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Operational procedures for Animal Detection Systems

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Contents

Foreword

| | |
|---|----|
| Introduction | vi |
| 1. Scope..... | 7 |
| 2. References | 7 |
| 3. Terms, definitions and abbreviations | 7 |
| 4. ADS operational testing and accreditation of ADS organisations | 8 |
| 5. ADS records | 8 |
| 6. Planning for ADS operations | 8 |
| 7. Preparation for ADS operations..... | 9 |
| 7.1 General | 9 |
| 7.2 ADS worksite preparation | 9 |
| 7.3 Safety lanes | 9 |
| 7.4 Search areas..... | 10 |
| 7.5 Control areas and points | 10 |
| 8. ADS operational scenarios | 10 |
| 8.1 Role of animals | 10 |
| 8.2 Clearance application..... | 11 |
| 8.2.1 Search patterns..... | 11 |
| 8.2.2 Safety distances..... | 12 |
| 8.3 Technical survey application..... | 12 |
| 8.3.1 Technical survey deployment concept | 12 |
| 8.3.2 Marking for technical survey | 12 |
| 8.3.3 Safety and movement..... | 12 |
| 8.3.4 Target indications for technical survey | 13 |
| 8.3.5 Recording and reporting | 13 |
| 8.4 Target indications for clearance..... | 14 |
| 8.5 Recording search areas..... | 14 |
| 8.6 Quality management | 14 |
| 9. Environmental factors affecting ADS operations..... | 14 |
| 9.1 Wind | 14 |
| 9.2 Rain | 14 |
| 9.3 Snow | 15 |
| 9.4 Humidity | 15 |
| 9.5 Atmospheric pollution..... | 15 |
| 9.6 Vegetation | 15 |
| 9.7 Channelling of target odours underground | 15 |
| 9.8 Recording of environmental data | 15 |

| | | |
|---------------------|--------------------------------------|----|
| 9.8.1 | Use of a weather station | 16 |
| 10 | Rest and rotation of ADS | 16 |
| 10.1 | General | 16 |
| 10.2 | Length of search periods | 16 |
| 11. | Responsibilities | 16 |
| 11.1 | National Mine Action Authority | 16 |
| 11.2 | ADS organisation | 16 |
| Annex A (Normative) | References | 18 |

Foreword

International standards for humanitarian mine clearance programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of mine clearance, standards were recommended and a new universal definition of 'clearance' was agreed. In late 1996, the principles proposed in Denmark were developed by a UN-led working group and the International Standards for Humanitarian Mine Clearance Operations were developed. A first edition was issued by the UN Mine Action Service (UNMAS) in March 1997.

The scope of these original standards has since been expanded to include the other components of mine action, and to reflect changes to operational procedures, practices and norms. The standards were re-developed and renamed as *International Mine Action Standards* (IMAS).

The United Nations has a general responsibility for enabling and encouraging the effective management of mine action programmes, including the development and maintenance of standards. UNMAS, therefore, is the office within the United Nations responsible for the development and maintenance of IMAS. IMAS are produced with the assistance of the Geneva International Centre for Humanitarian Demining.

The work of preparing, reviewing and revising IMAS is conducted by technical committees, with the support of international, governmental and non-governmental organisations. The latest version of each standard, together with information on the work of the technical committees, can be found at <http://www.mineactionstandards.org/>. Individual IMAS are reviewed at least every three years to reflect developing mine action norms and practices and to incorporate changes to international regulations and requirements

Introduction

Animal Detection Systems (ADS) can be used in different roles within mine action programmes. ADS units are most suitable for land release operations in areas with low concentrations of Explosive Ordnance (EO) contamination. As such, ADS units are well suited for technical survey (TS), clearance of low-density EO contaminated areas, TS/clearance of roads/verges/railways, TS/Clearance of sites heavily contaminated with metal, Battle Area Clearance (BAC) and the Clearance of safe deployment lanes for ADS units and other assets.

