

Needs Tables - Country Specific

Country or Region of Need

Afghanistan**Specific Technical Needs for Deminers Detectors**

	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	extensive usage now	staff deminers	local	possibly 10% further productivity improvement, concerns about missed mines
Sniffer detector	v.high		R&D needed	possibly 10% productivity improvement
Scrub sniffer	moderate	not discussed		vegetated areas are causing concern, many have been deferred
QA detector	v.high	not discussed	R&D needed	QA currently difficult
Mineralised soil metal detector	none	UWA		no mineralised soil known, brickworks defeat all detectors tested so far
Low false alarm rate mine detector	v. high	deminers	R&D needed	future productivity improvement 30% or more would have to work in collapsed buildings - collapsed material is baked hard mud, stones, fragments, UXO etc.
Deep target mine detector	v. high	deminers	R&D needed	few areas cannot be demined without this capability
Detector for mines in mud	limited	staff	R&D needed	
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	high in vegetation	staff	may be provided by Japan	claim to have invented this concept, but need more up-to-date machines to exploit this
Ground preparation machine (e.g. Flails, Uno).	limited	staff	may be provided by Japan	useful in some areas but verification will be difficult. Mainly for vegetation clearance work
Backhoe excavators, front-end loaders, possibly armoured.	high	staff	Commercial	8 in use now, 4 more on order, more needed
Rubble crusher	limited	staff	HALO Trust	difficult to optimise cost-effectiveness
Magnetic fragment removal	high	staff	R&D needed	Gravel, sandy areas with high fragment density, could be fitted to backhoe or flail
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards	yes possibly useful	deminers	Commercial	snakes and scorpions, dust, problems in mud
Magnetic probe	limited	UWA	R&D needed	to be evaluated
Low insertion force probe		UWA	R&D needed	
Smart probe	none	not discussed	R&D needed	hard or rocky soil means that probing is almost never used
Excavation tools	moderate	UWA	refinements needed	Improved tools could improve productivity slightly, but keep deminers happier and protect hands in prodding accidents
Ground and rubble breaker	v. high	UWA	R&D needed	needed for work in collapsed buildings - collapsed material is baked hard mud, stones, fragments, UXO etc.
Ground marking equipment	potentially useful	UWA	R&D needed	paint marking on sand could save some time, say 2% improvement, but biggest benefit is likely to be in quality of clearance
Improved personal protective equipment	needed	UWA	Commercial	evaluating requirements currently, need reassurance on blast secondary fragmentation and shock wave effects in squatting position
Mine-resistant boots	limited	UWA		staff do not think this is important and could compromise quality standards
Scratch -resistant film for visors	very useful	UWA	Commercial	would extend life of visors
Anti-fog treatment for visors	very useful	deminers	Commercial	extend working times for deminers in wet, cold weather
Universal battery charger	none	UWA		currently use dry cells. No plans to change
UXO cutter		not discussed		
UXO spinner		not discussed		

Needs Tables - Country Specific

Information/Info Technology Needs				
High quality internet access.	needed	staff	cost problem	staff would make effective use of this would improve information accuracy, could make use of this
Field data recording	needed	UWA	R&D needed	no apparent means of utilising this
Data distribution and updating	needed	UWA	R&D needed	
Map and photograph registration		not discussed		
High resolution aerial photography	potentially useful	UWA	Air force(?)	needs evaluation, could identify where mines have been exposed by wind
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis	high priority	staff		have attempted an internal study, need formal methodology
Measurement needs				
Dog performance tests	essential if dogs used	UWA	Afghanistan, N. Iraq	Evaluation of dog potential needed
MEDDS Improvement		not discussed		
Quality performance measurement	needed	staff	R&D needed	Quality a vital issue
Productivity performance measurement	needed	staff	local	Major emphasis on this behind safety
Operational needs not classified				
Deep mine location and excavation	v. high	UWA	R&D needed	needed for work in collapsed buildings - collapsed material is baked hard mud, stones, fragments, UXO etc.
Mud flats	limited	staff	R&D needed	Major problem here
Removing compacted mine and UXO contaminated rubble	v. high			
Mine Resistant Vehicles for civilian use	limited	UWA	R&D needed	Could help with transport problems, tractors in suspect areas. Economic resources to pay cost very limited.
Triple canopy jungle		not applicable		

