

In close collaboration with a leading provider of C-IED training to humanitarian mine action organizations, the C-IED APT will be developed to be able to

- move rubble and obstructions aside (delicately when appropriate),
- conduct a rapid camera survey of an area, producing accurate map records,
- investigate suspicious objects either robustly or delicately,
- collect ordnance that may not be considered safe to move by hand,
- disrupt potential IEDs with either a water charge, frangible or solid projectile: each of three disrupters feature three pre-loaded barrels (25.4 mm and 40 mm),
- fire a closed grapnel and line that can then be used to pull the target,
- place explosive charges to disrupt or destroy IEDs,
- attach hooks and a winch cable to drag heavy items to another place,
- deploy cutting equipment able to cut an additional entry into a vehicle/container,
- deploy a commercial off-the-shelf freeze neutralizing kit,
- gain safe entry to a vehicle for internal camera inspection,
- carry a multichannel (selective) wireless signal jammer to prevent wireless initiation systems being used in the vicinity,
- carry and place smaller robots when access through small openings is required.¹⁶

One advantage it has over all other similarly sized C-IED machines is the ability to be driven by an on-board operator to the area of need. Its small footprint and maneuverability allow it to drive over sidewalks when traffic is gridlocked following an incident. It can push or lift debris aside to access an area, and its flexible chassis and ground clearance allow it to move over rubble to get where it is needed. ©

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ENDNOTES

MediaWiki: Supporting IMSMA Documentation by Kontotasiou and Cottray [from page 5]

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3. "Welcome to MediaWiki.org." MediaWiki. Accessed 5 May 2017. <http://bit.ly/2edEanE>.
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Interpreting Submunition Fragmentation Marks on Hard Surfaces for the Survey of Cluster Munition Strikes

by Evans [from page 11]

1. Salem, Harriet. Email correspondence with author, 10 January 2017.
2. "Tactics, Techniques and Procedures for the Field Artillery Cannon Battery." U.S. Marine Corps. *Appendix J, Field Manual 6-50 MCWP 3-16.3*. Accessed 1 June 2017. <http://bit.ly/2qFqWr1>.

21st Century Survey in Eastern Ukraine and the Use of Technology in Insecure Environments by Torbet and Thompson [from page 20]

1. "Escalation of Hostilities has Exacerbated Civilian Suffering – UN Report." United Nations Human Rights Office of the High Commission. Accessed 1 June 2017. <http://bit.ly/2rIwq8x>.
2. The ceasefire agreement signed in February 2015.
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4. "Ukraine." *Landmine and Cluster Munition Monitor* 2016. Accessed 1 June 2017. <http://bit.ly/2siiiPU>.
5. A draft law aiming to establish one is currently being read in Ukraine's parliament, the Verkhovna Rada.
6. "People in Need Banned From Humanitarian Aid in Donetsk Region, Eastern Ukraine." Reliefweb. Accessed 1 June 2017. <http://bit.ly/2qFs3v1>.
7. In Ukraine the threshold defined by HALO is evidence sighted by a survey team or a credible witness (someone who has seen a mine, accident site, etc.).
8. The form includes a clear statement that the information it contains is not submitted to IMSMA, or used to plan clearance, until the NTS process is complete and a full NTS form is completed.

Mine Detecting Rats Make an Impact in Cambodia by Fast, Bach, McCarthy, and Cox [from page 32]

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Mine Action in Burma: Building Trust and Incremental Gains by Crowther, Dresner, and Aaron [from page 39]

1. "Myanmar_Burma – Casualties and Victim Assistance." *Landmine and Cluster Munition Monitor*. 21 November 2016. Accessed 18 May 2017. <http://bit.ly/2ruWYWz>.

Social Inclusion of Marginalized Communities: Mine Action in Laos by Kalamar [from page 44]

1. The process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity. The World Bank Group. Social Inclusion. Last modified 2017. Accessed 9 May 2017. <http://bit.ly/1UkYO5a>.
2. Patricia H. Collins. "Intersectionality's Definitional Dilemmas." *Annual Review of Sociology*, vol. 41, 2015, pp. 1-20.
3. Government of Laos officially recognizes 49 ethnic groups, however, on the basis of the distinct languages within the four language families, the actual number is thought to be even as high as 240 different ethnic groups. Minority Rights Group International. Last modified 2017. <http://bit.ly/2psqmvh>. Accessed 9 May 2017.
4. Minority Rights Group International. Last modified 2017. Accessed 9 May 2017. <http://minorityrights.org/country/laos/http://bit.ly/2psqmvh>.
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6. According to some estimations, Laos has between 70 and 120 distinct languages. Enfield, N. J., 'Laos - language situation', In: K. Brown (Ed.). *Encyclopedia of Language and Linguistics* 6 (2006): 698-700. Amsterdam: Elsevier (2006).
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15. UN General Assembly, National report submitted in accordance with paragraph 5 of the annex to Human Rights Council resolution 16/21* Lao People's Democratic Republic, A/HRC/WG.6/21/LAO/1, 2014, p.17.
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19. Personal interview, April 2017.