Due to the many ways that ADS are used, and the variety of scenarios in which they may be utilised, it is not possible to establish uniform standards that can be applied under all circumstances. ADS are a tool that may be used in land release operations to support TS and clearance. When engaging in land release operations ADS units require accreditation in line with IMAS 07.31. Testing, in accordance with IMAS 07.12 and 07.40, should be used to confirm that individual ADS units satisfy quality requirements, particularly in terms of their capability to detect EO including, landmines and other target objects that may be specified by authorities, customers and other stakeholders.

While ADS is a generic term, only dogs and rats are currently in use. This chapter, however, will cover operational procedures relating to Mine Detection Dogs (MDD) and Mine Detection Rats (MDR) in the context of mine clearance (including the conventional Explosive Remnants of War (ERW)), while Explosive Detection Dogs (EDD) and other operational applications of ADS may be covered in the relevant annexes supporting this chapter. This chapter recognises that dogs may be used as MDD, Technical Survey Dogs (TSD) or both.

Operational procedures for Animal Detection Systems

1. Scope

This standard provides specifications and guidelines for operational procedures to be adopted for Animal Detection Systems (ADS) when used in mine action operations.

For the purposes of this standard, 'Operational Procedures' means procedures to be applied as part of using ADS operationally. They include but are not limited to operational planning and preparation for ADS, search procedures, environmental factors affecting ADS, rest and rotation of ADS units and target indications for technical survey (TS) and clearance.

2. References

A list of normative references is given in Annex A. Normative references are important documents to which reference is made in this standard and which form part of the provisions of this standard.

3. Terms, definitions and abbreviations

A complete glossary of all the terms, definitions and abbreviations used in the International Mine Action Standards (IMAS) series is given in IMAS 04.10.

In the IMAS series, the words 'shall', 'should' and 'may' are used to indicate the intended degree of compliance.

- a) 'shall' is used to indicate requirements, methods or specifications which are to be applied in order to conform to the standard;
- b) 'should' is used to indicate the preferred requirements, methods or specifications; and
- c) 'may' is used to indicate a possible method or course of action.

The term 'National Mine Action Authority' (NMAA) refers to the government entity, often an interministerial committee, in an EO-affected country charged with the responsibility for broad strategic, policy and regulatory decisions related to mine action.

Note: In the absence of an NMAA, it may be necessary and appropriate for the UN, or some other body, to assume some or all of the responsibilities of an NMAA.

The term 'Animal Detection System' (ADS) refers to the combination of animals, handlers, supervisors, managers, equipment, facilities, policies, procedures and other associated functions, that interact to provide a tool intended to detect vapour from Explosive Ordnance (EO). 'Vapour' may include vapour from the case material and other substances as well as from explosives.

The term 'ADS Organisation' refers to any organisation (government, NGO or commercial entity) responsible for implementing mine action projects or tasks with the use of ADS.

The term 'ADS Unit' refers to an animal and its handler (under the direction and monitoring of team/site management).

The term 'Mine Detection Dog' (MDD) refers to a dog specifically trained to detect and indicate vapour from EO, normally in a minefield environment/setting.

The term 'Mine Detection Rat' (MDR) refers to a rat, specifically trained to detect and indicate EO, normally in a minefield environment/setting.

The term 'Explosive Detection Dog' (EDD) refers to a dog specifically trained to locate and correctly indicate the presence of defined explosive substances or other relevant target objects.

The term 'Demining' refers to activities that lead to the removal of Explosive Ordnance.

The term 'Explosive Ordnance' (EO) is interpreted as encompassing mine action's response to the following munitions:

- Mines
- Cluster Munitions
- Unexploded Ordnance
- Abandoned Ordnance
- Booby traps
- Other devices (as defined by CCW APII)
- Improvised Explosive Devices

The term 'Target Object' is used to describe a specified object that ADS units are required to detect during search and clearance operations.