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Country or Region of Need	Angola			
Specific Technical Needs for Deminers Detectors	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	high	staff	South Africa	dogs mainly used for MEDDS technique, further productivity gains may be feasible
Sniffer detector	v.high	staff	R&D needed	possibly 30% productivity improvement if reliability can be demonstrated
Scrub sniffer	v.high	UWA	R&D needed	potentially the most effective way to deal with extensive areas of vegetation which may contain mines
QA detector	v.high	UWA	R&D needed	QA currently difficult
Mineralised soil metal detector		not discussed		
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more
Deep target mine detector		not discussed		
Detector for mines in mud		not discussed		
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	v. high	staff	Commercial	Several machines in use - this method being widely adopted. Perhaps 20% further productivity gain possible
Ground preparation machine (e.g. Flails, Minebreaker, Rhino). Backhoe excavators, front-end loaders, possibly armoured. Rubble crusher	controversial	staff not discussed not discussed	Commercial, donor	Staff debate utility of these machines. Some groups make extensive use and claim good results. Others claim the work needed to assure complete mine clearance is too expensive and dangerous.
Magnetic fragment removal	moderate-high	UWA	some R&D needed	Could help reduce effort needed for manual clearance (when fitted to vegetation clearance machinery).
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards		not discussed		
Magnetic probe		not discussed		
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools		not discussed		
Ground and rubble breaker		not discussed		
Ground marking equipment		not discussed		
Improved personal protective equipment		not discussed		
Mine-resistant boots		not discussed		
Scratch -resistant film for visors	very useful	not discussed	3M product	would extend life of visors
Anti-fog treatment for visors		not discussed		
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		
Information/Info Technology Needs				
High quality internet access.		not discussed		
Field data recording		not discussed		
Data distribution and updating		not discussed		
Map and photograph registration		not discussed		
High resolution aerial photography	potentially useful	UWA	Commercial	original area chosen by ITC for concept testing
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis		not discussed		
Measurement needs				
Dog performance tests		not discussed		
MEDDS Improvement	needed	staff	R&D needed	Extensive scope for evaluating MEDDS and making further improvements through locally based research
Quality performance measurement	needed	staff	R&D needed	Major problem for staff, cause of many disputes and arguments, essential for commercial contract work
Productivity performance measurement	needed	staff	R&D needed	Staff find it difficult to compare productivity data from different organisations
Operational needs not classified				
Deep mine location and excavation		not discussed		
Mud flats		not discussed		
Removing compacted mine and UXO contaminated rubble		not discussed		
Mine Resistant Vehicles for civilian use	very useful	not discussed	R&D needed	Could alleviate transportation problems, also food distribution and assist with agriculture
Triple canopy jungle		not discussed		

Country or Region of Need

Bosnia and Herzegovina**Specific Technical Needs for Deminers Detectors**

	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	high and controversial	staff	various (not local)	dogs are being used with machinery to clear vegetation, but there are known performance problems which few people know how to address.
Sniffer detector	v.high	staff	R&D needed	possibly 30% productivity improvement if reliability can be demonstrated - problems with digs may indicate similar difficulties for vapour-based detectors
Scrub sniffer	v.high	UWA	R&D needed	potentially the most effective way to deal with extensive areas of vegetation which may contain mines
QA detector	v.high	UWA	R&D needed	QA currently difficult
Mineralised soil metal detector	moderate	staff	Trials inconclusive	Problem is known to exist, and several detectors are being evaluated by different groups
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more
Deep target mine detector	limited	UWA	R&D needed	Some areas may require this, principally river banks and steep slopes where landslides have buried mines
Detector for mines in mud	moderate	staff	R&D needed	many river-bank areas cannot be demined without this capability
Trip wire detector	v.high	staff	R&D needed	need strongly expressed, as this could help reduce time needed for manual clearance, the problem particularly concerning deminers is PROM bounding fragmentation mines. Some non-metallic tripwires, but most contain metal with plastic coating.
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	v. high	staff	Commercial	Several machines in use - this method being widely adopted. Perhaps 20% further productivity gain possible
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	controversial	staff	Commercial, donor	Staff debate utility of these machines. Some groups make extensive use and claim good results. Others claim the work needed to assure complete mine clearance is too expensive and dangerous.
Backhoe excavators, front-end loaders, possibly armoured.	moderate	UWA	Commercial	Extensive reconstruction work necessary, these machines could reduce time and effort on clearance in ruined residential areas.
Rubble crusher	moderate	UWA	HALO Trust	Power of some fragmentation mines may necessitate heavy armour (PROM-1), little local experience
Magnetic fragment removal	moderate	UWA	some R&D needed	Could help with reconprstruction problems
Personal equipment and tools for deminers				Sticky soil limits ability to pick up fragments, but could help reduce effort needed for manual clearance (when fitted to vegetation clearance machinery).
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards	limited	UWA		few other hazards
Magnetic probe	limited	UWA		sticky soil, also most fragments are left in ground (probing procedures used)
Low insertion force probe	needed	UWA	R&D needed	could reduce manual costs by 10%
Smart probe	unknown	staff	Canadian Defence	test results needed
Excavation tools	very useful	UWA	many designs available	HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant on rocky and stony soil areas in south of country. These areas will be important later, not for the time being
Ground and rubble breaker		not discussed		
Ground marking equipment		not discussed		

