

Past, Present, Future: Mine Action in Motion by Ambassador Stefano Toscano [from page 8]

1. Reference Sri Lanka Strategy.
2. In the late 1990s and early 2000s, much of the detection R&D and trials were related to metal detectors. The hopes at that time were that the Ground Compensation and Large Loop detection were going to be the silver bullet, which wasn't the case. In the 2010s, R&D moved towards the dual and double sensor detection (metal detection and GPR). While this advancement did enhance the efficiency of work, it by no means provided the silver bullet (for many reasons) that the sector was (is) seeking. However, through this R&D work, progress has been made and its undeniable that efficiency and safety of operations has improved as a result.
3. The foundation behind the Humanitarian-Development-Peace-Nexus (HDPN), also known as the triple nexus, is based on the need for stronger collaboration, coherence, and complementarity towards the delivery of collective outcomes. By leveraging the comparative advantages of its three dimensions, the nexus has the potential to reduce vulnerabilities and decrease the number of appeals that remain unanswered, while strengthening risk management capacities and tackling the root causes of conflict. In addition, this approach has been at the center of multilateral efforts to fulfil the commitments made at the 2016 World Humanitarian Summit and accelerate progress towards the 2030 Agenda for Sustainable Development. The triple nexus promotes a change in the way activities are planned, implemented, monitored, reported, and financed in order to more effectively and coherently meet needs, reduce risks, and build resiliency in the short, medium, and long term.

Mine Action: The Early Years by Ian Mansfield [from page 11]

1. Cambodia, The Development of Indigenous Mine Action Capacities, page 21, The Department of Humanitarian Affairs, 1997.
2. *To Walk the Earth in Safety*, US Department of State, 1999. <https://bit.ly/3z4FWkx>.
3. The Development of Indigenous Mine Action Capacity, The Department of Humanitarian Affairs, 1997.
4. Afghanistan – The Development of Indigenous Mine Action Capacity, page 41, The Department of Humanitarian Affairs, 1997.
5. United Nations General Assembly resolution A/RES/49/215 Assistance in Mine Clearance of 23 December 1994.
6. Summary – UNGA Resolution A/RES/49/215 Assistance in Mine Clearance of 23 December 1994.
7. Mine Action and Effective Coordination; The United Nations Policy, UNMAS/1998/08/vers.1.6.
8. *After the Guns Fall Silent; The Enduring Legacy of Landmines*, Shawn Roberts and Jody Williams, VVAF, 1995.
9. “The Mine Action Support Group (MASG):” E-Mine, UN Mine Action. <https://www.mineaction.org/en/mine-action-support-group-masg>
10. Details of MASG meetings can be found on the website at: “MASG Meeting Notes,” E-Mine, UN Mine Action. <https://bit.ly/3z55DkT>.
11. International Mine Action Standards, GICHD. <https://www.mineactionstandards.org/>

Applying “All Reasonable Effort” in the Falkland Islands Mine Clearance Programme: Encouraging Efficient, Confident, and Timely Evidence-Based Land Release Decision Making by David Hewitson and Guy Marot [from page 16]

1. Previous incarnations of the LRC, responsible for work in earlier phases of the programme included Bactec International Ltd and Dynasafe Bactec Ltd.
2. From *Phase 5 project contractual documentation, Section 4 – Statement of Service Requirement*.
3. *IMAS 07.11 Land Release, Edition 1, Amendment 5, February 2019*, includes broad guidance on the process elements influencing ARE. The recently released TNMA 07.11/03 All Reasonable Effort (ARE), Version 1.0, March 2021, provides more detailed advice on what constitutes ARE and how to demonstrate its application. Sources such as <https://www.hse.gov.uk/managing/theory/alarplance.htm> explain the concept and practice of ALARP.
4. *IMAS 07.14 Risk Management in Mine Action, First Edition, February 2019, section 3 Terms, definitions and abbreviations*.
5. In some case over 40cm of peat had ‘grown’ over the 1982 mine layer surface level, and on beach areas 11m of sand had accumulated.
6. Suspected hazardous areas (SHAs) in the Falkland Islands were likely to contain other forms of ERW as well as mines. Mine clearance procedures were targeted only on those parts of the SHA where mines were expected until the LRC and DPO were confident that they had all been found and dealt with. At that point the remaining area within the fenced boundary of the SHA could be searched for non-landmine UXO (mortar rounds, grenades, etc.) using the much faster BAC techniques. At some SHAs less than 5 percent of the total SHA area was subject to mine clearance procedures, but the entire area needed to be checked for other UXO hazards.

Linking Mine Action and Development: The Case of Komyshuvakha by Nick Vovk [from page 28]

1. G. Rist, *The History of Development: From Western Origins to Global Faith*, London, Zed Books, 2008.
2. McGrath, R. (2000), *Landmines and Unexploded Ordnance, A Resource Book*, London, Pluto Press, p. 17.
3. PRIO, (2004) *Reclaiming the Fields of War: Mainstreaming Mine Action in Development* (p. 10): <https://bit.ly/2McoXdn>.
4. *IMAS 4.10 (Amendment 10, February 2019)*, p. 29: <https://bit.ly/3juebM5>.
5. Barlevi, Hanoch (2003) “The Mine Action/Mine Risk Education Integrated Approach,” *Journal of Mine Action*: Vol. 7 : Iss. 1, Article 38. <https://bit.ly/3htHWhk>.
6. GICHD, *Linking Mine Action and Development: Humanitarian and Development NGOs*, 2008, p. 72. <https://bit.ly/369kQps>.
7. Gasser, Russell (2008) “Linking Mine Action and Development: Local-level Benefits and Challenges,” *The Journal of ERW and Mine Action*: Vol. 12 : Iss. 2, Article 1. <https://bit.ly/2Y7wj4C>.
8. Paterson, Ted and Filippino, Eric (2006) “The Road to Mine Action and Development: The Life-Cycle Perspective of Mine Action,” *Journal of Mine Action*: Vol. 9: Iss. 2, Article 23. <https://bit.ly/3c5cPWt>.
9. Van Der Linden, Filip (2006) “Mine Action and the Millennium Development Goals,” *Journal of Mine Action*: Vol. 9: Iss. 2, Article 24. <https://bit.ly/3644uPa>.
10. Hofmann, Ursign and Juergensen, Olaf (2017) “Preparing for the Future: How the SDGs Impact Mine Action,” *The Journal of Conventional Weapons Destruction*: Vol. 21: Iss. 3, Article 12. <https://bit.ly/39Z3c8Z>.
11. Humanitarian Demining, Geneva International Centre for and Programme, United Nations Development, “Leaving no one Behind: Mine Action and the Sustainable Development Goals” (2017). <https://bit.ly/2KFQZxq>.
12. Downs, Charles (2010) “Linking Mine Action and Economic Development,” *The Journal of ERW and Mine Action*: Vol. 14 : Iss. 1, Article 19. <https://bit.ly/3qHZMOT>.
13. Lundberg, John (2006) “Humanitarian Demining as a Precursor to Economic Development,” *Journal of Mine Action*: Vol. 9 Iss. 2, Article 22. <https://bit.ly/36aI4f3>.
14. Bogdanov N. and Nikolic A. 2013. Area Based Development Approach – Evidence from Border Rural Region Drina-Sava. Book of Proceedings from the Seminar Agriculture and Rural Development – Challenges of Transition and Integration Processes. Ed. N. Bogdanov and S. Stevanovic. Serbia,