The term 'Test Item' is used for EO that are laid in the test site for detection by the ADS unit.

The term 'Target Odour' is used to describe the scent from the target object or the test item.

4. ADS operational testing and accreditation of ADS organisations

All ADS organisations shall gain organisational accreditation for ADS operations by the National Mine Action Authority (NMAA) / National Mine Action Centre (NMAC) prior to commencing operations. All ADS units deployed to demining operations shall have passed operational accreditation testing, as outlined in IMAS 07.31 and shall satisfy all requirements outlined in IMAS 09.40, before being permitted to conduct live TS and/or clearance operations.

5. ADS records

ADS organisations shall maintain records of important details concerning the health, training and work of all animals in their care. These records provide the ADS organisation and external monitors with a continuous documented record. The following information should be included as a minimum:

- general data about the animal such as breed, sex, genealogy, age (date of birth) and reproductive history, linked to their unique identity (tag, chip etc);
- comprehensive medical history. This should include basic medical statistics of the animal, dimensions weight etc; records of any illnesses, diseases or injuries and the treatment given; dietary requirements; and records of all routine health checks and inoculations, in accordance with IMAS 09.44;
- training records to include the dates, duration and type of training carried out, including refresher training. Details should include instructors/handlers; environmental conditions (weather, atmosphere and site); operating procedures; target objects and test items they have been trained with, and laying details; results of training; an analysis of the animal's performance during training; and
- records of operational testing.

ADS records shall be managed in accordance with the requirements of the NMAA.

6. Planning for ADS operations

When planning ADS operations there are a number of elements that should be considered:

- the possible type of EO. An assessment of the EO hazards should be carried out to ensure that the animals deployed as part of ADS units have been trained and tested for the target object(s) being searched and for or any other hazards that may be present (e.g. tripwires). If any hazards may be present that the ADS unit has not been trained or tested for, the ADS unit should not be deployed in the area until either these hazards have been removed, or the ADS unit have been trained and tested to respond appropriately;
- the number of ADS units available for the task;
- the search procedures to be used;
- the environmental conditions and;
- the task management requirements. The task management requirements will dictate the control and administration areas required (see para 7.5 below).

7. Preparation for ADS operations

7.1 General

Preparation for ADS operations involves:

- ensuring that all training and testing requirements for the ADS units (including accreditation of the ADS organisation) have been carried out and the ADS units are ready for work. Details of the specifications and guidelines for the operational accreditation of ADS organisations are included in IMAS 07.31, general principles requirements and guidelines for ADS are provided in IMAS 09.40 and details on health are described in IMAS 09.44;
- ensuring that if the TS or clearance task is projected to take more than five days, temporary training boxes, lanes or panels in a suitable training area are prepared for on-site maintenance training, taking into account the travel distance from the ADS organisations' facility;
- establishing the ADS worksite. The worksite layout shall be established in accordance with the specifications and guidance included in this standard and IMAS 10.20; and
- ensuring that all necessary support for the operations is in place. Such support will include logistic and administrative support, but shall also include medical support, both for personnel and the animals deployed. IMAS 10.40 specifies the minimum requirements for medical emergency preparedness for mine action operations.

7.2 ADS worksite preparation

In establishing a worksite it is necessary to ensure that:

- the on-site maintenance training site has been installed;
- the minimum safety distances between ADS units can be maintained;
- there are sufficient search areas for the number of ADS units to be deployed on the task;
- any requirements for the management and supervision of the task can be complied with; and
- consideration is to be given to factors such as possible changes in wind direction, the humidity of the soil and vegetation, and areas of high moisture content that may prevent effective search. Other contamination such as multiple target types, garbage, scent from non EO items with similar chemical composition etc, should be also taken into consideration.