Needs Tables - Country Specific

Improved personal protective equipment	needed	staff	R&D needed	light weight, comfortable protection from high velocity fragments needed - existing protection helps but better coverage of legs and arms would help reduce injuries from frag. mine accidents staff think that these give dangerous false sense of security
Mine-resistant boots	limited	staff		would extend life of visors
Scratch -resistant film for visors	very useful	not discussed	3M product	cold, damp conditions frequent
Anti-fog treatment for visors	very useful	not discussed		
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		UXO are very old and/or badly corroded.
Information/Info Technology Needs				
High quality internet access.	needed	staff	cost problem	Staff officers have E-mail access, but web access too slow for many purposes. Well trained staff could make effective use of internet resources.
Field data recording	useful	UWA		would improve data collection
Data distribution and updating	needed	staff		frustrating problem for staff currently
Map and photograph registration	badly needed	staff		major problem with GIS systems
High resolution aerial photography	potentially useful	UWA	Commercial	potentially valuable in south where vegetation problems are much reduced
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis	badly needed	staff	R&D needed	Staff need this to help donors make funds available and evaluate results
Measurement needs				
Dog performance tests	essential if dogs used	staff	local	Evaluation of dog problems needed. Performance tests in Sept-Nov 1999 showed less than 25% of dogs performing to required standard
MEDDS Improvement		not discussed		
Quality performance measurement	needed	staff	R&D needed	Major problem for staff, cause of many disputes and arguments, essential for commercial contract work
Productivity performance measurement	needed	staff	R&D needed	Staff find it difficult to compare productivity data from different organisations
Operational needs not classified				
Deep mine location and excavation	limited	staff	R&D needed	Some problems on river banks and where landslides have occurred
Mud flats	moderate	staff	R&D needed	Problem along river banks (thought to be extensive)
Removing compacted mine and UXO contaminated rubble	moderate	staff		Problem associated with reconstruction work
Mine Resistant Vehicles for civilian use	high potential	UWA	some R&D needed	Could help reclaim suspect and lightly contaminate land for use, also potential export market
Triple canopy jungle	high potential	staff	R&D needed	Some very severe vegetation problems, particularly on hillsides

Needs Tables - Country Specific

Country or Region of Need	Cambodia			
Specific Technical Needs for Deminers Detectors	potential utility	who raised this?	availability	potential benefits
Mine detection dogs Sniffer detector	high v.high	staff staff	Mozambique R&D needed	possibly 15% productivity improvement, limited by vegetation, disease threat. Higher gains possible with mechanical support, but economics may be difficult to sustain possibly 30% productivity improvement Very large areas of vegetation with unknown mine and or UXO contamination - a factor in common with Laos and Vietnam. Ability to survey without cutting vegetation is vital, remote detection preferred QA currently difficult, need high tech sensors for quality assurance work
Scrub sniffer	v. high	staff	R&D needed	QA currently difficult, need high tech sensors for quality assurance work
QA detector Mineralised soil metal detector	v.high high	staff staff	R&D needed Commercial	Essential for demining in several large regions
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more, depth detection capability also a requirement A few locations, such as collapsed trenches, require this, but excavation is viable alternative
Deep target mine detector	limited	staff	R&D needed	Access problems, most areas can be accessed in dry season when normal techniques are adequate.
Detector for mines in mud Trip wire detector Mechanical assistance for deminers	limited	staff not discussed	R&D needed	currently being evaluated, economics of large machines may be difficult to sustain. Productivity gains depend on being able to find land areas without AT blast mines or large UXO's.
Ground preparation - vegetation cutter (Flails)	v. high	staff	Evaluation	useful in some areas but verification will be difficult - limited UXO problems in some areas
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	v. high	staff	Evaluation	useful for excavation problems in certain locations
Backhoe excavators, front-end loaders, possibly armoured. Rubble crusher	limited	staff not discussed	none limited R&D needed	Can easily be fitted to any mechanical system to reduce manual follow-up by deminers
Magnetic fragment removal Personal equipment and tools for deminers	v.high			
Water filtration equipment	needed	deminers	Commercial	Deminers complained about low quality of drinking water
Saws and vegetation cutting tools	needed	deminers	Commercial	Improving tool quality could improve manual productivity by 5-10%
Cotton uniforms	needed	deminers	Commercial	Improving comfort could lift productivity by 5-10%
Protection from non-explosion hazards	needed	deminers	Commercial	snakes, insects (repellants without side-effects needed), thorns (high quality safety shields, gloves).
Magnetic probe	useful	deminers	local capacity	finding fragments in sandy areas, deminers use pocket magnets sometimes
Low insertion force probe	useful	not discussed	local capacity	Several solutions found from research
Smart probe	unknown	not discussed	Canadian Defence	Testing being done HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant if improved detection not available. Change to SOP's being considered requiring excavation in preference to probing.
Excavation tools Ground and rubble breaker	needed	UWA not discussed	many designs available	
Ground marking equipment	limited	not discussed	R&D needed local capacity	considerable time is spent on current marking method (sticks and ropes) - paint marking may be quicker in some areas. However, pace of work is so slow that vegetation growth can hide paint marks quickly.
Improved personal protective equipment	needed	staff	France	accident details available to some extent, visors, aprons being introduced staff want foot protection when entering mined areas for emergency rescue
Mine-resistant boots	needed	staff	France	would extend life of visors
Scratch -resistant film for visors	very useful	not discussed	3M product	warm to hot conditions are normal
Anti-fog treatment for visors	not needed?	not discussed		wanted for radios and possibly detectors
Universal battery charger	needed	deminers	unknown	portable, lightweight and low cost version needed - military equipment not portable enough
UXO cutter	needed	staff	R&D needed	