- Belgrade. <https://bit.ly/2OvnwL3>.
15. Santini F., S.S. Matus, G. Louwagie et al. 2012. Facilitating an Area-Based Development Approach in Rural Regions in the Western Balkans. Volume 1: Main Report. Luxembourg: Publications Office of the European Union; Rome: Food and Agriculture Organization of the United Nations. <https://bit.ly/37g8qNL>.
 16. Pearce, C.J. (1999) "The Operational Implementation of the International Humanitarian Demining Development Concept," *Journal of Mine Action*: Vol. 3: Iss. 1, Article 14. <https://bit.ly/362jcpN>.
 17. Harfst J. 2006. A Practitioner's Guide to Area-Based Development Programming. p. 9-13. UNDP Regional Bureau for Europe & CIS. <https://bit.ly/2NxVnQ3>.
 18. DG ECHO, Forgotten Crisis Assessment 2019: <https://bit.ly/36GYn3P>.
 19. Government of Ukraine, 2020, Mine Ban Treaty Article 5 Deadline Extension Request: <https://bit.ly/2NBP51U>.
 20. *Landmine Monitor* 2020 (p. 2; 36): <https://bit.ly/3osj4GN>.
 21. Due to the fact that Ukraine does not possess a state-run EO incident database DRC-DDG has been tracking EO accidents by collating open resource data since 2014: <https://bit.ly/33K3QVg>.
 22. Crowther, Edward (2019) "Contamination in Eastern Ukraine: Observations by OSCE," *The Journal of Conventional Weapons Destruction*: Vol. 2: Iss. 1, Article 9. <https://bit.ly/39eflCx>.
 23. Robinson, Toby and O'Keeffe, Rosanna (2019) "The Challenges of Humanitarian Mine Clearance in Ukraine," *The Journal of Conventional Weapons Destruction*: Vol. 23: Iss. 1, Article 8. <https://bit.ly/367DK08>.
 24. International Crisis Group. 2020. Peace in Ukraine (III): The Costs of War in Donbas. Europe Report No. 261. <https://bit.ly/3fsmPJh>.
 25. Humanitarian Needs Overview: Ukraine. 2020. p. 24-25. <https://bit.ly/3piX9CM>.
 26. REACH, Protection Assessment of Isolated Settlements in Government-Controlled Areas Along the Contact Line, p. 33, (Ukraine: REACH, 2019), <https://bit.ly/3kf8NMe>.
 27. IMPACT. 2020. Area Based Risk Assessment: Popasna Raion, Luhansk Oblast, Eastern Ukraine. <https://bit.ly/369d3rU>.
 28. REACH, 2019, Economic Security Assessment: Government-Controlled Areas of Donetsk and Luhansk Oblasts Within 20km of the Contact Line. p. 2. <https://bit.ly/3odwRAG>.
 29. Luhansk Oblast Development Strategy (2021-2027): <https://bit.ly/2OJVLvL>.
 30. These include Ukrainians (52%), Russians (40%), Belarusians (5%), and Moldovans (3%). Many are pensioners (40%) with some children (10%). Employed represent 30% of the settlement, mostly as farmers as well as miners, pharmacists, teachers, etc.
 31. Data collected through DRC-DDG needs assessments between 2018 and 2021 through (phone and in-person) key informant interviews, focus group discussions, and participant observations.
 32. By June 2021, DRC-DDG demining teams released 66,417 sq m of land and permanently marked 23,119 sq m of contamination in Komyshevukha; their work will continue until autumn 2021.
 33. In doing so, DRC-DDG EORE team reached 619 residents of Komyshevukha by June 2021 (or 20% of the entire population): 42.3% male, 57.7% female; 14.7% children (between six and 11 years old), 14.2% adolescent (12 to 17 years old), 38.5% adults (18 to 59 years of age), and 32.6% elderly (60 years old and above).
 34. The M&E system was designed to be both formative (field monitoring visits, programme quality checks, quality assurance and quality control, etc.) and summative (focusing on outcomes and capturing lessons learned). Moreover, participatory methodologies are being used, inclusive of needs assessments, community meetings, collection and analyzes of feedback and concerns shared by beneficiaries via complains and reporting mechanism as well as through focus group discussions and key informant interviews.
 35. Chiovelli, Giorgio, Michalopoulos, Stelios, and Papaioannou, Elias (2018) "Landmines and Spatial Development," Working Paper 24758, National Bureau of Economic Research. <https://bit.ly/3bvwi2>.
 36. Rasmussen, Ph.D., Lewis (2020) "Whither HMA Policy: Linking HMA and Development Assistance," *The Journal of Conventional Weapons Destruction*: Vol. 24: Iss. 1, Article 3. <https://bit.ly/2M16YqA>.
 37. As seen at two events organized in 2021 by the United Nations Development Programme (UNDP) (i.e., 'Beyond Square Meters Cleared: Mine Action and Development': <https://bit.ly/33Me4V5>) and GICHD (i.e., 'The Sustainable Development Outcomes of Mine Action in Jordan': <https://bit.ly/3ynK8wT>).
 38. Due to delays caused by the COVID-19 pandemic and the consequent quarantines as well as the winter stand-down period (with cold and snowy weather conditions preventing demining in eastern Ukraine) clearance continues until present day.
 39. DRC-DDG legal assistance team was funded under a different donor.