7.3 Safety lanes

Safety lanes, which are confirmed as clear of hazards, are used to provide access to and around the worksite. During clearance, safety lanes should not be less than 2.0m wide to allow safe passage for the handler and the Mine Detection Dogs (MDD)/Mine Detection Rats (MDR) , and to allow casualty evacuation by stretcher in an emergency. During TS, safety lanes may not be required and limited

movement in the track searched by the animal may be acceptable. During clearance, safety lanes shall be marked in accordance with the minimum requirements specified in IMAS 08.40.

7.4 Search areas

When ADS units are used for clearance of EO, the most common method of deploying is to divide the area into search boxes, or panels with safety lanes between them. When this system is used, the following rules shall apply:

- clearly marked safety lanes are to be established around search areas. These may be cleared manually or by the ADS units;
- the corners of each search box or panel shall be clearly marked so as to be visible to the handler from all sides;
- when painted markers are used to mark the boundaries of search areas or other ADS working areas, they must be thoroughly dry; and
- the entire area inside the box or panel shall be visible to the handler. If the vegetation is such that the handler is not able to observe the MDD/MDR at all times during the search, the vegetation shall be removed, or the box or panel shall be divided into smaller sections.

When animals are used for TS a variety of deployment methods may be applied, in line with accredited procedures including systematic or targeted use of animals in wider vegetated areas.

7.5 Control areas and points

Control areas or points for the management and supervision of the task shall be established for the ADS worksite in accordance with the specifications and guidance included in IMAS 10.20.

Multiple control points may be established inside Suspected Hazardous Areas (SHA) to assist in the effective deployment of ADS units during TS.

8. ADS operational scenarios

8.1 Role of animals

ADS techniques are normally part of an integrated survey and clearance concept that will contribute to a more efficient land release process. ADS units may be trained in one or more of roles in mine action, including:

- Clearance of medium and low-density minefields;
- TS and clearance on Cluster Munition Remnants (CMR) contaminated areas;
- Battle Area Clearance (BAC);
- TS in support of Non-Technical Survey (NTS) with the aim to define Confirmed Hazardous Areas (CHAs) more accurately;
- TS inside CHAs in conjunction with clearance;
- TS in “buffer zones” with the aim to ensure that no EO exist outside cleared areas; and
- Quality Control (QC) of areas that have been cleared by manual mine clearance or processed by machines.

While some animals may be able to undertake several of the roles above, others have been trained specifically for only one or two roles. Several animals that have been trained in different applications may thus be used on a single task to achieve highest efficiency. Critical analysis must always be

undertaken to identify which ADS units should be used where and how ADS units are trained and deployed for different operational tasks.

8.2 Clearance application

If ADS units are used as the primary detection tool, then all areas are to be searched by at least two different ADS units before being considered as cleared.

As an exception, one ADS unit can be used on its own in support of emergency medical evacuation.

Use of ADS units for clearance requires a more rigorous approach to ensure that all areas have been searched properly, with overlap between each search lane. To achieve this, ADS units must be able to search in straight lanes, which will often require prior cutting of vegetation. This is especially the case when searching for landmines.

During CMR and BAC the use of only one animal to achieve clearance may be deemed acceptable. Decisions on conditions for use of one animal to obtain CMR and BAC shall be made by the NMAA.

An ADS unit may be deployed as a part of an integrated clearance approach in combination with another asset (i.e. mechanical). When this is the case, the NMAA may allow only one ADS unit to be deployed. Such decisions shall be regulated in the National Mine Action Standards (NMAS) and ADS organisations' accredited Standard Operating Procedures (SOPs).

8.2.1 Search patterns

The two most common search patterns currently in use when animals are used for clearance are:

- the box or panel system; The ADS unit searches in a series of straight parallel lanes between 0.3m and 1m wide within a search box or panel. These lanes are typically up to 10m in length. The lanes may originate from any side of the search box or panel (depending on wind direction). Where ADS units are comprised of handlers and MDD, the MDD may search with or without a leash. An MDD may search on its way out from the handler only, or both on its way out and back. Where MDR are used, ADS units will typically search with a leash attached to a string.
- the short-leash (or pole for MDR) system; The animal searches in a series of straight parallel lanes between 0.3m and 0.5m wide within a search box or panel. The lanes may originate from any side of the search area (depending on wind direction). The handler will walk next to the animal in a lane that has been previously cleared while the MDD/MDR searches on the other side of a rope, which is uncleared area.