Needs Tables - Country Specific

UXO spinner Information/Info Technology Needs	needed	staff		needed for large UXO's - military versions not portable enough.
High quality internet access. Field data recording Data distribution and updating Map and photograph registration	needed	staff not discussed not discussed not discussed	cost problem	staff are trained to make effective use of internet no apparent means of utilising this no apparent means of utilising this
High resolution aerial photography	potentially useful probably needed	not discussed	Commercial	needs evaluation, possibly very useful in areas with limited access. Timing needs careful choice. Stereo images can show old trench lines and foxholes giving good data on likely mined areas - remote explosive detection preferred This is a problem in Laos - information on US munitions badly needed
UXO render-safe procedures Socio-economic survey / analysis Measurement needs	needed	not discussed staff	R&D needed	Some low quality assessments have been done
Dog performance tests MEDDS Improvement Quality performance measurement Productivity performance measurement Operational needs not classified Deep mine location and excavation Mud flats Removing compacted mine and UXO contaminated rubble	essential if dogs used needed needed	not discussed not discussed staff UWA	Mozambique local	Evaluation of dog potential needed important issue Recognised as problem of growing importance
Mine resistant vehicles	needed some severe vegetation problems	staff	S. Africa	AT and large UXO are recognised as threats to vehicles, restricting application of vegetation clearance machinery. Survey using mine resistant vehicles could help.
Triple canopy jungle		staff		Hilly vegetation covered areas in east of country contaminated with UXO

Country or Region of Need

Central & South America: Nicaragua, Ecuador, Peru

		who raised this?	availability	potential benefits
Specific Technical Needs for Deminers				
Detectors				
Mine detection dogs	limited	staff	USA	Vegetation restricts dogs to QA tasks possibly 30% productivity improvement
Sniffer detector	v.high	staff	R&D needed	
Scrub sniffer	v. high	staff	R&D needed	Almost all mined areas are covered in vegetation, often triple canopy jungle. Ability to localise mine and UXO contamination is essential.
QA detector	limited	staff	R&D needed	
Mineralised soil metal detector		not discussed	Commercial	QA currently difficult, dogs preferred
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more, rubbish from previous occupiers a major problem - aluminium
Deep target mine detector	moderate	staff	R&D needed	River flats, mud banks, mines washed away in floods
Detector for mines in mud	moderate	staff	R&D needed	River flats, mud banks, mines washed away in floods
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	limited	staff	R&D needed	much of terrain is too rugged for existing vehicles, mud makes access difficult
Ground preparation machine (e.g. Flails, Minebreaker, Rhino). Backhoe excavators, front-end loaders, possibly armoured.	limited	staff	R&D needed	much of terrain is too rugged for existing vehicles, mud makes access difficult
Rubble crusher		not discussed		
Magnetic fragment removal		not discussed		
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools	v.high	staff	Commercial	Improving tool quality could improve manual productivity by 5-10%
Cotton uniforms		not discussed		
Protection from non-explosion hazards		not discussed		
Magnetic probe		not discussed		
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools		not discussed		
Ground and rubble breaker		not discussed		
Ground marking equipment		not discussed		
Improved personal protective equipment	needed	staff	no local capacity	accident details available to some extent, visors, aprons being introduced
Mine-resistant boots		not discussed		
Scratch -resistant film for visors		not discussed		
Anti-fog treatment for visors		not discussed		
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		

Needs Tables - Country Specific

Information/Info Technology Needs

High quality internet access.	needed	staff	cost problem	staff are trained to make effective use of internet
Field data recording		not discussed		no apparent means of utilising this
Data distribution and updating		not discussed		no apparent means of utilising this
Map and photograph registration		not discussed		
High resolution aerial photography		not discussed		Thick vegetation would limit usefulness
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis		not discussed		
Measurement needs				
Dog performance tests	essential if dogs used	staff	USA	Evaluation of dog potential needed
MEDDS Improvement		not discussed		
Quality performance measurement	needed	staff	R&D needed	QA currently difficult, dogs preferred
Productivity performance measurement		not discussed		
Operational needs not classified				
Deep mine location and excavation	moderate	staff	R&D needed	floods, landslides have buried mines
Mud flats	moderate	staff	R&D needed	floods, landslides have buried mines
Removing compacted mine and UXO contaminated rubble				
Mine Resistant Vehicles		not discussed		
Triple canopy jungle	v.high	staff	R&D needed	large contaminated areas in jungle terrain