Developing National Landmine Clearance Capacity in Ukraine by Tobias Hewitt and Ronan Shenhav [from page 35]

1. *Landmine Monitor*, Annual Report 2020, p. 36-38, <http://www.the-monitor.org/media/3168934/LM2020.pdf>.
2. The most heavily contaminated areas are thought to be around Vinnytsia, Ternopil, Zhytomyr, Dnipro, Kyiv, Odesa and Kharkiv. The Crimean peninsula remains one of the areas most affected by ERW contamination from WWII. *Landmine Monitor*, Ukraine 1999, http://archives.the-monitor.org/index.php/publications/display?act=submit&pqs_year=1999&pqs_type=lm&pqs_report=ukraine&pqs_section.
3. Until 2012 the called the Ministry of Emergency Situations.
4. Through the SES Department of Pyrotechnic Works and Humanitarian Demining.
5. *Landmine Monitor*, Ukraine 2014, <http://www.the-monitor.org/en-gb/reports/2014/ukraine/mine-action.aspx>.
6. Government of Ukraine, Official website of the Ministry of Defence of Ukraine, 'Coordination of mine action activities' (visited on 23 February 2021), <https://www.mil.gov.ua/diyalnist/protiminna-diyalnist/koordinacziya-protiminnoi-diyalnosti.html>.
7. An inter-ministerial working group was up for this purpose in 2006. The Cabinet of Ministers Decree No. 131 of 18 February 2009 adopted the State Program for Demining by the Ministry of Emergency Situations for 2009-2014, foreseeing clearance of 15 km² over five years with the destruction of 500,000 items of ERW. In 2010, relevant ministries were tasked to forward proposals by to establish of a national body for demining and a presidential decree established a NMAA in 2013. *Landmine Monitor*, Ukraine 2014, <http://www.the-monitor.org/en-gb/reports/2014/ukraine/mine-action.aspx>.
8. Geneva International Center for Humanitarian Demining (GICHD), United National Development Programme (UNDP), Organization for Security and Co-operation in Europe (OSCE), Danish Demining Group (DDG), Swiss Foundation for Mine Action (FSD).
9. The Ukrainian Institute of Standardization order № 511 'On the adoption of national standards' of December 19, 2018, adopted the national standard DSTU P 8820-1:2018 'Mine action. Management Processes. Basic Provisions,' which entered into force on April 1, 2019. However these have not been operationalised. Government of Ukraine, Official website of the Ministry of Defence of Ukraine, 'Coordination of mine action activities' (visited on

23 February 2021), <https://www.mil.gov.ua/diyalnist/protiminna-diyalnist/koordinacziya-protiminnoi-diyalnosti.html>.

Saving Lives in Eastern Ukraine: Alternative EORE Approaches by Olena Kryvova [from page 43]

1. United Nations Office for the Coordination of Humanitarian Affairs, "HUMANITARIAN RESPONSE PLAN UKRAINE, AT A GLANCE," 25 November 2020, <https://bit.ly/2OKDbDF>.
2. United Nations Office for the Coordination of Humanitarian Affairs, "Ukraine Situation Report," last updated 25 January 2021, <https://bit.ly/2NxQkzm>.
3. The Geneva International Centre for Humanitarian Demining, *Review of New Technologies and Methodologies for Explosive Ordnance Risk Education (EORE) in Challenging Contexts*, August 2020, <https://bit.ly/3qqH12x>.
4. БезМин," Facebook, <https://www.facebook.com/BezMin.info>.
5. БезМин," VKontakte, <https://vk.com/bezmininfo>.

Explosive Ordnance Risk Education in Ukraine during the COVID-19 Pandemic by Andro Mathewson and Asya Bolotova [from page 49]

1. Council on Foreign Relations. *Conflict in Ukraine*. Accessed May 21, 2021. <https://on.cfr.org/3h4r53C>
2. UNOCHA. *Humanitarian Needs Overview Ukraine*. United Nations. February, 2021. <https://bit.ly/3jJWfyS>
3. UNOCHA. *Humanitarian Needs Overview Ukraine*. United Nations, June, 2020. <https://bit.ly/38IWJyT>
4. WHO. Ukraine: *WHO Coronavirus Disease Dashboard*. May 9, 2021. Accessed May 21, 2021. <https://covid19.who.int/region/euro/country/ua>.
5. UNMAS. *Explosive Ordnance Risk Education (EORE)*. 2020. New York: United Nations
6. The official definition of EORE is "activities which seek to reduce the risk of injury from EO by raising awareness of women, girls, boys, and men in accordance with their different vulnerabilities, roles, and needs, and promoting behavioral change. Core activities include public information dissemination, education, and training."
7. "New Tech for Schools in Ukraine Lets Children Tap into Education." UNICEF European Union, December 29, 2020. <https://uni.cf/3kYVt0f>
8. UNICEF has been providing laptops to schools and children across Ukraine during the COVID-19 pandemic to help minimize the negative effects of the pandemic on education.
9. For further examples and an in-depth discussion of virtual reality as a tool for EORE, please see: GICHD. *Review of New Technologies and Methodologies for EORE in Challenging Contexts*. September 2020. 37-41. <https://bit.ly/2WZ8MG6>

Landmine Clearance and Socio-economic Development: A Study in Colombia by Oliver Ford, Amasia Zargarian, and Eric Keefer [from page 53]

1. A department is the Colombian equivalent of a state in the United States.
2. AICMA downloadable spreadsheets, accessed May 2021.
3. "Clearing the Legacy of Conflict in Colombia." The HALO Trust. <https://bit.ly/3lBe431>.
4. A *vereda* is an administrative division within a municipality. It represents an important geographical demarcation for humanitarian mine action in Colombia.

