Proposal

for research

on

Mine Detection Dog Practices and Performance

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Proposed Outcomes

- A comparative assessment of available humanitarian demining operations using dogs. The assessment will incorporate the following components:
  - quantitative analysis of the activities of dogs and their handlers working in field conditions, obtained using standard behavioural sampling methodology
  - summary of interviews with operators and dog handlers, providing an overview of attitudes, experience and field skills
  - overview and analysis of background training procedures for dogs and handlers
  - this study will be the first ever to provide an objective analysis of the activities of mine clearance operations using dogs.
- Development and testing of procedures for standardised testing of mine-detection dogs. The ultimate aim of providing a testing procedure that can be used to assess performance under any conditions is a target objective, but may not be achieved within the 2-year framework of this study.
- Development of recommendations for working towards a standardised measure of performance under any conditions. The views of all stakeholders must be canvassed as a part of this process.
- Facilitation of a network designed to integrate the activities of commercial operators, funding agencies, assessment providers and scientific analysts in relation to assessment issues. The network already exists in embryo form, but needs consolidation, management and integration of a scientific component.
- An objective analysis of the views, recommendations and expectations of all stakeholders in relation to performance assessment of mine detection operations using dogs, in relation to a realistic assessment of the abilities of dogs to meet those requirements.

Problem Statement

Mine detection dogs have been used for at least 40 years. Humanitarian mine clearance programs have used dogs since 1989 (first in Afghanistan and later in other countries). Until recently, their performance was regarded as excellent (within limited operating conditions). However, the recent unsatisfactory performance of dogs in Bosnia and some other countries has raised questions about the ability of dogs to detect mines and other explosive devices reliably, and points to serious weaknesses in our understanding of how dogs detect mines. The failure in Bosnia was in performance tests - most dogs failed to achieve the standard set for the test. However, we do not know with any certainty what the required standard should be. The fundamental problem appears to be the difficulty of linking an accetable general performance standard to detection success under local conditions.

In good conditions, possibly in conjunction with mechanical vegetation clearance, mine detection dogs provide the most cost-effective means of humanitarian mine clearance. However, uncertain and/or unsubstantiated performance outcomes suggest there is a substantial risk in committing funds to mine detection dog programs. At a meeting of parties involved in mine clearance operations using dogs, held in Geneva in March 2000, the following points became clear:

- There are no reliable data available on performance of mine dog clearance operations.
- There are no recognised techniques available for measuring performance of mine dog clearance operations.
- A recent attempt to measure performance in Bosnia indicated a high failure rate (approximately 80% of dogs and handlers failed to find mines and explosives at the test site). It is unclear whether the main source of failure in this attempt was in the dogs and handlers, or in the test itself.
- Performance problems are surfacing in Afghanistan, where confidence in performance had been high – reports of missed mines are appearing and there was a recent accident involving a missed mine and dogs. Missed mines in “cleared” areas may not be detected for some time (even years), thus estimates of clearance success cannot be obtained directly from cleared minefields, and must be estimated using testing procedures.

There is, therefore, an **urgent need** to develop a test or tests that can be used to provide acceptable assessments of performance of mine dogs and their handlers. Until such tests are available, funding agencies will necessarily be cautious about providing significant funds to mine clearance operations using dogs. The development of the tests is a difficult enough task. However, for the test(s) to be acceptable to all stakeholders, its development should involve rigorous indexing criteria that link performance under field conditions to standardisation across sites, yet provide cost-effective implementation for commercial operators. Thus the views and operational requirements of all stakeholders must be canvassed as part of the process of test development. At the Geneva meeting in March, all stakeholders indicated support for such an enterprise.

When the first international standards for humanitarian mine clearance were produced in 1996, the UN and its advisers felt that they were not in a position to incorporate standards on the training and use of mine-detection dogs, due to the limited knowledge and experience available at that time. It was therefore decided to develop separate standards and guidelines for dogs at a later stage, after gaining more experience from mine dog operations. Today, almost three years

later, we are no wiser as to how mine dog operations are best undertaken. The mine dog community has gained a great deal of experience during those years, but views about procedures tend to be contradictory, and commercial considerations and the difficulty of operating under field conditions have resulted in few data being gathered. Clearly, an objective (i.e. scientific) approach to the problem is needed, preferably conducted by researchers who are not constrained by commercial considerations. This project takes that forward-looking step, and offers an opportunity for the funding agency to **support international demining activities at an important grass-roots level, as well as improve accountability and confidence in demining programs that use dogs. These are the primary benefits of this project.**

Through its international aid program, Australia has supported mine detection dog operations in several countries, most recently in Bosnia where serious problems were identified. Here, we outline a proposal that will allow Australia to make a substantial contribution to improving standards of assessment of mine dog operations in all countries.