Needs Tables - Country Specific

Country or Region of Need	Chad			
Specific Technical Needs for Deminers	potential utility	who raised this?	availability	potential benefits
Detectors				
Mine detection dogs	v.high	staff	Afghanistan, N. Iraq	possibly 30% productivity improvement
Sniffer detector	v.high	staff	R&D needed	possibly 30% productivity improvement
Scrub sniffer		not discussed		
QA detector	v.high	not discussed	R&D needed	QA currently difficult
Mineralised soil metal detector		not discussed		
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more, PMA-3 mines pose a major threat
Deep target mine detector	v. high	staff	R&D needed	many areas cannot be demined without this capability
Detector for mines in mud	moderate	staff	R&D needed	many areas cannot be demined without this capability
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)		not discussed		
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	v. high	staff	Commercially available	Need machines which can work with deep sand, sifting machines, should avoid detonations
Backhoe excavators, front-end loaders, possibly armoured.	limited	staff	none	Possibly very useful
Rubble crusher		not discussed		
Magnetic fragment removal	v. high		R&D needed	Sandy areas with fragments, small UXO.
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards	yes possibly useful			snakes and scorpions, sunburn, dust, problems in mud
Magnetic probe				finding fragments in sandy areas, non magnetic mines
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools	very useful	staff	many designs available	Productivity improvement could be significant if improved detection not available
Ground and rubble breaker		not discussed		
Ground marking equipment	potentially useful	not discussed	R&D needed	paint marking on sand could save some time, say 2% improvement, but biggest benefit is likely to be in quality of clearance, and improvement in safety
Improved personal protective equipment	needed	staff	not in Chad	accident details needed before specifying details, helmets and visors not being used
Mine-resistant boots		not discussed	France	
Scratch -resistant film for visors	very useful	not discussed	3M product	would extend life of visors
Anti-fog treatment for visors	not needed?	not discussed		warm dry conditions are normal
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		UXO are very old and/or badly corroded.
Information/Info Technology Needs				
High quality internet access.	needed	staff	cost problem	staff officers need better English to make full use of internet resources
Field data recording		not discussed		no apparent means of utilising this
Data distribution and updating		not discussed		no apparent means of utilising this
Map and photograph registration		not discussed		
High resolution aerial photography	potentially useful	staff	?	needs evaluation, could identify where mines have been exposed by wind
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis		not discussed		
Measurement needs				
Dog performance tests	essential if dogs used	staff	Afghanistan, N. Iraq	Evaluation of dog potential needed
MEDDS Improvement		not discussed		
Quality performance measurement		not discussed		
Productivity performance measurement		not discussed		
Operational needs not classified				
Deep mine location and excavation	v. high	staff	R&D needed	Major problem here
Mud flats		not mentioned		
Removing compacted mine and UXO contaminated rubble		not applicable		
Mine Resistant Vehicles	v. high	staff	S. Africa	Staff expressed strong need for use in survey work and route clearance
Triple Canopy Jungle		not mentioned		

Needs Tables - Country Specific

Country or Region of Need	Croatia			
Specific Technical Needs for Deminers Detectors	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	v.high	staff	various (not local)	dogs are being used with machinery to clear vegetation, more are needed, performance tests are becoming an issue with some companies
Sniffer detector	v.high	staff	R&D needed	possibly 30% productivity improvement if reliability can be demonstrated - problems with digs may indicate similar difficulties for vapour-based detectors
Scrub sniffer	v.high	UWA	R&D needed	potentially the most effective way to deal with extensive areas of vegetation which may contain mines
QA detector	v.high	UWA	R&D needed	system capable of checking large areas quickly.
Mineralised soil metal detector	moderate	staff	Trials inconclusive	Problem is known to exist, and several detectors are being evaluated by different groups
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more
Deep target mine detector	limited	staff	R&D needed	Some areas may require this, principally river banks and steep slopes where landslides have buried mines. Large UXO also a problem in some areas
Detector for mines in mud	moderate	staff	R&D needed	many river-bank areas cannot be demined without this capability
Trip wire detector	v.high	staff	R&D needed	need strongly expressed, as this could help reduce time needed for manual clearance, the problem particularly concerning deminers is PROM bounding fragmentation mines. Some non-metallic tripwires, but most contain metal with plastic coating.
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	v. high	staff	Commercial	Several machines in use - this method being widely adopted. Perhaps 20% further productivity gain possible
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	v.high	staff	Commercial, donor	Many groups make extensive use and claim good results. Others claim the work needed to assure complete mine clearance is too expensive and dangerous. CROMAC are enthusiastic and have asked for more machines like this
Backhoe excavators, front-end loaders, possibly armoured.	moderate	UWA	Commercial	Extensive reconstruction work necessary, these machines could reduce time and effort on clearance in ruined residential areas.
Rubble crusher	moderate	UWA	HALO Trust	Power of some fragmentation mines may necessitate heavy armour (PROM-1). No local experience at the moment
Magnetic fragment removal	moderate	UWA	some R&D needed	Could help with reconstructions problems
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		Sticky soil limits ability to pick up fragments, but could help reduce effort needed for manual clearance (when fitted to vegetation clearance machinery).
Saws and vegetation cutting tools	v.high	staff	Commercial	Good quality saws are needed. Deminers often are issued with poor quality tools
Cotton uniforms		not discussed		
Protection from non-explosion hazards	moderate	UWA		cold and wet conditions the major problem
Magnetic probe	limited	UWA		sticky soil, also most fragments are left in ground (probing procedures used)
Low insertion force probe	unknown	UWA	R&D needed	could reduce manual costs by 10%
Smart probe	unknown	staff	Canadian Defence	test results needed
Excavation tools	very useful	UWA	many designs available	HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant on rocky and stony soil areas in south of country. These areas will be important later, not for the time being
Ground and rubble breaker		not discussed		
Ground marking equipment		not discussed		