Impact Caused by the COVID-19 Pandemic on Humanitarian Demining in Colombia by Salomé Valencia Aguirre, Angela De Santis, Ph.D., and Sebastián Tovar Jaramillo [from page 60]

1. Johns Hopkins University, "COVID-19 Map - Johns Hopkins Coronavirus Resource Center Coronavirus," day accessed 28 April, 2021, <https://bit.ly/3wzV9Jx>.
2. Urrea-Ríos, Ivan Leonardo and Piraján, Jackeline, "Impacto de la pandemia covid-19 sobre la economía colombiana. Una pandemia temporal con efectos permanentes (Impact of the COVID-19 Pandemic on the Colombian Economy. A Temporary Pandemic with Permanent Effects)," SSRN, 20 August 2020, <https://bit.ly/34mZ93X>.
3. ONUMUJERES COLOMBIA, "Dimensiones de Género en la crisis del COVID-19 en Colombia: Impactos e implicaciones son diferentes para mujeres y hombres," <https://bit.ly/2TlP8Sz>.
4. Bindseil, Wolfgang and Mansfield, Ian (2020) "Mine Action in the Time of COVID-19: A Donor's Perspective," *The Journal of Conventional Weapons Destruction* 24, no. 2 (December 2020): 9-11, <https://commons.lib.jmu.edu/cisr-journal/vol24/iss2/4>.
5. *Landmine and Cluster Munition Monitor* 2020, <https://bit.ly/3fkPNw6>.
6. Tablero de Desminado Humanitario - OFICINA DEL ALTO COMISIONADO PARA LA PAZ - DESCONTAMINA COLOMBIA, Información de operaciones monitoreadas y aprobadas por el CEM con corte 2007 a 31 enero 2021, <https://bit.ly/2RNaw9c>.
7. ACAPS, COVID-19 Impact on humanitarian operations, April 2020.
8. Three international organizations (The HALO Trust, Humanity & Inclusion, Danish Demining Group), plus two national organizations.
9. Descontamina Colombia, <https://bit.ly/3vvaHq>.

Moving the Story Forward: Utilizing Deminer Narratives to Increase Women's Empowerment in Mine Action and Beyond by Brenna Matlock [from page 64]

1. The study utilized the definition provided by John Creswell in *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, "Phenomenological research is a design of inquiry...in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants. This description culminates in the essence of the experiences for several individuals who have all experienced the phenomenon." In this case, the lived experience of women who are deminers is examined in the study.
2. According to *The SAFE Encyclopedia of Communication Research Methods*, "Rhetorical theory is fundamentally concerned with composition, forms, functions, means, venues, producers, audiences, effects, and criticism of discourse." Rhetorical strategies and theories are utilized to examine the texts of both the public-facing documents and the women's survey responses.
3. The exception being South/Central America due to 1) the lesser number of demining operations in the region and the newness of the current demining programs such as those in Colombia.
4. Handling of all surveys and responses followed James Madison University Internal Review Board approved protocols to protect respondents' data and anonymity.
5. Calza Bini, Arianna; Janssen, Nyske; and Jones, Abigail (2014) "Effects of Mixed Teams on Land Release," *The Journal of ERW and Mine Action*, 18:1,

Article 4.

Digital Rehabilitation Technologies Deliver Hope for Survivors by Abder Banoune [from page 68]

1. "Landmine Monitor 2020, The Impact," *Landmine and Cluster Munition Monitor*, <https://bit.ly/3iCpD8e>.
2. Cieza A, Causey K, Kamenov K, Wulf Hanson S, Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019.
3. ATscale, "The Case for Investing in Assistive Technology," 2020, <https://bit.ly/3kJ93GK>.
4. Canicave, Jerome, Danielle Tan, "Pilot Testing of 3D Printing Technology for Transibial Prothesis in Complex Contexts (Togo, Madagascar, and Syria)," May 2017, <https://bit.ly/3yCS79p>.
5. WHO, "Rehabilitation 2030: A Call for Action, The need to scale up rehabilitation," 2018, <https://bit.ly/34gFrqJ>.
6. As it is shown by the *Landmine and Cluster Munition Reports 2020*, over the previous year casualties from cluster munition attacks were reported in Syria and Libya, while casualties due to cluster munition remnants were recorded in ten countries and other areas: Afghanistan, Iraq, Lao PDR, Lebanon, Serbia, South Sudan, Syria, and Yemen, as well as Nagorno-Karabakh and Western Sahara. Similarly, mine casualties in 2019 were identified in fifty-five states and other areas, of which thirty-six are States Parties to the Mine Ban Treaty. Action 38 of the OAP. Available here: <https://bit.ly/36TzNMk>.

Mental Health: Taking a Proactive Approach to Support Staff in Mine Action by Laura Biscaglia, Abigail Jones, and Robert White [from page 75]