There are advantages and disadvantages in both the search patterns above, and the search patterns some mine action programmes prefer by searching an area once with the long leash, and once with the short leash system.

The relative advantages are:

- long leash can be faster, especially when the handler has clear oversight of the search lane; and
- short leash makes it easier for the handler to monitor the performance of the animal, to ensure complete search to the end of the lane, and to work in difficult terrain with limited visibility.

The following procedures apply during clearance when searching with ADS units:

- the search shall follow the search pattern described in the ADS organisation's accredited SOPs;

- the ADS unit shall search the whole box, panel or lane with no parts remaining un-checked;
- neither the handler nor any other person shall enter a SHA or CHA before it has been searched by two MDD/MDR, except when a single MDD/MDR search has been deemed an acceptable justification for land release (see para 8.2 above).

8.2.2 Safety distances

IMAS 10.20 provides specifications and guidelines on the establishment of safety distances for demining operations. With ADS operations, the minimum safety distance also ensures that working animals are not distracted by the presence of other animals in the area.

8.3 Technical survey application

Animals can be specially trained to conduct search in vegetated areas. Search patterns may be adapted to the environment. Maximum search distance should be limited by the communication system, the ability of the handler to guide the animal, type of terrain and density of vegetation.

8.3.1 Technical survey deployment concept

While there is no detailed standard system of deployment, two broad approaches shall apply:

- Targeted investigation; The MDD/MDR is guided towards specific hot spots with a high likelihood of contamination. To reach and fully search a hot spot, the handler may need to guide the MDD/MDR towards the hot spot from multiple angles. To achieve this the handler may need to establish several control points inside a wider SHA from where the MDD/MDR can be guided. Control points shall only be constructed within safe ground; and
- Systematic investigation; A systematic search in areas where no likely hotspots can be observed. Systematic investigation is typically undertaken in near parallel lanes with a certain distance between. These lanes may not be straight, and the ADS may mitigate smaller terrain obstacles during the search.

One deployment of ADS Units as a TS asset may combine targeted and systematic investigation.

8.3.2 Marking for technical survey

There is no specific requirement for area marking when TS is applied, search lanes should be recorded and annexed to the survey report. Control points and safe lanes for the deployment of MDD/MDR inside SHAs shall, however, be marked with temporary marking in line with IMAS 08.40 and as described in the demining organisation's SOPs.

8.3.3 Safety and movement

The handler may move into a SHA to establish control points for effective deployment of the MDD/MDR. A precondition for moving into a SHA is that safe walking access has been ensured. Safe walking access can be ensured through:

- A safe lane that has been cleared to the new control point and the control point itself has been cleared. The minimum width of safe lanes should be defined by the NMAA;
- The handler uses inflatable boots and follows the tracks of an MDD/MDR that will also search the control point; and
- At tasks where the likelihood of finding AP mine contamination during TS is considered low, the handler follows in the track of a short leashed MDD/MDR that searches the ground to the control point and the control point itself.*

*A precondition for walking behind a short-leashed MDD/MDR is that the animal has not indicated in front of the handler. If an indication occurs, the spot shall be investigated and confirmed as contamination free before any further forward movement. Alternatively, the MDD/MDR is brought back and a different search lane is established from a different location.

In areas with no risk from landmines but where Explosive Remnants of War (ERW) and CMR may be present, it may be deemed appropriate to walk into the deployment area with no prior need to establish safe lanes. A condition is a prior assessment that defines the risk of detonating ERW/CMR through walking as sufficiently low. The risk of accidental detonation of target objects through walking will vary depending on the type and age of the suspected threat.