Needs Tables - Country Specific

Improved personal protective equipment	needed	staff	R&D needed	light weight, comfortable protection from high velocity fragments needed - existing protection helps but better coverage of legs and arms would help reduce injuries from frag. mine accidents
Mine-resistant boots	moderate	staff		desireable for marking minefield boundaries, but some staff think that these give dangerous false sense of security
Scratch -resistant film for visors	limited	UWA	3M product	would extend life of visors
Anti-fog treatment for visors	very useful	UWA		cold, damp conditions frequent
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		UXO are very old and/or badly corroded.
Information/Info Technology Needs				
High quality internet access.	needed	staff	cost problem	Staff officers have E-mail access, but web access too slow for many purposes. Well trained staff could make effective use of internet resources.
Field data recording	useful	UWA		would improve data collection
Data distribution and updating	needed	staff		frustrating problem for staff currently major problem with GIS systems, digital ortho maps can be prepared locally but finance for this is needed
Map and photograph registration	badly needed	staff		potentially valuable in south where vegetation problems are much reduced
High resolution aerial photography	potentially useful	UWA	Commercial	
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis	badly needed	staff	R&D needed	Staff need this to help donors make funds available and evaluate results
Measurement needs				
Dog performance tests	essential if dogs used	staff	local	Evaluation of dog problems needed, performance tests being used on ad-hoc basis by some companies
MEDDS Improvement		not discussed		
Quality performance measurement	needed	staff	R&D needed	Major problem for staff, cause of many disputes and arguments, essential for commercial contract work
Productivity performance measurement	needed	staff	R&D needed	Staff find it difficult to compare productivity data from different organisations
Operational needs not classified				
Deep mine location and excavation	limited	staff	R&D needed	Some problems on river banks and where landslides have occurred
Mud flats	moderate	staff	R&D needed	Problem along river banks (thought to be extensive)
Removing compacted mine and UXO contaminated rubble	moderate	staff		Problem associated with reconstruction work
Mine Resistant Vehicles for civilian use	high potential	UWA	R&D needed	Could help reclaim suspect and lightly contaminate land for use, also potential export market
Triple canopy jungle	high potential	staff	R&D needed	Some very severe vegetation problems, particularly on hillsides

Needs Tables - Country Specific

Country or Region of Need	Egypt			
Specific Technical Needs for Deminers Detectors	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	v.high	UWA	Afghanistan, N. Iraq	possibly 30% productivity improvement possibly 30% productivity improvement, must work with old mines in desert conditions
Sniffer detector	unknown	staff	R&D needed	
Scrub sniffer		not discussed		
QA detector	v.high	not discussed	R&D needed	QA currently difficult
Mineralised soil metal detector		not discussed		
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more many areas cannot be demined without this capability
Deep target mine detector	v. high	staff	R&D needed	many areas cannot be demined without this capability
Detector for mines in mud	moderate	staff	R&D needed	
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)		not discussed		
	limited because of deep mines and UXO		may be provided by USA or Germany	useful in some areas but verification will be difficult, rocky terrain is unsuitable, UXO may damage machine
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).		staff		Mines and UXO are too dangerous to make this feasible in most areas - AP blast mines, grenades are OK.
Backhoe excavators, front-end loaders, possibly armoured.	limited	staff	none	
Rubble crusher		not discussed		
Magnetic fragment removal	limited		R&D needed	Sandy areas with fragments, small UXO.
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards	yes possibly useful			snakes and scorpions, sunburn, dust, problems in mud
Magnetic probe				finding fragments in sandy areas, non magnetic mines
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools	very useful	UWA	many designs available	HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant if improved detection not available
Ground and rubble breaker		not discussed		
Ground marking equipment	potentially useful	not discussed	R&D needed	paint marking on sand could save some time, say 2% improvement, but biggest benefit is likely to be in quality of clearance, and improvement in safety
Improved personal protective equipment	needed	staff	not in Egypt	accident details needed before specifying details, helmets and visors not being used
Mine-resistant boots	needed	staff	France	staff think inflatable overshoes are adequate
Scratch -resistant film for visors	very useful	not discussed	3M product	would extend life of visors
Anti-fog treatment for visors	not needed?	not discussed		warm dry conditions are normal
Universal battery charger		not discussed		
UXO cutter		not discussed		
UXO spinner		not discussed		UXO are very old and/or badly corroded.

