ETHICAL IMPACT RISK ASSESSMENT FOR ROBOTS AND CARRIED SENSOR SYSTEMS FOR ENVIRONMENTAL SURVEILLANCE IN A HUMANITARIAN DEMINING CONTEXT

Dr. **Irina Stănciugelu**[1]

Dominic Kelly[2]

Abstract

The aim of the paper is to provide a practical tool supporting the ethical risk assessment process for the use of robots and carried sensor systems for environmental surveillance in a humanitarian demining context. The ethical assessment process is developed as part of the FP7 European Research Project, *Demining Tool-Box for humanitarian clearing of large scale area from anti-personnel landmines and cluster munitions* (D-BOX). European policies with regard to emerging security technologies are considered keeping in mind the EU legal instruments applicable both at the R&D stage as well as during the deployment phase. These include privacy and data protection norms, fundamental rights provisions, EU safety standards on dual use and export control regulations. In light of the above, the development and employment of robots and carried sensor systems for environmental surveillance should encourage respect for the ECHR core values and fundamental rights. Most importantly, compliance should be pursued at the R&D stage where ethical and societal issues can be considered and appropriately handled.

In this context, the ethical framework for the analysis of robots and carried sensor systems for environmental surveillance presented in this paper is constructed by application of European Convention of Human Rights (ECHR). This approach allows technology developers to consider the ethical issues from the outset of the R&D stages, and to maximise the ethical compliance of robots and carried sensor systems for environmental surveillance during the deployment. The ethical framework is supplemented by an *Ethical Impact Risk Assessment Template* which is a practical tool summarising the entire analysis effort. The *Template* is useful for technology developers and operational decision makers and aims to support ethical governance of robots and carried sensor systems for environmental surveillance both during R&D stages and the deployment phase.

Key-Words: Humanitarian demining, robots, carried sensor system, ethical impact risk assessment.

Introduction

Mobile robotic systems have many applications relating to security and environmental surveillance, including humaniatarian de-mining campaigns. The reason is obvious as robots can carry out dangerous tasks associated with landmine detection and de-mining activities. As mentioned by Baudoin and Habib [3], robotics solutions that are properly sized with suitable sensors, modularized mechanical structutres, autonomus or semi-autonomus navigations systems that are well adapted to the local conditions of the field can improve the safety and the security of personnel as well as their work efficiency and flexibitity. However, the rapidity of growth within the robotics industry in the security and environmental surveillance domains is leaving a gap between the effective use of the technology and its ethical application.

There are different EU legal instruments relevant and applicable both at the R&D stage and in the deployment phase[4] of robotics technologies across the fields of security and environmental surveillance. These include privacy and data protection norms, fundamental rights provisions, some EU safety standards on dual use, export control rules, as well as other specific legal instruments. The legal instruments depend on the specific context of the technology being employed.

In light of the above, the development and employment of robotics technologies used in de-mining activities should encourage respect for the ECHR core values and fundamental rights; most importantly, compliance should be particularly encapsulated at the R&D stage where ethical and societal issues can be considered and appropriately handled. Unlike other means of environmental surveillance (e.g. CCTV and satellites), robotic vehicles are mobile, flexible and have 24/7 capability uses[5]. If they are platforms for sensors or sensor fusion technology they can hear as well as see. The potential for data collection is extensive in quantity but also in accessing and assembling different kinds of information to be networked and used. This requires consideration of the possible uses of the appropriate technology. It should also take into account the actors that have potentially involved in its use; in particular, the individuals or category of individuals that may be affected by its use. The potential effects that it may have on their fundamental rights and the associated risks or problems must also be considered. Once these risks and problems have been identified it is necessary to consider and adopt measures aimed at their elimination or mitigation. These measures may concern the governance of these technologies or be technological innovations themselves. This means they may consist of technical solutions that inhibit the possibility that a technology will be employed that might jeopardise the fundamental rights of an individual (value sensitive design approach)[6]. Once adopted, the consistency and effectiveness of these measures have then to be validated and monitored.