1. This article uses the term "staff" to refer to full-time, part-time, national, international, paid, voluntary, professional, technical, non-professional, and clerical staff.
2. Semi-structured interviews were carried out with stakeholders from the mine action sector and experts on occupational health, mental health, and well-being in aid work.
3. Working Well? Aid worker well-being and how to improve it, CHS Alliance, January 2020
4. Mental Health: Strengthening Our Response, World Health Organization, 30 March 2018
5. The authors recognize that the above definition of mental health frames gender identity in binary terms, which suggests the need for an update.
6. Mental Disorders, World Health Organizations, 28 November 2019
7. Factors associated with common mental health problems of humanitarian workers in South Sudan, H. Strohmeier et al., 2018; The Mental Health of Expatriate and Kosovar Albanian Humanitarian Aid Workers, B.L. Cardozo et al., 2005; Factors Associated With Adverse Mental Health Outcomes in Locally Recruited Aid Workers Assisting Iraqi Refugees in Jordan, C.B. Eriksson et al., 2013.
8. Resilience of Humanitarian Workers, P. Blanchetiere, 2006
9. Men's Mental Health: Beyond Victim-Blaming, Rob Whitley, 2018
10. Jachens, Liza (Research Associate, Psychology and Counseling Department, Webster University Geneva), interviewed by the authors on 26 April 2021.
11. UNHCR's Mental Health and Psychosocial Support for Staff, Courtney E. Welton et al., 2013
12. Ibid.
13. NGOs & Risk Manging Uncertainty in Local-International Partnership, Humantarian Outcomes, 2019.
14. Gender-Based Violence and the Humanitarian Community, L. Wagener, Senior Consulting Psychologist, Headington Institute (<https://bit.ly/3hrZARM>.)
15. Managing Stress in Humanitarian Aid Workers: Guidelines for Good Practice, 3rd edition, Antares Foundation, 2012.
16. Managing the Security of Aid Workers with Diverse Profiles, European Interagency Security Forum, 2018.
17. LGBTQ Mental Health: International Perspectives and Experiences. N. Nakamura and C.H. Logie (Eds.), 2020.
18. Managing the Security of Aid Workers with Diverse Profiles, European Interagency Security Forum, 2018.
19. Gender Differences in PTSD: Susceptibility and Resilience, J. Hu, B. Feng, Y. Zhu, W. Wang, J. Xie and X. Zheng, 2016; Gender Differences in Post-Traumatic Stress Disorder, M. Olf, W. Langeland, N. Draijer, and B.P.R. Gersons, 2007
20. Gender Differences in Depression in Representative National Samples: Meta-Analyses of Diagnoses and Symptoms, R.H. Salk, J.S. Hyde, and L.Y. Abramson, 2017; Why Is Depression More Prevalent in Women?, Paul R. Albert, 2015
21. Gender Differences in Anxiety Disorders: Prevalence, Course of Illness, Comorbidity and Burden of Illness, C.P. McLean, A. Asnaani, B.T. Litz and S.G. Hofmann, 2011; Sex differences in depression and anxiety disorders: Potential biological determinants, M. Altemus, 2006
22. Gender-Based Differences in Burnout: Issues Faced by Women Physicians, Kim Templeton et al., 2019
23. Mental Health and Substance Use: Gender and Women's Mental Health, World Health Organization, 2015
24. According to Humanitarian Outcomes' Aid Worker Security Database, major attacks against humanitarian workers in 2019 surpassed all previous years on record, with national staff bearing the brunt of these attacks. "UNMAS Afghanistan and DMAC Strongly Condemn Brutal Murder of an Afghan Deminer in Nangarhar - Afghanistan," Reliefweb, 12 September 2017. <https://bit.ly/3xmmPSf>
25. UNMAS Afghanistan and DMAC Strongly Condemn Brutal Murder of an Afghan Deminer in Nangarhar - Afghanistan," Reliefweb, 12 September 2017. <https://bit.ly/3xmmPSf>
26. Landmine Monitor 2019, Casualties. Landmine & Cluster Munition Monitor, <https://bit.ly/37h5cZg>.
27. Explosive ordnance disposal personnel in the U.S. military have higher risk of insomnia and post-traumatic stress disorder: a large retrospective cohort study, Lin Otto, Smolenski, Stewart, Workman, Kincaid, Belsher, Bush, Evatt, 2021
28. A survey conducted by Mines Action Canada in 2019 concluding that approximately 80% of field operations or national staff are men and 19% are women. <https://www.minesactioncanada.org/bythenumbers>.
29. The Impact of Masculinity on Mental Health, Ross, Bozynski, Johnson, Abraham, Human Journals Case Study, January 2020 Vol.:14, Issue:3
30. Men's Mental Health: Beyond Victim-Blaming, Rob Whitley, 2018.
31. A proactive approach: Examples for integrating disaster risk reduction and mental health and psychosocial support programming, Brandon Gray, Julian Eaton, Jayakumar Christy, Joshua Duncan, Fahmy Hanna, & Sekar Kasi, International Journal of Disaster Risk Reduction 54, 2021
32. IMAS 07.14, Risk Management in Mine Action
33. IMAS 10.10 Safety & occupational health - General requirements
34. Ibid.
35. Humanitarian Aid Workers Mental Health and Duty of Care, Liza Jachens, 2019.

36. Presenteeism refers to the lost productivity that occurs when employees are not fully functioning in the workplace because of an illness, injury, or other condition. Even though the employee may be physically at work, they may not be able to fully perform their duties and are more likely to make mistakes on the job. Although not tracked like absenteeism, the costs of presenteeism have been estimated to be larger in real terms as employees suffering from longer-term conditions see persistent drops in productivity. It is important to note that employees contributing to presenteeism are, by definition, trying to give their best efforts but are physically or mentally unable to do so. Definition taken from 'Presenteeism A review of current thinking', Garrow Valerie, 2016
37. "Leading Well: Aid leader perspectives on staff well-being and organisational culture," CHS Alliance, ICVA, April 2021, <https://bit.ly/3jpZhai>.
38. Oscar Kilo, home of the national police wellbeing service. <https://oscarkilo.org.uk/>
39. Blue Light Wellbeing Framework, College of Policing, 2020
40. Mental health services in Cambodia: an overview, Sarah J Parry and Ewan Wilkinson, 2019.
41. Mental Health & Psychosocial Support, Humanity and Inclusion, <https://bit.ly/3fOn3Mp>.

An Innovative Approach to the Mental Health Needs of Humanitarian Mine Action Personnel by Ken Falke, Bret A. Moore, Psy.D., ABPP, and Richard Tedeschi, Ph.D. [from page 81]

1. Institute of Medicine. (2014). Treatment for posttraumatic stress disorder in military and veteran populations: Final assessment. The National Academies Press.
2. Lewis-Schroeder, N., Kathryn, K., Murphy, B., Wolff, J., Robinson, M., & Kaufman, M. (2018). Conceptualization, Assessment, and Treatment of Traumatic Stress in First Responders: A Review of Critical Issues. *Harvard Review of Psychiatry*, 26, 216-227.
3. Wisco, B. E., Marx, B. P., Wolf, E. J., Miller, M. W., Southwick, S. M., & Pietrzak, R. H. (2014). Posttraumatic stress disorder in the U.S. veteran population: Results from the national health and resilience in veterans study. *The Journal of Clinical Psychiatry*, 75(12), 1338-1346
4. Moore, B. A., & Penk, W. E. (2019). *Treating PTSD in military personnel: A clinical handbook* (2nd ed.). Guilford Press.
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Data Driven Decision Making in Southeast Asia by Mikael Bold and David Avenell [from page 85]

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Key Performance Indicators (KPIs) for Land Release and Stockpile Destruction Operations – Notes on a New Technical Note for Mine Action by Roly Evans and David Hewitson [from page 91]

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A Virtual Reality Application for the Training of Deminers by Lynn Al Khansa, Elias Bou Saada, Rachid Maaloul, Mohammed Al-Husseini, Ph.D., Ali El-Hajj, Ph.D., Mohammed Baydoun, Ph.D., and Hassan Ghaziri, Ph.D. [from page 97]

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Recognizing and Reducing Risks From Ammunition and Explosives by Martina Salini and Samuel Paunila [from page 102]

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9. The Small Arms Survey (SAS) recorded 242 UEMs incidents over the period 2010-2019, out of which 39 took place in Africa, 16 in the Americas, 116 in Asia, 70 in Europe, and 1 in Oceania. See: Small Arms Survey, *UEMS in Residential Areas*, Fact Sheet, March 2020. Available at <http://www.smallarmssurvey.org/fileadmin/docs/V-Fact-sheets/SAS-Fact-Sheet-UEMS.pdf>
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11. Action on Armed Violence (2018), *Improvised Explosive Device (IED) Monitor 2018* (London: AOAV), pp. 27-28. Available at <https://aoav.org.uk/wp-content/uploads/2019/05/Explosive-Violence-Monitor-2018-v5.pdf>. Last accessed 24 May 2021
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14. GICHD Strategy 2019-2022
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ly/3lkGTjV.