Needs Tables - Country Specific

Information/Info Technology Needs

High quality internet access.	needed	staff	cost problem	staff officers need better English to make full use of internet resources
Field data recording		not discussed		no apparent means of utilising this
Data distribution and updating		not discussed		no apparent means of utilising this
Map and photograph registration		not discussed		
High resolution aerial photography	potentially useful	UWA	Air force(?)	needs evaluation, could identify where mines have been exposed by wind
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis		not discussed		
Measurement needs				
Dog performance tests	essential if dogs used	UWA	Afghanistan, N. Iraq	Evaluation of dog potential needed
MEDDS Improvement		not discussed		
Quality performance measurement		not discussed		
Productivity performance measurement		UWA	local	Little appreciation of actual costs - rely on Defence Ministry
Operational needs not classified				
Deep mine location and excavation	v. high	staff	R&D needed	Major problem here
Mud flats	v. high	staff	R&D needed	Major problem here
Removing compacted mine and UXO contaminated rubble				
Mine Resistant Vehicles for Civilian Use				
Tiple Canopy Jungle				

Needs Tables - Country Specific

Country or Region of Need	Jordan			
Specific Technical Needs for Deminers	potential utility	who raised this?	availability	potential benefits
Detectors				
Mine detection dogs	v.high	US military liaison	Afghanistan, N. Iraq	possibly 80% productivity improvement in searching for missed mines
Sniffer detector	v.high	staff	R&D needed	possibly 80% productivity improvement
Scrub sniffer	none	not discussed		minefield locations are known
QA detector	v.high	not discussed	R&D needed	QA currently difficult
Mineralised soil metal detector		not discussed		
Low false alarm rate mine detector	v. high	staff	R&D needed	future productivity improvement 30% or more
Deep target mine detector	v. high	staff	R&D needed	many areas cannot be demined without this capability
Detector for mines in mud		staff	R&D needed	many areas cannot be demined without this capability - areas can be muddy in winter months
Trip wire detector	moderate	not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)		not discussed		could be very useful in thick vegetation, but AT mine rollers would be essential to protect vehicles from known AT mines which are numerous
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	being used now	staff	Commercial or donor	used for risk reduction as part of normal demining process after manual clearance.
Backhoe excavators, front-end loaders, possibly armoured.	very useful	UWA	Commercial or donor	Deeply buried mine areas could be easier to excavate this way
Rubble crusher	none	not discussed		
Magnetic fragment removal	limited		R&D needed	Sandy areas with fragments, small UXO. Could be fitted to other machinery
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools	moderate	not discussed		Could be very useful in thick vegetation
Cotton uniforms		not discussed		
Protection from non-explosion hazards	yes			snakes and scorpions, sunburn, dust, problems in mud
Magnetic probe	possibly useful	not discussed		finding fragments in sandy areas, non magnetic mines
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools			many designs available	mine locations usually known
Ground and rubble breaker	very useful	UWA	not discussed	HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant if improved detection not available
Ground marking equipment	potentially useful	not discussed	R&D needed	no apparent need
Improved personal protective equipment			not in country	paint marking on sand could save some time, say 2% improvement, but biggest benefit is likely to be in quality of clearance
Mine-resistant boots	needed	staff	France	accident details needed before specifying details, helmets and visors not being used
Scratch -resistant film for visors	needed	staff	France	Staff think inflatable overshoes are adequate
Anti-fog treatment for visors	very useful	not discussed	3M product	would extend life of visors
Universal battery charger	not needed?	not discussed		warm dry conditions are normal
UXO cutter		not discussed		
UXO spinner		not discussed		