Epidemiological Study of Landmines/ERW Accidents and Victims in Kachin, Kayah, and Shan States, Burma by Zwang and Simon [from page 48]

1. National Center for Health Statistics. "Census Questions on Disability Endorsed by the Washington Group." Center for Disease Control (2010). Accessed 27 June 2017. <http://bit.ly/2udE3Rt>.
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2. Washington Group on Disability Statistics; www.washingtongroup-disability.com.
3. Statistical Package for the Social Sciences.
4. While the purpose of this study did not assess whether DRC/DDG provided support for all participants or which questions were not asked, all the landmines victims identified by DRC/DDG usually received victim assistance.

Bridging a Critical Mine Action Information Management Gap: Complex Conflict Environments by Ghareeb Barzangy [from page 53]

1. National database IMSMA for Gray Area managed by iMMAP.

Addressing the Explosive Hazard Threat in Northern Syria: Risk Education on UXO, Landmines, Booby Traps, and IEDs by Skilling and Zapanik [from page 55]

1. "Humanitarian Needs Overview 2017: Syrian Arab Republic." United Nations Office for the Coordination of Humanitarian Affairs (December 2016). Accessed 19 May 2017. <http://bit.ly/2iBlGoo>.
2. "IMAS 04.10, Glossary of Mine Action Terms, Definitions, and Abbreviations." *IMAS: International Mine Action Standards*, Second edition, 1 January 2003. Accessed 19 May 2017. <http://bit.ly/2rzEXGX>.
3. "The Use of Explosive Weapons in Syria: A Time Bomb in the Making." Handicap International (2015). Accessed 19 May 2017. <http://bit.ly/2qFjv3S>.
4. "Syria." Action on Armed Violence (2016). Accessed 19 May 2017. <http://bit.ly/2rm7Yt2>.
5. "Set to Explode: Impact of Mines, Booby Traps and Explosive Remnants of War on Civilians in Northern Syria." *Medecins Sans Frontieres* (April 2017). Accessed 19 May 2017. <http://bit.ly/2q3X5as>.
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9. "International MRE Working Group Meeting: Draft Minutes." Presented at the International MRE Working Group, Geneva, Switzerland, 8 February 2017.
10. Needs and Population Monitoring uses a set of tools and methods implemented through OCHA to identify, assess, and track target populations.
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12. "Briefing Note: Housing, Land, and Property (HLP) in the Syrian Arab Republic." Norwegian Refugee Council (2016). Accessed 19 May 2017. <http://bit.ly/2phCpwZ>.
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An APT Demining Machine by Andy Smith [from page 61]

1. "Clearance" is defined in IMAS 09.10 as "the removal and/or destruction of all mine and ERW hazards."
2. The author saw this in use with HALO Trust in 1996/7.
3. Notably by the demining INGO Menschen gegen Minen (MgM).
4. For details of the Sarvatra Arjun demining system, see <http://bit.ly/2pWZyUm>. Accessed 17 May 2017.
5. This small machine was made and used by the author. For a video showing the use of this rice-tractor machine, Accessed 17 May 2017. see <http://bit.ly/2qtexZX>.
6. Much of Myanmar, Colombia and Tajikistan are examples, but there is often confidence of the absence of an AT mine threat in many places elsewhere.
7. The author had designed the prototypes of its wheels in 2011.
8. The author uses the following definition of "appropriate technology": Technology is appropriate when it can achieve the desired end; is tailored to fit the psychosocial and biophysical context prevailing in a particular location; is suitable to the social and economic conditions of the geographic area; is affordable to both buy and use; and can be managed and maintained using local skills.
9. Study of the Database of Demining Accidents (DDAS) confirms this: Accessed 17 May 2017 <http://bit.ly/1f7H60s>.
10. The APT can be used with COTS agricultural equipment, magnet arrays, detector arrays and a dedicated counter-IED platform.
11. The mines used were: 5 x PMA 1A, 5 x PMA 2, 5 x PMA-3, 1x PMR-2A and 1 x PROM-1.
12. Report available upon request from the author.
13. It was verified as cutting vegetation (up to 10cm Ø) at a rate of 2739 m2 per hour in the test area.
14. There are some video clips of the testing in a short film online at <http://bit.ly/2rfr3gu>. Accessed 17 May 2017.
15. The current plan is to protect against 5.56 NATO BALL ammunition (steel core). Enhanced protection will add between 500 and 1000kg in weight depending on whether shaped-charge amelioration is required.
16. The C-IED specialist training organisation is PCM ERW Risk Management & MAT Kosovo LLC, contact info@pcm-erw.com.