Aims of this Study

To employ a highly experienced dog training specialist to report on best practice in 4 – 5 mine detection dog operations (e.g. Afghanistan, Northern Iraq, Angola/Mozambique, Balkans). The specialist would visit each operating site for 2-4 weeks with the following objectives:

a) Compare demining operations with "good practice" standards in other uses of trained sniffer dogs, such as narcotics detection.

b) Identify strengths and weaknesses of dog operations within each mine clearance operation.

c) Search for the best practices in each mine detection operation, allowing transfer to other operators.

d) Identify regional operating constraints.

e) Observe local operating practices in the field, as well as interviewing operators and conducting standardised tests on the dogs. Assess dog, handler, and combination personality profiles.

f) Conduct an in depth analysis of training procedures and practices for the dogs used at each location.

g) Gather samples and data to link into related research questions about the ability of dogs to detect mines - such as soil samples, vegetation profiles, and microclimate.

h) Prepare a report providing reference information on procedures and practices in each program.

The final report would provide guidance on “best practice” for mine detection dog operations to assist in obtaining best value for future funds committed in support of mine detection dog programs.

Personnel

The team has two 'arms': i) the demining research group from the Dept of Mechanical and Materials Engineering at UWA led by **A/Prof James Trevelyan**, who will provide logistic support, experience, contacts and connections in the world of demining; and ii) an animal behaviour specialist (see below). We have also had preliminary discussions with appropriate specialists from within the academic community at UWA who will provide expertise in soil chemistry and botany.

The question of how dogs actually detect mines and the influence of local conditions on detectability are important research topics that potentially will influence the development and implementation of testing procedures. In collaboration with overseas groups such as that led by Dr Paul Waggoner (Auburn University, USA), we anticipate developing research programs on these topics in parallel with the program proposed here. Dr Waggoner's group has developed procedures for testing the olfactory detection skills of dogs under standardised conditions.

The animal behaviour specialist is **Dr Ian G. McLean**, who originally trained as a biologist specialising in behaviour and ecology. He offers the following skills:

- He has conducted observational and experimental research on many different types of animal under all the field conditions likely to be encountered in this program. For example, he has lived and worked in remote field camps in northern Canada (cold, dry), central Australia (hot, dry), Saudi Arabia (hot dry), subantarctic islands (cool, wet), and southwestern New Zealand (temperate, very wet).

- Although primarily an animal biologist, he has done several studies on plant communities requiring assessment of community structure.

- He has worked as a government scientist (research ecologist), academic (teaching animal behaviour, animal psychology, conservation biology, environmental science) and private consultant (dealing with problem dogs).

- He has substantial leadership and research management experience, having worked with and led research teams of up to 20 personnel ranging from research students to senior scientists.

- He has extensive hands on experience with dogs, having used trained dogs as a tool in his research programs for many years. He has written a book on dog training to accompany his course on dog behaviour, taught through the UWA extension program. His experience dealing with problem dogs as a consultant means that he is accustomed to watching and assessing dogs, and dealing with their handlers/owners.

- He has worked for 25 years as a guide on ecotourism operations, thus is accustomed to dealing with people under conditions that are sometimes trying.

- He has published over 70 scientific articles and many articles in the popular literature, thus is an accomplished writer and very experienced at designing research, and collating, analysing and presenting data.

- He is currently completing a research project on the development of behaviour in German Shepherd dogs which has involved extensive observational research on the dogs themselves, as well as regular interviews with the dog owners over an extended period. German Shepherd dogs are the breed most frequently used in mine clearance operations.

- He is an experienced video and still photographer and has used video in many research projects: he has been a semi-professional photographer for many years. Video and still photography are important data-gathering methods to be used in this project.

Dr. McLean's skills and experience make him ideally and probably uniquely qualified for this work. He brings to the project a unique combination of extensive hands-on experience with dogs, impeccable scientific credentials, training in animal behaviour, animal psychology and environmental science, and extensive field experience. He is also available – potentially a significant constraint for establishing a project such as this.