Needs Tables - Country Specific

Information/Info Technology Needs

High quality internet access.	useful	not discussed	cost problem	staff officers need better English to make full use of internet resources
Field data recording		not discussed		no apparent means of utilising this
Data distribution and updating		not discussed		no apparent means of utilising this
Map and photograph registration		not discussed		no apparent means of utilising this vegetation thick over difficult areas,
High resolution aerial photography	limited use	UWA	Air force(?)	minefield locations are accurately known
UXO render-safe procedures		not discussed		
Socio-economic survey / analysis		not discussed		
Measurement needs				
Dog performance tests	essential if dogs used	UWA	Afghanistan, N. Iraq	Evaluation of dog potential needed
MEDDS Improvement		not discussed		
Quality performance measurement		not discussed		
Productivity performance measurement		UWA	local	Little appreciation of actual costs - rely on Defence Ministry
Operational needs not classified				
Deep mine location and excavation	v. high	staff	R&D needed	Major problem here
Mud flats	moderate	staff	R&D needed	Some problems here along rivers
Removing compacted mine and UXO contaminated rubble				
Mine Resistant Vehicles for civilian use				
Triple canopy jungle				

Needs Tables - Country Specific

Country or Region of Need

Lebanon**Specific Technical Needs for Deminers Detectors**

	potential utility	who raised this?	availability	potential benefits
Mine detection dogs	v.high	UWA	Afghanistan, N. Iraq	possibly 30% productivity improvement
Sniffer detector	v.high	staff	R&D needed	possibly 30% productivity improvement Could help eliminate areas with no contamination
Scrub sniffer	high	not discussed	R&D needed	QA currently difficult
QA detector	v.high	not discussed	R&D needed	Moderate mineralisation problems in some areas
Mineralised soil metal detector	high	UWA	Australia	future productivity improvement 30% or more
Low false alarm rate mine detector	v. high	staff	R&D needed	
Deep target mine detector		not discussed		
Detector for mines in mud		not discussed		
Trip wire detector		not discussed		
Mechanical assistance for deminers				
Ground preparation - vegetation cutter (Flails)	low	UWA	Commercial or donor	Access difficult for machinery, except in Bekaa valley, but farmers have cleared most vegetation
Ground preparation machine (e.g. Flails, Minebreaker, Rhino).	risk reduction	staff	Commercial or donor	In Bekaa valley could be useful risk reduction tool, but trials needed with cluster bomblets Could be useful in reducing clearance costs where large scale soil replacement feasible to save costs of delays.
Backhoe excavators, front-end loaders, possibly armoured.	unknown	not discussed	none	
Rubble crusher		not discussed		
Magnetic fragment removal	limited		R&D needed	Vegetation cover prevents access, but could be useful addition to other mechanised equipment
Personal equipment and tools for deminers				
Water filtration equipment		not discussed		
Saws and vegetation cutting tools		not discussed		
Cotton uniforms		not discussed		
Protection from non-explosion hazards	yes possibly useful			snakes and scorpions, sunburn. current techniques use prodding only, no removal of fragments
Magnetic probe		not discussed		
Low insertion force probe		not discussed		
Smart probe		not discussed		
Excavation tools	very useful	UWA	many designs available	HARC prodder demonstrated, other designs mentioned. Productivity improvement could be significant if improved detection not available
Ground and rubble breaker		not discussed		
Ground marking equipment	potentially useful	not discussed	R&D needed	paint marking on sand could save some time, say 2% improvement, but biggest benefit is likely to be in quality of clearance accident details needed before specifying details, helmets and visors only starting to be used by some deminers
Improved personal protective equipment	needed	staff	not in country	
Mine-resistant boots	needed	staff	France	Staff think inflatable overshoes are adequate
Scratch -resistant film for visors	very useful	not discussed	3M product	would extend life of visors
Anti-fog treatment for visors	very useful	not discussed		cold and damp conditions in winter
Universal battery charger		not discussed		
UXO cutter	limited	not discussed		Likely to be useful, current equipment not known
UXO spinner	limited	not discussed		UXO's are usually removed from construction sites. Neutralisation in place does not seem to be necessary

Needs Tables - Country Specific

Information/Info Technology Needs

High quality internet access. Field data recording Data distribution and updating Map and photograph registration	needed	staff not discussed not discussed not discussed	cost problem	staff officers have good English skills and could make good use of this no apparent means of utilising this no apparent means of utilising this
High resolution aerial photography UXO render-safe procedures	potentially useful very useful	UWA staff	Political problems USA	needs evaluation, could identify where mines have been exposed by weather, but political issues are very difficult because of military occupation of country. Even if assistance provided by Israel, Syrians would probably object strongly and vice versa desperately needed by Army EOD teams for efficient resource utilisation by government
Socio-economic survey / analysis Measurement needs	very useful	researchers	R&D needed	
Dog performance tests MEDDS Improvement Quality performance measurement	essential if dogs used	UWA not discussed not discussed	Afghanistan, N. Iraq	Evaluation of dog potential needed
Productivity performance measurement Operational needs not classified Deep mine location and excavation Mud flats Removing compacted mine and UXO contaminated rubble		UWA not discussed not discussed not discussed	local	Little appreciation of actual costs - rely on Defence Ministry
Mine Resistant Vehicles for civilian use Triple canopy jungle	moderate	UWA not relevant	S. Africa	Agriculture continues in areas contaminated with cluster bombs - protection for farmers could be valuable