8.3.4 Target indications for technical Survey

If the MDD/MDR indicates, the precise location shall be recorded. If the indication spot is visible by the handler, it may be plotted directly on a map.

If the ADS unit is tasked to search in areas where indication spots may not be visible, the MDD/MDR should be equipped with a tracker (typically GPS based).

The handler should use wind and search direction to determine the required area to investigate following an indication. If no target object is found on the indication spot, a 4x4 m box shall be cleared as a minimum before concluding that there were no target objects, during the TS. The location of the box will vary depending on the wind direction, terrain slope and the search direction by the MDD/MDR. Larger boxes may be required.

If a manual deminer is to investigate the indication by an MDD/MDR, the deminer shall clear a safe lane in accordance with the respective NMAS.

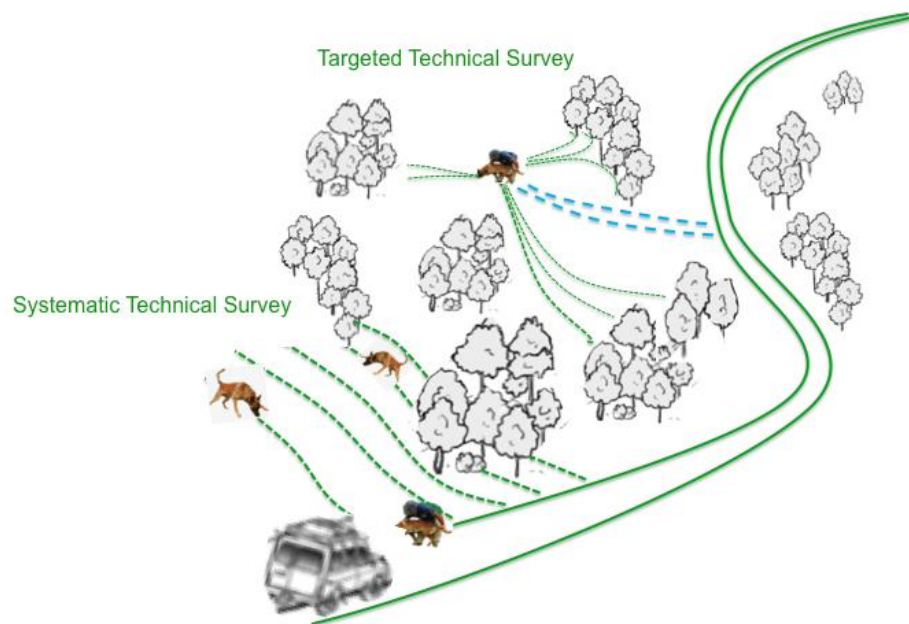


Figure illustrating how ADS units can be deployed for targeted and systematic TS on the same task

8.3.5 Recording and reporting

All areas that have been searched by an ADS unit shall be recorded and added to a survey task folder. Justification for the degree of ground coverage shall also be explained and included in the survey task folder.

8.4 Target indications for clearance

Animals, when indicating, shall not be in physical contact with the target objects, as described in the demining organisation's SOPs. MDR, due to their low weight, are permitted to apply light scratching on the point of indication. If an MDD sits or lies down on the top of the target object, or scratches at the ground during operations, training or testing, it should be withdrawn from operational service and re-trained until the fault is corrected.

The location of an indication by an MDD/MDR should be clearly and accurately marked.

Rewarding indications during operations should be avoided, unless it is possible to judge whether the indication is a true target object. If an animal is rewarded during operations, it shall not be permitted to enter any hazardous or un-searched area during the reward procedure.

When investigating ADS indications during clearance, the minimum area that shall be investigated is a 1.25-meter radius around the point of the indication. This should be extended and/or offset depending on the wind direction and other variables that the handler is aware of.

8.5 Recording search areas

The location of each search area shall be surveyed and recorded along with the details of ADS units that worked in that area.