Ethical framework – The European Convention on Human Rights (ECHR)

ECHR is the first Council of Europe's conventions and the cornerstone of all of its activities. It was adopted in 1950 and entered into force in 1953. Its ratification is a prerequisite for joining the Organisation[7]. The Convention has a great symbolic importance because it expresses the "European community of values"[8]. These values ground European identity and should be reflected in the actions promoted by the EU. The values are: respect for human dignity, freedom, equality, solidarity, democracy and the rule of law. Each of these values should be realised by enforcing specific human rights. In particular:

- **Dignity:** human dignity, the right to life, the right to the integrity of the person, prohibition of torture and inhuman or degrading treatment or punishment, prohibition of slavery and forced labour.
- **Freedoms:** the right to liberty and security, respect for private and family life, protection of personal data, the right to marry and found a family, freedom of thought, conscience and religion, freedom of expression and information, freedom of assembly and association, freedom of the arts and sciences, the right to education, freedom to choose an occupation and the right to engage in work, freedom to conduct a business, the right to property, the right to asylum, protection in the event of removal, expulsion or extradition.
- **Equality:** equality before the law, non-discrimination, cultural, religious and linguistic diversity, equality between men and women, the rights of the child, the rights of the elderly, integration of persons with disabilities.
- **Solidarity:** workers' right to information and consultation within the undertaking, the right of collective bargaining and action, the right of access to placement services, protection in the event of unjustified dismissal, fair and just working conditions, prohibition of child labour and protection of young people at work, family and professional life, social security and social assistance, health care, access to services of general economic interest, environmental protection, consumer protection.

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[1] CBRNE Ltd, UK, irina.stanciugelu@cbrneltd.com
[2] CBRNE Ltd, UK, dominic.kelly@cbrneltd.com
[3] Baudoin Y., Habib M.K.,(eds) (2011), Using robots in hazardous environments, Woodhead Publishing Limited, p.xxiii
[4] Mordini E., Bonfanti M.E., "Report on the Evaluation of Ethical aspects Concerning the findings on Critical and emerging Technologies, pp. 4-6, deliverable WD 6.3, ETCETERA project, presented at The ETCETERA Workshop "Ethics, Governance, and Societal Implications of Emerging Security Technologies" September 9-10th, 2013 Rome-Italy; the document is not yet published; however, herewith the site of the project: http://www.etcetera-project.eu/ ;
[5] Report to COMEST of Workshop on Ethics of Modern Robotics in Surveillance, Policing and Warfare* (University of Birmingham, United Kingdom of Great Britain and Northern Ireland, 20-22 March 2011, p. 3;
[6] Value sensitive design is an approach that aims at integrating values of ethical importance in a systematic way within engineering design; see Freiedman, B., Kahn, P.H. Jr. and Borning, A., 'Value sensitive design and information systems', in *Human-Computer Interaction in Management Information Systems: Foundations* (Eds P.Zhang and Galletta D.), M.E. Sharpe, Armonk, pp.348-372
[7] http://human-rights-convention.org/ last accessed on 20.03.2015;
[8] Mordini E., Bonfanti M.E., *Op.cit*. pp. 4-6

- **Citizens' rights:** the right to vote and stand as a candidate at elections to the European Parliament and at municipal elections, the right to good administration to be enforced also with the European Ombudsman, the right of access to documents, the right to petition, freedom of movement and residence, diplomatic and consular protection.
- **Justice:** the right to an effective remedy and a fair trial, presumption of innocence and the right of defence, principles of legality and proportionality of criminal offences and penalties, the right not to be tried or punished twice in criminal proceedings for the same criminal offence.

In the context of robotic technologies used for environmental surveillance and de-mining activities the most important human rights to be considered are respect for private life and data protection (under the value of freedom), environmental protection (under the value of solidarity), and respect of health and safety. In terms of privacy, the robotic technologies used for environmental surveillance face issues strictly related to the large amount of the data collected where recognizable people are involved. However, these issues are comparable to those relating to existing security systems with data storage capabilities. Recently the European Parliament discussed the issue of automatic security systems and underlined the necessity for further action and regulation for privacy-related issues in relation to machine vision systems as technology develops (e.g. of automated algorithmic surveillance such as facial recognition or intelligent scene monitoring)[9].

Ethical impact risk assessment template for robots and environmental surveillance technologies used in de-mining operation

For whom is this template for**?** This ethics template is aimed at supporting the assessment of the ethical impact inherent in the R&D and deployment stages of robotics and environmental surveillance technologies used in de-mining operations. It should be used both by technology developers (R&D stages) and operational planners (deployment phase). The same template is used in all phases (R&D and deployment): the ethical issues will differ according to the context or situation.

