Chapter 7

Humanitarian Demining Action Plan: Humanity and Technological Challenges

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ABSTRACT

The presence of landmines and Explosive Remnants of War (ERW) in a place represents a major threat to civilian and affects the rebuilding process and the life of the people at that place. Hence, one of the fundamental goals of humanitarian demining is to detect and clear all forms of danger from infected areas efficiently, reliably and as safely and as rapidly as possible while keeping cost minimized. Although demining has been given top priority, currently mine’s clearing operation is a dangerous, complex, time consuming, slow, labor-intensive, and costly operation. The currently available technologies are not suited to achieve the objectives of humanitarian demining. In the context of humanitarian demining it is essential to have a reliable and accurate sensor and/or an integration of heterogeneous/ homogeneous sensors with efficient and reliable data fusion and processing technique that can quickly discriminates mines from innocuous buried objects. In addition, it is necessary to overcome the constrain on the resources by developing innovative, cost effective and practical technology inspired by locality and real minefield needs to help in speeding up the demining process and enhance accuracy, productivity, operation and personnel safety, achieve higher quality of the service, and contribute to local economy. This chapter presents the facts and problems associated with landmines and their impact on health, economy, land and environment along with the difficulties in detecting and removing them. It highlights the main requirements for humanitarian demining action plan and list up solutions and priorities. Then, it presents the challenges facing technological development in different directions and concludes with the suitable actions to save human and environment from such complex problem facing humanity.

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INTRODUCTION

The concept Landmines and Explosive Remnants of War (ERW), which includes unexploded ordnance (UXO) and abandoned explosive ordnance represent a major threat to civilian. UXO refers to munitions, such as, bombs, shells, mortars, grenades and as similar. Landmines are indiscriminate weapon and they are so effective, yet so cheap, easy to make, and lay on or just under the ground surface. A mine comprises a quantity of explosive material inside casing, typically metal, plastic or wood casing, and it has a fuse mechanism to detonate the explosives (GICHD, 2007). A mine is detonated by the action of its target (a vehicle, a person, an animal, etc.), the passage of time, or controlled mean. Mines are generally categorized into two groups, Antipersonnel (AP) and Antitank (AT) or Anti-Vehicle mines (recently used term) (GICHD, 2007). AT mines are significantly larger than AP mines with a weight of several kilograms and require more pressure to detonate. All types of mines designed to be detonated by the presence, proximity or contact of a vehicle can be classified under this category. AP mines are quite small, weighing a few hundred grams at most. These mines are typically laid on the surface or buried within a few centimeters of the ground surface (normally but not always, on average 4-50mm), or buried under leaves or rocks. AP mines are designed to be exploded by the presence, proximity or contact of a person and incapacitate, injure or kill one or more persons (IMAS, 2003). AP mines are widely considered to be ethically problematic weapons with ability to kill or incapacitate their victims. AP mines commonly use the pressure of a person’s foot as a triggering means (low triggering pressure), but tripwires are also frequently employed (Habib, 2007a; Habib, 2008a; Habib 2008b). In addition, mines represent a substantial barrier to economical recovery and the return to normal life while they deny access to land, food, water and other basic needs. Besides this, the medical, social, economic, and environmental consequences are immense (O’Malley, 1993; Blagden, 1993; Physicians for Human Rights, 1993; US Department of State, 1994; King, 1997; ICRC, 1998, Habib, 2001, Habib, 2002b). In addition, landmines and ERW prevent the repatriation of refugees and displaced people while it hampers the delivery of humanitarian aid. The removal and destruction of all forms of dangerous battlefield debris, particularly landmines and ERW are vital prerequisites for any region to recover from the aftermath of a war. United Nation Department of Human Affairs (UNDHA) assesses that there 60-100 million mines that are scattered across the world and pose significant hazards. There are, more than 70 states were believed to be mine-affected (O’Malley, 1993; Blagden, 1993; Physicians for Human Rights, 1993; US Department of State, 1994; King, 1997; Habib, 2002b, Habib, 2008a and b; ICBL, 2009). Currently, the annual rate of mine clearance is very slow. It is believed that in the 1990s, 20 new mines were laid for every mine cleared (Winslow, 1997).

Removal of landmines carries high risks while it is slow and costly. The production costs of conventional AP mines are roughly between 3 and 30 US$ and it is slightly more for smart mines. But, the current cost rate of clearing one mine is ranging between 300-1000 US$ per mine (depending on the mine infected area and the rate of false alarms). In another way of cost consideration, depending on country, type of terrain, climate, commercial clearance, and NGOs involved, costs to clear landmines can vary from US$2 to US$39 per square meter. As an example of the size of the problem, Bosnia-Herzegovina has over 18,000 minefields mapped, with probably similar number of minefields are not yet mapped. The mapped area represents approximately 3,000 Km² of contamination of which around 1,000 Km² is good land for agricultural. In 2002, four square kilometers were cleared (French, 2006). Since 1999, at least 1,100km² of mined areas and a further 2,100km² of battle areas have been cleared in more than 90