to which will be added the detection of improvised explosive devices (terrorist threat) and the evacuation of victims, scenarios favored by Defense experts gathered in research groups of the Organization 'Science and Technology' of NATO.

In an edition of 4 July 2018, under the pen of Sarah Frere, the daily 'La Libre Belgique' stressed the importance of legislating for the prohibition of 'autonomous weapons', referring to the opinion of Scientists, proposals of ECOLO-GROEN and the precedent which was, at the initiative of Belgium, the prohibition of the use of anti-personnel mines and the OTTAWA Convention. The simplistic title 'Robot Killer' of this 'paper' (as it was at the time of the Ottawa Convention - 1997 - the qualification of 'Mine-clearing Robot ') distorts the interest of research in Mobile Robotics whose technological evolution allows already assisting human operators (including the military) when performing risky tasks in dangerous environments: as a frequent example, the intervention of the EOD<sup>2</sup> robot of the Belgian Defense Explosives Removal Service during frequent calls on suspicious sites (last intervention noticed, that of STOCKEL, related to the arrest of suspected terrorists, in possession of vehicle carrying explosive TATP).

It was in 1982 at the initiative of the G7 at an economic summit held in Versailles that the International Advanced Robotics Program (IARP) was adopted, the objective of which clearly stated the need for international cooperation in order to develop the robotics to assist human operators in hazardous tasks in dangerous environments. Alongside 16 member countries of this program, Belgium joined the program and entrusted its representation to the Royal Military Academy (RMA) in 2001. The RMA decided to coordinate two working groups, one devoted to robotics for humanitarian demining, the second one devoted to robotics assisting at risk operations. These two groups launched several European projects funded by the European commission, including the VIEW-FINDER project providing assistance to fire departments in toxic areas, the project TIRAMISU planning to develop a coherent set of tools for humanitarian demining including autonomous devices for the detection of mines, and the project ICARUS, combining drones, marine and land-based robotic devices for the search and rescue of victims. Some demining robots are currently adapted to the detection of improvised explosive devices, in particular at the initiative of the Italian Defense Department financing the IDS company in the development of a vehicle called MINERVA, equipped with a matrix of ground penetration radars (GPR) and other sensors to detect and identify explosives.

The RMA, for its part, adapted a SEDEE<sup>3</sup> robot, endowing it with a matrix of metal sensors developed by the German firm VALLON GmbH

The ELROB'2018 competition will present 16 teams of which five (NIC Instruments Ltd-UK, TELEROB GmbH-GE, BROKK Ltd.-SE, ELP GmbH-GE, TAUT-AT) will be tested on explosive device detection capabilities and seven competitors tested on rescue capabilities for victims (TELEROB GmbH-GE, Fraunhofer & TNO-GE-NL, BISG-FI, TAUT, BROKK and ELP, AVRORA-RU)

The aim of these competitions is to promote the best advances in technology and to strengthen cooperation in research.

---

<sup>1</sup> Explosive Knowledge Centre – [www.ici-belgium.be](http://www.ici-belgium.be)

<sup>2</sup> Explosive Ordnance Disposal

<sup>3</sup> Service belge d'enlèvement et de destruction d'engins explosifs (EOD) [www.mil.be/dovo](http://www.mil.be/dovo)

The events will be doubled this year by the organization of the 21st International Symposium on Robotics (ISMCR'2018<sup>4</sup>) under the auspices of the International Confederation IMEKO, and more particularly its technical committee (TC17) coordinator of research in robotics, chaired by Japan, of which Belgium is an active member in charge of the organization of this symposium.

No reasoned research of the 'killer robot' type is seriously considered in 'terrestrial' robotics.

But what about aerial robotics, drones? The Royal Military Academy is currently coordinating a new Horizon project called SAFE CHORE whose objective is the detection of 'dangerous' drones as part of border surveillance.

And it is obvious that many projects aim to use drones (still known under the name RPAS<sup>5</sup>) in the framework of (NATO, among others) missions of recognition, surveillance and acquisition of objectives ... it is precisely this last type of missions which could 'appearing to the qualification of' killers' if the objective is the enemy and the acquisition its neutralization ... .And everyone remembers the importance given to drones by the US administration under the presidency of Obama, in the framework for the detection and 'neutralization' of terrorist leaders....

However, priority is given to monitoring and reconnaissance missions and to the specific examination of suspect areas or areas affected by CBRN-type contaminations: the recent example of measures to confirm the use or location of chemical weapons in Syria, as well as the use of drones for the detection of mine-infested areas in Croatia confirm the interest of these machines.

It is now utopian to legislate on the prohibition of 'combat' or 'combat support' drones, as investments in this area are very much involved while the role of drones alongside fighter planes is already essential: the conflicts affected by the intensive use of bombing (and precise targeting by some drones) are unfortunately, since the Second World War, pests in terms of civilian casualties: the Balkans yesterday, Afghanistan, Syria, Yemen, between others, emphasize this damage

The United States are obviously very involved in the development of drones of different categories (ROVER system, PREDATOR, MQ-5B HUNTER ...) but the European countries like France, Germany, Italy and Great Britain also have invested and also invest in drones in the arms industry, supported by NATO, the European Defense Agency or even the European Commission (oriented towards the civil security of the European area). These investments are in billions and today pose many problems in terms of intrinsic safety of the vehicles used (their autonomy, control-or loss of control-possible interference with air traffic, reliability of communications, etc.). and in the field of ethics (protection of privacy, for example, but also interdependence between man and machine ... .

The current proliferation of video games' (or even serials and science fiction) taking the use sophisticated weapons of combat 'affect the younger generations and deserve preventive and perhaps paramount legislation, the' killings accidents' multiply today....

The ISMCR'2018 International Symposium will detail some of the topics discussed above. ELROB'2018, meanwhile, will illustrate the progress of terrestrial robotics.

Perhaps we can conclude with these reflections of Axel KAHN, eminent researcher of international renown in Ethics: "With robots, men have undoubtedly taken an important step in their powers to master nature and to conquer the world. Universe ...but will these tools I not evolve towards a form of empowerment that weakens this control and lead to dehumanization? .We are not already close to control by an interactive device (Internet, virtual world of the Web) ... The world of tomorrow depends on all of us. With the help of robots, why not? The human singularity of our animality allows it, it does not guarantee it. "

---

<sup>4</sup> See program on [www.ici-belgium.be/events](http://www.ici-belgium.be/events) and [www.elrob.org](http://www.elrob.org)

<sup>5</sup> RPAS Remotely Piloted Aircraft Systems