16. United Nations Safeguard Programme (2019), A Guide to Developing National Standards, p. 16, <https://bit.ly/39126cL>.
17. AMAT advice and services are triggered with a request for assistance from a state or an organization. The analysis of the request often warrants desk research and a risk assessment, resulting in the design of a response package or a programme for the state to reduce risks from ammunition and explosives in the short and long term
18. The course covered the following modules of the IATG: IATG 01.10 Introduction to the IATG; Ammunition Safety Management – Theory of Explosives and Ammunition Classification, Causes of Explosions; IATG 01.50 UN Hazard Classification System; IATG 02.10 Introduction to Risk Management Principles and Processes; IATG 03.20 Lotting and Batching; IATG 02.20 NEQ Quantity Distance calculation exercises; IATG 02.30 Explosive Limit Licensing; IATG 09.10 Security of Ammunition Storage Areas; IATG 06.20/30 Storage and Handling; and IATG 05.30 Barricades.
19. As per the feedback compiled to date 27 May 2021, from sixty-two trained army officers ranked from lieutenant to general (fourteen women, forty-eight men).
20. The PNDHD is the national authority responsible for ammunition management in Mauritania.
21. The countries supporting Moldova were organised under the Multinational Small Arms and Ammunition Group (MSAG) and include Austria, Canada, Germany, Sweden, Switzerland, and the United States.
22. Approximately 1,900 metric tons of ammunition have been destroyed since 2004.
23. Chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE).
24. OCHA/UNDAC (United Nations Disaster Assessment and Coordination team), unpublished daily situation reports, 20-25 March 2021.
25. Contact AMAT via amat.gichd.org or UNSaferGuard.org
26. For example; Arms Trade Treaty Voluntary Trust Fund (ATT VTF), The Saving Lives Entity (SALIENT), UN Trust Facility Supporting Cooperation on Arms Regulation (UNSCAR), etc.

Alternatives to Open Burning and Open Detonation: The Disparity Between HMA and Commercial Best Practices by Linsey Cottrell and Kendra Dupuy [from page 107]

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3. USEPA (2017c). Technical fact sheet – dinitrotoluene (DNT), <https://bit.ly/2N0FnXf>.
4. NATO, *Environmental Impact of Munition and Propellant Disposal, Final Report of Task Group AVT-115*, February 2010, Research and Technology Organisation North Atlantic Treaty Organisation, <https://bit.ly/2ZgpHBA>.
5. In accordance with Section 1421 of the National Defence Authorisation Act for Fiscal Year 2017, National Academies of Sciences study on conventional munitions demilitarization alternative technologies.
6. National Academies of Sciences, Engineering, and Medicine, *Alternatives for the Demilitarization of Conventional Munitions*, (Washington, DC: The National Academies Press, 2019. <https://bit.ly/2Ny3xIb>.
7. Under contract frameworks let through the NATO Support and Procurement Agency (NSPA)
8. *IMAS 09.60 Underwater Survey and Clearance of Explosive Ordnance*, First Edition, December 2014, <https://bit.ly/3bapd5y>.
9. Sei-Him Cheong et al., National Physics Laboratory, *Final report: Characterisation of acoustic fields generated by UXO removal*, June 2020, <https://bit.ly/2Zg3mUC>.
10. “Dumped Munitions,” Quality Status Report 2010, OSPAR Commission, <https://bit.ly/2ZkIlrS>.
11. “KBA Data,” Key Biodiversity Areas, <https://bit.ly/3rVojR9>.
12. International Ammunition Technical Guideline, IATG 10.10, *Demilitarization and destruction of conventional ammunition*, 2nd edition, February 2015. <https://bit.ly/2ZheJvp>.
13. For example, scrap steel prices rose from US\$367 per tonne in Jan. 2018 to US\$420 in January 2021, figures from London Metal Exchange, <https://bit.ly/3jSUEVH>.
14. USEPA, *Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes*, December 2019, <https://bit.ly/3qrMcPR>.
15. “Explosive Harvesting Program,” Golden West Humanitarian Foundation, updated 8 January, 2021, <https://bit.ly/2N7JrVv>.

First Steps to Limiting Conflict Pollution in Central Vietnam by Allan Vosburgh [from page 112]

1. Vosburgh, Allan, “Providing IMAS Training to Local Military Forces and Mitigating Long-Term ERW Risks in Vietnam,” *The Journal of Conventional Weapons Destruction*, Feb 2020, <https://bit.ly/3nsxyB>.
2. Geneva International Centre for Humanitarian Demining, “Developing Policies for Management of Residual Explosive Remnants of War (MORE),” Geneva, Switzerland, Page 3.

Measuring Explosive Munitions Use with Open Source Data: A New Tool for Enhancing Humanitarian Mine Action by Jonathan Robinson and Christoph Baade [from page 116]

1. Human Rights Watch (HRW), *Explosive Weapons Devastating Civilians: International Action Needed to Curtail Deaths, Long-Term Harm in Populated Areas* (Feb 2020). Accessed from <https://bit.ly/3k8WuUu>. on 1 May 2020.
2. Geneva International Center for Humanitarian De-mining (GICHD), *Explosive Remnants of War (ERW) Definitions* (Nov 2001). Accessed from <https://bit.ly/3z7MhM0>.
3. Action on Armed Violence (AOAV), *The Reverberating Effects of Explosive Weapon Use in Syria* (Jan 2019), Page 4. Accessed from <https://bit.ly/2YTXiUY>.
4. The Carter Center is a nongovernmental organization guided by the principles of Founders Jimmy and Rosalynn Carter. Founded in partnership with Emory University, on a fundamental commitment to human rights and the alleviation of human suffering, The Carter Center has helped to improve the lives of people in more than eighty countries by resolving conflicts, advancing democracy and human rights, preventing diseases, and improving mental health.
5. *The Explosive Munitions Use in Syria Project* is run by the Syria Conflict Mapping Project, part of The Carter Center’s Conflict Resolution Program on Supporting Peace in Syria.
6. As opposed to the common practice of counting the conflict event itself, which can contain multiple explosive munition uses.
7. The Carter Center, *Explosive Weapons Contamination in Syria, Report 1; Southern Syria: As Sweida, Daraa and Quneitra Governorates* (Nov 2019),