8.6 Quality management

ADS operations shall be subject to Quality Management (QM) processes in line with IMAS 07.12 and monitoring in accordance with IMAS 07.40.

When ADS Units are used as a Quality Control (QC) tool after the application of another primary search tool, i.e. manual or mechanical operations, one MDD/MDR may be used, provided that clearance and/or TS requirements for the primary search tool, as specified by the NMAA, are achieved.

9. Environmental factors affecting ADS operations

9.1 Wind

Wind has a significant effect on the conduct of ADS operations. A well-trained MDD/MDR should be able to indicate the exact location of a target object with a head or side wind. ADS should, however, not be used during wind speeds that exceed wind speeds where reliable detection has been achieved during training/testing. Increased wind speed increases the inaccuracy of detection and a larger area may need to be investigated around an indication during windy conditions.

9.2 Rain

Light rain has minimal impact on the presence of target odours in the soil and subsequent evaporation may give a short-term release of odour that will improve the detectability of target objects.

Heavy rain washes target odours deeper into the soil or disperses them over a wider area making ADS operations difficult.

After periods of heavy rain, ADS organisations shall test MDD/MDR on test sites of identical soil conditions that have also been subjected to the same heavy rain to ensure that MDD/MDR can still detect target objects in line with the requirements stipulated in NMAS and accredited SOPs. If MDD/MDR are unable to detect target objects reliably then ADS operations shall not take place.

9.3 Snow

ADS units should not be deployed when the ground surface is covered with snow and/or is frozen.

9.4 Humidity

To ensure that ADS units are capable of operating effectively in the prevailing humidity conditions, the MDD/MDR should be trained and tested under these conditions. If conditions change dramatically, additional training and testing should be introduced immediately to ensure that MDD/MDR are able to operate to the required standard under the new conditions.

9.5 Atmospheric pollution

Atmospheric pollution may prevent an MDD/MDR from working effectively and safely, therefore ADS units shall not be used in areas where the atmosphere is obviously polluted by gases, smoke or odours from petroleum products, fertiliser, chemicals, garbage, domestic burning (including vegetation) and traffic or factory exhausts. Prolonged exposure may have health implications for the MDD/MDR and the handler.

9.6 Vegetation

During technical survey, ADS units may be used in areas with medium to high vegetation provided the MDD/MDR has been tested and accredited for this application. During clearance, ADS units should not be used in areas where vegetation prevents searching, or if vegetation restricts the ability of the handler to view and control the search, which needs to be more stringent than during TS.

Vegetation may be removed by cutting, in certain circumstances burning may be considered as an option. Vegetation cutting may disturb the scent picture above target objects and affect the scent plume. When vegetation cutting is required, irrespective of how the cutting is to be carried out, training and testing shall be carried out prior to any ADS operations taking place to determine:

- the safe time delay between cutting and an MDD/MDR search; and
- the indication accuracy of the MDD/MDR after vegetation cutting.

Burning of vegetation may have a negative effect on MDD/MDR detection capability. ADS units shall not be used to search in areas where the vegetation has been burned unless they have been proven capable of detecting target objects in burned areas.

9.7 Channelling of target odours underground

Plants with extensive and widespread root systems, or tunnel systems, (e.g. those made by rodents or insects), could result in target odours being transferred away from a target object or test item. Under such circumstances a larger area should be investigated if nothing is found at the site of an indication.

9.8 Recording of environmental data

ADS organisations should establish procedures for a long-term collection, recording and storage of environmental data during ADS operations and training.

The most useful data to measure and store are temperature, rain (before and during search), humidity in air/soil, wind speed/direction, soil conditions and vegetation type and height.

9.8.1 Use of a weather station

Weather stations should be considered as part of the ADS organisation's 'toolkit'. Weather stations typically measure wind velocity and direction, humidity, air pressure, and temperature in soil and air, but can measure most of the data listed in para 9.8. The measurements can be done manually, but modern weather stations provide automatic recording of data at low cost.