For what purpose? This ethics template serves as a heuristic tool. In other words, it provides the user with a framework to identify potential ethical risks associated with robotics and environmental surveillance technologies. This is important because robots and environmental surveillance systems used in de-mining activities have been treated as primarily a technical challenge where technological advances are either generally understood as something positive or seen through purely consequentialist ethical lens[10] (that is: means and right are secondary as long as the outcome is positive). However, robots and environmental surveillance systems raise a wide range of issues touching the values of safety, privacy and data protection and environmental protection.

What's in it? The template consists of a matrix[11]: In the rows of which a catalogue of rights and norms are identified. In the columns of the matrix there are the categories of risk assessment processes as follows:

- Designation of risk related to a specific right or norm (respected, applicable, non-applicable). An earlier designation of a risk as "Not Applicable" should not be treated as definitive.
- The 'Controls' to be described in the Template are the mechanisms in place to mitigate the risk. Examples of Controls are (a) compliance with legislation & regulations, (b) the inclusion of advice on the issue in the training of the users, (c) an explicit reference to the issue in SOPs or (d) reference to the process of ethical governance.
- The 'Residual risk' (High, Medium or Low) is the level of risk that remains, based on a reasonable assessment of the effectiveness of the specified Controls. For example, training can be forgotten under stress and therefore it cannot fully mitigate a risk. However, if a particular ethical issue is of little concern locally, the initial risk will already be Low and training might suffice to reduce it to As Low As Reasonably Practicable (ALARP).
- Actions should be specified in the Template to reduce the risk to ALARP, whatever the level of residual risk. Evidence of the resolution of the Actions should be appended to the Template.

How to use it? Read through the different rights/ethical categories that might be affected. Consider what your tool is designed to do, what issues emerged when you deployed it and which emerged as you developed the tool. Try to complete as many boxes of the table below as possible and identify key ethical challenges. The results of the ethical impact risk assessment should be discussed by the team and decision makers. The completed Templates should be retained for the record and review.

When to use it? It is important to engage with ethical issues as early as possible in the R&D process. Beyond consulting this Ethics Template, it is advisable to seek advice from ethics specialists.

Origin and limitations of Template: This check-list was developed as part of the EU-FP7 funded D-BOX project. It is an initial attempt to systematically account for and manage ethical issues that have been identified during the D-BOX tools development process and discussions within the Ethics Committee.

Ethical Impact Risk Assessment	
Name	
Position	
Robot/environmental surveillance technology in de-mining activity context	
Date	
Please circle the stage to which the impact assessment refers:	
Research & development (R&D)	Deployment

Ethical issue (values and principles)		Respected/Applicable/ Non-applicable	Instance	Control	Residual risk (High, Medium, Low)	Action
Freedom	Respect for private and family right					
	Protection of personal data					

[9] See 'D3.2.1 Ethical Legal and Societal issues in robotics', FP7 project' euRobotics The European Robotics Coordination Action', available at: http://www.eurobotics-project.eu/cms/upload/PDF/euRobotics_Deliverable_D.3.2.1_ELS_IssuesInRobotics.pdf

[10] Krieger K., Stănciugelu I., *Ethics checklist for CBRNE tool developers and suppliers, users and trainers*, FP 7 PRACTICE project available at: http://www.practice-fp7-security.eu

[11] The matrix has been created with support of Nigel Hale and Dave Usher, CBRNE Ltd.

Environmental Protection	Use of materials/substances/ processes that are not highly polluting					
	Generation of minimal environmental pollution as possible.					
Safety	Use of material/substances/processes not dangerous to human health					
	Safety standards & regulations					
	Generation of minimal health risk as possible.					
Care	Validated in trials					
	Compliance with ethical & legal standards for trials (including informed consent)					
	Effectiveness					
Respect of legal export rules and other legal provisions that might apply						
Provision of training for users						

Conclusions

The institutions supporting research and development of robots and environmental surveillance technologies should undertake an effort to educate and sensitise programme managers toward ethical issues. They should seek advice from external experts because properly addressing ethical concerns requires a depth of knowledge that cannot realistically be expected of programme managers or scientists[12]. Research-performing institutions should provide assistance for researchers addressing ethical issues in their work on security technologies.

Many institutions performing R&D activities already have in place policies and procedures to address a variety of ethical and legal issues that arise in S&T research. For example, institutional ethics review boards are common. Where policies and procedures already exist to address ethical concerns, new ones should not be created to address them.

[12] Mordini E., Bonfanti M.E., *Op.cit*.