The Carter Center, *Explosive Weapons Contamination in Syria, Report 2; Damascus and Rural Damascus* (Jan 2020), The Carter Center, *Explosive Weapons Contamination in Syria, Report 3: Northwest Syria: Aleppo, Idleb, and Latakia Governorates* (Aug 2020), and The Carter Center, *Explosive Weapons Contamination in Syria, Report 4: Northeast Syria: Al Hassakeh, Ar Raqqa, and Deir Ez Zor Governorates* (November 2020). Accessed from <https://bit.ly/3Ecb05G> and

8. Although it is understood that the data study alone cannot fully predict explosive weapons contamination as a variety of conditions are needed for the formation of this such as firing conditions, weather, ground type and age of munitions (to name some).
9. These weapons types are general such as air launched, ground launched shelling, rather than specific weapons manufacturers. It is also understood that a variety of factors contribute to the formation of explosive weapons contamination, not just where high levels of bombardments have occurred.
10. The advantage of the study being that the distribution of explosive munitions is focused on rather than the exact number of items in it.
11. Given that it takes considerable time and effort to verify or confirm an event or munition use.
12. For example, the data from the project could identify and establish suspected hazardous areas (SHA) polygons which could then later be entered in IMSMA and followed up by non-technical surveys.
13. As the project helps; 1) assist in raising awareness and prioritization of potential high risk areas of UXO contamination in Syria for risk education, 2) assist with prioritizing areas for on the risk mitigation activities and ground surveys as part of the initial stage of mine action, 3) support advocacy efforts in the de-mining sector and donor levels, 4) bring together key decision makers from all sides of a conflict, 5) highlight the need for an effective long term policy response and 6) contribute to reducing the threat posed by explosive munitions and the lasting impact it has to people living in affected areas.
14. For example, IMMAP, *The Mosul Dashboard: Explosive Incidents* (Oct 2016). Accessed from <https://bit.ly/3huWZGt>.
15. For example, Humanity and Inclusion (HI), *The Use of Explosive Weapons in Syria; A Time Bomb in the Making* (May 2015). Accessed from <https://bit.ly/3ljXJPT>.
16. The Carter Center's reports explain more about the data used. See *The Carter Center, Explosive Weapons Contamination in Syria, Report 2; Damascus and Rural Damascus* (Jan 2020), Page 3. Accessed from <https://bit.ly/2YIOhOk>.
17. For more details about this method, see The Carter Center, *Explosive Weapons Contamination in Syria, Report 2; Damascus and Rural Damascus* (Jan 2020), Page 3 - 4. Accessed from <https://bit.ly/3CapDF0>.
18. Such as with the limited accuracy and trust of open source data, and the method likely under-counting the number of explosive munitions in a given conflict event, especially if no exact number of munitions was given.
19. This is as detailed as the study goes. It does not specify the exact weapon type used or manufacturer. For more information please see the aforementioned Carter Center reports.
20. The study was presented to members of the UNMAS Humanitarian Mine Action Syria Working Group in Amman on 15 September 2019 after being invited to do so. This built on a proof of concept study focused on Eastern Ghouta and in Yemen in 2018 conducted by one of the authors. In addition, at least 8 HMA actors focused on Syria have expressed interest in using the findings and method of the project for their work in Syria. Two HMA actors are currently testing the validity of the findings in their activities on the ground, while one has built in the method outlined in this project to enhance their own desk assessment process.
21. The advantage of the study being that the distribution of explosive munitions is focused on rather than the exact number of items in it.
22. Map from The Carter Center, *Explosive Weapons Contamination in Syria, Report 1; Southern Syria: As Sweida, Daraa and Quneitra Governorates* (Nov 2019), Accessed from <https://bit.ly/2XcJvbH>.
23. A reasonable assumption based on previous studies such as RAND Corporation, *Unexploded Ordnance Clean Up Costs; Implications of Alternative Protocols*, (2005), Accessed from <https://bit.ly/3npvIZX>.
24. With this count likely much higher given the limitations of the data, methodology and way UXO is formed.
25. Partly available from open sources.
26. This is in addition to various issues such as lack of international appetite for funding in government areas of Syria, sanctions and terrorism laws applied to Syria, and limited access into the country and within for entities that conduct de-mining.
27. Such as Ukraine, Libya or in Yemen, where one of the authors conducted a pilot version of the explosive munitions project with Halo Trust in late 2018.
28. As The Carter Center did in January 2020 and mentioned in the following source The Carter Center, *Using Conflict Data to Help Demining Efforts in Syria* (Aug 2020), Accessed from https://www.cartercenter.org/news/features/p/conflict_resolution/using-conflict-data-for-demining-in-syria.html on 30 January 2021.
29. This often underutilized field was developed in the early 2000s from contexts in the 1990s, before being further enhanced in the mid 2010s. Two key reports on this topic that contains numerous examples of HMA being used in peacebuilding are 1) Geneva International Center for Humanitarian De-mining (GICHD), *Mine Action and Mediation* (Oct 2016). Accessed from <https://bit.ly/3ht2s0m> 2) International Peace Research Institute (PIRO), *Preparing the Ground for Peace – Mine Action in Support of Peace Building* (Feb 2004). Accessed from <https://bit.ly/3lkFUAb>.
30. The completed project will span five reports and visualize and analyze a dataset of hundreds of thousands of explosive munitions uses extrapolated from tens of thousands of conflict events. This will cover thousands of communities in the 14 governorates of Syria from July 2013 until the present day. This data will be freely available from The Carter Center Syria Program on request. The Carter Center is expected to regularly update the dataset in the future as part of a routine maintenance of the project to keep it relevant.
31. They are currently seeking to develop a pilot project in Ukraine, develop other information layers to be used in the project as well as its wider use in the peacebuilding sector.