The Mechanical Engineering team know staff in most of the major mine detection dog operations directly through personal contacts. They have the support of major international organisations such as the Geneva International Centre for Humanitarian Demining (GICHD), RONCO (in the USA, now the sole supplier of demining services to the US Department of State), and the Mine Action Program for Afghanistan (which runs the largest mine action dog operation in the world). Preliminary agreements for collaboration and cooperation have already been made with the two major players: Dan Hayter of Global Training Academy (the main RONCO consultant for dog operations) and NOKSH (the Norwegian Peoples Aid program). Both organisations will be visited during this program.

A/Prof. Trevelyan recently attended the first meeting of the international advisory group of experts directing the Geneva International Centre for Humanitarian Demining study on Mine Detection Dog Performance, established for the UN Mine Action Service (6-7 March, 2000). At that meeting, there was substantial agreement on the need for properly designed scientific research on the problem of performance of dogs undertaking demining activities, with the specific objective of developing standards to support commercial operations. The operators themselves supported the principle of researchers observing their operation and gathering data in order to work towards best practice recommendations. A verbal version of this proposal was tabled at the meeting and received enthusiastic support. Thus substantial international agreement required for implementation of this research program has already been obtained. We propose to send Dr McLean to the next meeting scheduled in September.

Dr. McLean's CV is attached to this proposal.

Methodology

At this stage of project development the following comments represent an indicative outline of methodology that will necessarily be refined with experience in the field, and in discussions with other project partners.

- Dr McLean will spend about 2 weeks on site at each demining operation.

- Detailed observations of the demining teams will be undertaken, with the primary aim of understanding the dynamics of the team. Preliminary data on activity patterns, including actual time spent searching for mines, are already available from one operation in Bosnia (S. Solomon, pers. comm.), and additional equivalent observations will be made. However, the new data set will be expanded to incorporate a detailed behavioural analysis of the team while actually searching for mines using quantitative behavioural sampling techniques.

- Dog handlers will be observed with their dogs both while working, and at other times (if they spend leisure time with the dogs).

- Dog handlers will be interviewed in order to understand the following background perspectives:
  - their personal motivation
  - their experience with and knowledge about dogs
  - their attitudes towards dogs
  - their background preparation for this work generally, and for the current local conditions specifically, including the extent of company-provided training
  - their attitudes towards their working conditions, including attitudes towards the beneficiaries of their work (i.e. the local people for whom the land is being cleared)
  - their understanding of dog training principles
  - their application of dog training principles

1) The dogs will be tested using a standard test. However, the dogs are also tested regularly (possibly daily) by the operators and those tests will also be monitored and details documented. Ideally, a standard test would be conducted at the beginning and end of each working day. Details of such tests are being developed in consultation with the demining operators.

2) Whenever possible, the following will be recorded at sites at which mines are detected, preferably either at the time that the mine is detected, or under equivalent conditions (e.g. at the same time of day when similar weather prevails):
   - a summary analysis of vegetation structure within 2 m of the mine
   - microclimate effects such as i) a temperature profile from 0.5 m above the ground to the depth within the soil at which the mine occurred; ii) wind direction and speed at ground level; iii) a humidity profile from 0.5 m above the ground to ground level; iv) a standard volatility measure at ground level (if a simple measure can be identified).

3) There will be a strong focus on gathering quantitative data that can be used comparatively across demining operations.

Why should Australia fund this study?

Australia has made a significant commitment to demining (Au$100 million between 1996 and 2003), part of which has been used (and will be in future) for mine detection dog programs. Australia has a significant interest in obtaining the best possible performance from these programs. The cost of this study is small compared with the benefits likely to result from it. There should be direct benefits to Australia through obtaining better value for money spent on demining programs in future, and also benefits to the international community.

The international demining community has requested such a study. The study program being undertaken by GICHD has only received funds for some work on dog training in Norway, literature collection, and proposing some interim standards. What we are proposing here would greatly improve the quality of the work done by GICHD and its partners. The research program is being funded by Norway at the moment, and most of the work undertaken will be based in

Norway for that reason. If this study is funded, it will be integrated with the GICHD study so it becomes part of the internationally coordinated effort to address the general problem of using dogs to detect mines.

Are there other institutions in Australia with the necessary capabilities?

Our research on humanitarian demining has progressed to the point where A/Prof Trevelyan's group is internationally recognised as the leading university research group on humanitarian demining. We have received approximately Au$250,000 in funding from the US Defense Department and Au$50,000 in private funding annually since 1997. Our web site is recognised as a reference site on the subject. No other research centre on Australia has comparable expertise.

In combination with Dr. McLean's extensive scientific and practical experience with dogs, we submit that there are no other groups in Australia with comparable capabilities to perform this work.