10 Rest and rotation of ADS

10.1 General

Animals are highly individual in their characters. While some MDD/MDR are capable of working for several hours, others need more frequent breaks. Environmental conditions also influence the work of MDD/MDR.

ADS organisations shall establish procedures for the rest and rotation of MDD/MDR that takes into account environmental conditions and the individual natures of the MDD/MDR.

10.2 Length of search periods

The length of search periods should be determined by the handler and supervisor, based on the performance of the MDD/MDR and the conditions under which the ADS unit is working.

11. Responsibilities

11.1 National Mine Action Authority

The NMAA, or an agency acting on its behalf, shall:

- a) establish a clear and sustainable national policy on the use of ADS within the mine action programme;
- b) develop and implement relevant national standards and other guidelines governing the use of ADS within the mine action programme;
- c) accredit ADS organisations as fit to undertake clearance;
- d) develop and implement procedures for the QM of ADS operations (including operational accreditation and the monitoring of performance in the field) within the mine action programme and ensure that all personnel, charged with ADS QM are competent and experienced for their roles within this task; and
- e) assist ADS organisations with the establishment of testing and training areas and other facilities to support the deployment of ADS units.

11.2 ADS organisation

The ADS organisation shall:

- a) gain from the NMAA accreditation to operate as an ADS organisation;
- b) establish SOPs for the use of ADS units in land release operations. These SOPs are to be consistent with relevant NMAS, in the absence of national standards the ADS organisation shall apply the IMAS, or such standards as are specified in their contract or agreement;
- c) maintain and make available documentation of ADS operations as specified by the NMAA;
- d) establish places at each work site for daily on-site training where necessary;
- e) ensure that testing of ADS units is carried out on a regular basis under operational conditions; and

- f) establish systems, procedures and facilities to ensure the occupational and general health care of animals.

In the absence of a NMAA, the ADS organisation should assume additional responsibilities. These include, but are not restricted to:

- a) assisting the host nation, during the establishment of a NMAA, in framing national standards for ADS operations; and
- b) establishing liaison with other ADS organisations to ensure consistency in standards for ADS operations and cooperation in the testing of ADS units.

Annex A (Normative) References

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid ISO or EN:

- a) IMAS 04.10 Glossary of mine action terms, definitions and abbreviations;
- b) IMAS 07.31 Accreditation and operational testing of Animal Detection Systems and handlers
- c) IMAS 07.40 Monitoring of demining organisations;
- d) IMAS 08.40 Marking mine and ERW hazards;
- e) IMAS 09.10 Clearance Requirements
- f) IMAS 09.40 Animal Detection Systems - Principles, requirements and guidelines;
- g) IMAS 09.44 Guide to occupational health and general dog care
- h) IMAS 10.20 S&OH - Demining worksite safety; and
- i) IMAS 10.40 S&OH - Medical support to demining operations.

The latest version/edition of these references should be used. GICHD hold copies of all references used in this standard. A register of the latest version/edition of the IMAS standards, guides and references is maintained by GICHD, and can be read on the IMAS website (www.mineactionstandards.org/). NMAA, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

Amendment record

Management of IMAS amendments

The IMAS series of standards are subject to formal review on a three-yearly basis, however this does not preclude amendments being made within these three-year periods for reasons of operational safety and efficiency or for editorial purposes.

As amendments are made to this IMAS they will be given a number, and the date and general details of the amendment shown in the table below. The amendment will also be shown on the cover page of the IMAS by the inclusion under the edition date of the phrase '*incorporating amendment number(s) 1 etc*'.

As the formal reviews of each IMAS are completed new editions may be issued. Amendments up to the date of the new edition will be incorporated into the new edition and the amendment record table cleared. Recording of amendments will then start again until a further review is carried out.

The most recently amended IMAS will be the versions that are posted on the IMAS website at www.mineactionstandards.org.

| Number | Date | Amendment Details |
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