Management in Iraq by Mark Wilkinson, Ph.D. [from page 120]

1. "IEDs and Urban Clearance Variables in Mosul: Defining Complex Environments," *The Journal of Conventional Weapons Destruction*, Vol. 23, Issue 2, pp. 13-20, July, 2019, <https://bit.ly/3k8cbLs>.
2. "IED Threat Consistency, Predictability Suggest a 'Simple' Model for Clearance," *The Journal of Conventional Weapons Destruction*, Vol. 23, Issue 2, pp. 7-12, July, 2019, <https://bit.ly/3C7aMLf>.
3. UNMAS data current as of June 7, 2021.
4. "The Lethality Index: Re-Conceptualizing IED Clearance Planning and Delivery in Iraq," *The Journal of Conventional Weapons Destruction*, Vol. 24, Issue 1, pp. 38-44, <https://bit.ly/390izy9>.
5. "Connecting the Dots: The Pace of IED Clearance Seen as Key Factor to Safe Return of 1.67 Million Displaced Iraqis," *Counter IED Report*, Autumn, 2019, pp. 17-22, <https://bit.ly/3k5p1dm>.

6. Author's note: The term "effects based operations" originated in a military context and is attributed to Lt General David A. Deptula, USAF (Ret), principal author of the first Gulf War air campaign. In generic terms, the concept effects-based operations emphasizes end-state goals first, and then focuses on the means available to achieve those goals, recognizing that these means can vary.
7. The Lethality Index: Re-Conceptualizing IED Clearance Planning and Delivery in Iraq," *The Journal of Conventional Weapons Destruction*, Vol. 24, Issue 1, pp. 38-44, <https://bit.ly/2XjATQg>.
8. *Ibid.*, pp. 38-40.

Managing Risk Through Transparency and Cooperation: Improving Lebanon's PSSM Capacity by Jamie McGhee [from page 125]

1. "SAS-Fact-Sheet-UEMS.pdf," Small Arms Survey, <https://bit.ly/3zoIU4s>.
2. "Risk Reduction Checklist," UN SaferGuard, <https://bit.ly/3sQm8Qm>.
3. "Safety standards for electrical installations," IATG 05.40, <https://bit.ly/38lcFHj>.
4. The term "compatibility group" refers to a grouping identified by a letter which, when referenced to a compatibility table, shows those explosives which may be stored or transported together without significantly increasing the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident. Codes are used to indicate which natures may be safely stored together.
5. "UN explosive hazard classification system and codes," IATG 01.50, <https://bit.ly/3yqsVBs>.
6. "Types of buildings for explosives facilities," IATG 05.20, <https://bit.ly/38fBswF>.
7. The term "hazard class" refers to the UN recommended system of nine classes for identifying dangerous goods. Class 1 identifies explosives.
8. The term "hazard division" refers to the UN classification system that identifies hazardous substances.
9. "UN explosive hazard classification system and codes," IATG 01.50, <https://bit.ly/3jm9Mwj>.
10. "Quantity Distance Calculator," UNSaferGuard, <https://bit.ly/2WpHys2>.
11. A PES is any stock of explosives, however or wherever stored (building, stack, vehicle, railway wagon, berth, transit shed etc), the explosion of which will affect an exposed site. "Quantity Distances and Licensing Criteria, JSP 482 Edition 4, Chapter 10," <https://bit.ly/3gFueXb>.
12. "The Beirut Port Explosion," Forensic Architecture, <https://bit.ly/3DpXXgL>.
13. Morris, Loveday, "Beirut needs billions of dollars it doesn't have to rebuild after massive blast," *The Washington Post*, 21 August 2020, <https://wapo.st/3mBLaS7>.
14. "MAG's mission to keep explosives safe in Lebanon," MAG International, 29 March 2021, <https://bit.ly/3ymEbig>.

Assisting Landmine Survivors in Yemen by Elise Becker and Tamara Klingsheim [from page 129]

1. "Yemen: Casualties," *Landmine & Cluster Munition Monitor*, <https://bit.ly/37WJ4UF>
2. "Yemen: Mine Action," *Landmine & Cluster Munition Monitor*, <https://bit.ly/3j5onvO>

Remote Sensing and Artificial Intelligence in the Mine Action Sector

by Martin Jebens and Rob White [from page 134]

1. Baur, Jasper, Gabriel Steinberg, Alex Nikulin, Kenneth Chiu, and Timothy S. de Smet 2020. "Applying Deep Learning to Automate UAV-Based Detection of Scatterable Landmines" *Remote Sensing* 12, no. 5: 859. <https://bit.ly/3t3c7iQ>.
2. Nikulin, Alex, Timothy S. De Smet, Jasper Baur, William D. Frazer, and Jacob C. Abramowitz 2018. "Detection and Identification of Remnant PFM-1 'Butterfly Mines' with a UAV-Based Thermal-Imaging Protocol" *Remote Sensing* 10, no. 11: 1672. <https://bit.ly/3DEmy1q>.
3. Smet, Timothy & Nikulin, Alex. (2018). "Catching 'butterflies' in the morning: A new methodology for rapid detection of aerially deployed plastic land mines from UAVs." 37. 10.1190/tle37050306.1. <https://bit.ly/3BAOm51>.
4. Jebens, Martin; Sawada, Ph.D., Hideyuki; Shen, Junjie; and Tollefsen, Erik (2020) "To What Extent Could the Development of an Airborne Thermal Imaging Detection System Contribute to Enhance Detection?," *The Journal of Conventional Weapons Destruction*: Vol. 24 : Iss. 1, Article 14. <https://bit.ly/3yvHvaR>.
5. "#Drones for Good," ARPAS Magazine, April 2020, Iss. 11, <https://bit.ly/2WKxIRp>.
6. Big data is a concept in computer science that broadly covers the collection, storage, analysis, processing and interpretation of enormous amounts of different data (in MA context this could be data collected during NTS; satellite images, remote sensing data, white papers, positions of different objects) The data-sets are too large or complex to be dealt with by traditional data processing software's.
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How to Implement Drones and Machine Learning to Reduce Time, Costs, and Dangers Associated with Landmine Detection by Jasper Baur, Gabriel Steinberg, Alex Nikulin, Ph.D., Kenneth Chiu, Ph.D., and Timothy S. de Smet, Ph.D.

[from page 137]

1. Deep learning is a subfield of machine learning based on the use of deep neural networks. Machine learning is a subfield of artificial intelligence wherein a computer uses algorithms to improve at a task on its own only through experience. Artificial intelligence describes any program designed to imitate human perception.
2. A region-based convolutional neural network (R-CNN) is a method introduced in 2014 to perform fast and accurate object detection using deep neural networks.
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