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The procurement process

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Foreword

In July 1996, international standards for humanitarian mine clearance programmes were proposed by working groups at a conference in Denmark. 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 into *International Standards for Humanitarian Mine Clearance Operations*. A first edition of these standards was issued by the UN Mine Action Service (UNMAS) in March 1997.

This IMAS reflects changes to operational procedures, practices and norms that have occurred over the past three years. The scope of these standards has been expanded to include the other components of mine action, in particular those of mine risk education and victim assistance.

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 is the office within the United Nations Secretariat responsible for the development and maintenance of international mine action standards (IMAS).

The work of preparing, reviewing and revising these standards 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/>. IMAS will be reviewed at least every three years to reflect developing mine action norms and practices, and to incorporate changes to international regulations and requirements.

Introduction

This standard provides a conceptual overview of the step-by-step procurement process for mine action equipment and gives guidance on the appropriate application of such a process. Detailed guidance on the preparation and staffing, and examples of, of the principal documentation that supports the procurement process is also provided.

The process that leads to the procurement and subsequent use of equipment in mine action projects and programmes, consists of a number of definite stages and decisions. These are explained in this standard.

The procurement process

1 Scope

This standard provides a conceptual overview of the ideal procurement process and provides guidelines for its application.

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 and definitions

A list of terms and definitions used in this standard is given in Annex B. A complete glossary of all the terms and definitions used in the IMAS series of standards is given in IMAS 04.10.

In the IMAS series of standards, the words 'shall', 'should' and 'may' are used to indicate the intended degree of compliance. This use is consistent with the language used in ISO standards and guidelines.

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

4 The procurement process

4.1 Introduction

The ideal procurement process is shown diagrammatically at Annex C. In theory, every equipment project should pass through each stage of the process sequentially. In practice, the process is flexible, and some stages will overlap or may even be omitted, particularly in the case of small projects with limited engineering risk. Each project will be different and must be treated on its merits.

Unlike the classic military procurement process which is necessarily centralised, the procurement of mine action equipment should be decentralised, with maximum participation from the User, industry and the donor community. There should be a continuous dialogue between the stakeholders to ensure the early fielding of appropriate, affordable and safe equipment.

4.2 Concept formulation

Concept Formulation is the first stage of the Procurement Process, and covers the period of the emergence of the idea for a project to the initial statement of operational need. Ideas will crystallise from the constant interplay of the Users, programme management staff, donors, industry, academia and the military community. Some of the factors that contribute towards the emergence of an idea include:

- a) the need to replace inadequate and/or obsolete equipment for reasons of safety and/or cost-effectiveness;
- b) a change in policy or procedures requiring a new or modified capability;
- c) a new or re-defined mine threat;
- d) a technological advance - which provides a new or modified capability;

- e) a proposal by industry, developed principally for profit; and
- f) a proposal from academia, possibly derived from research related to a different application.

Concept Formulation should end with a preliminary statement of the operational need (SON), prepared by the originator of the idea or by a Sponsor acting on behalf of the originator. The SON should be a broad statement of operational needs based on an assessment of current capabilities and predicted future requirements. It should not be too prescriptive at this early stage in the procurement process, as that could limit the range of possible solutions. The format and staffing of SONs is discussed in detail in Annex D.

At this stage in the procurement process an attempt should be made by UNMAS to establish whether the SON is based on a local operational need or whether it has a wider and more universal application. For global equipment requirements it may be appropriate for UNMAS, or an agency acting on behalf of UNMAS, to become the project Sponsor.

4.3 Analysis and articulation of the equipment requirement

4.3.1 Preliminary study

Once a need has been identified, a Preliminary Study should be carried out by the project Sponsor. Its purpose is to give an indication of the practicability of the idea in terms of technological possibilities and cost. The study should be no more than a mind-clearing exercise to assist the Sponsor to draft the Statement of Tasks and Output (STO), although expert advice should be sought as required.

For some equipment projects a Preliminary Study alone may not be sufficient. In these cases Technology Demonstrator Programmes (TDPs) should be considered. These bridge the gap between successful research and specific project developments. Their purpose is to reduce the project cost, risk and time by demonstrating, in advance of project development, that technology can be translated into operationally effective systems. They are particularly relevant when there would be substantial risk in development or when the User needs convincing of the potential value of innovative or revolutionary technology. Funding for TDPs may present a problem at this early stage of a project, before a consensus has been achieved on the need, application and affordability.

4.3.2 Statement of tasks and output (STO)

The STO should be prepared by the Sponsor based on the findings of the Preliminary Study. Its purpose is to articulate the User's needs in broad terms, giving the tasks of the equipment and the key characteristics, with the emphasis on the output required rather than the means of achieving it, so as to enable full consideration of alternative solutions. The STO should explain the anticipated concept of use of the equipment. It should define the target parameters of the equipment solution, such as the critical weight and dimensions (for transportation), manpower constraints, (numbers and skills available), in-service date and predicted life span.

The format and staffing of STOs is discussed in detail in Annex E.

4.3.3 Feasibility studies

When the STO has been fully staffed and comments received, the Sponsor should make a decision on whether or not to proceed. For small equipment projects involving minimal costs and engineering risk, it may be possible to proceed directly to the development stage or even to an evaluation of OTS equipment. Otherwise it shall be necessary to carry out a Feasibility Study (FS). The purpose of a FS is to establish the feasibility of the STO in terms of technology, cost and time. In addition, a FS should:

- a) address the alternative solutions, showing the advantages and disadvantages of each in terms of performance, availability, reliability and cost, and identify the key problem areas;

- b) produce an outline development plan;
- c) estimate the likely manpower requirements and training implications; and
- d) estimate the life cycle ownership and operating costs.

The cost and duration of the FS shall depend upon the degree of engineering risk. Typically, for a major project, the cost may be 0.5% of the total predicted development cost and a duration 6-9 months. In some cases, particularly where advanced techniques are proposed, experimental and practical work may be needed to confirm the theory and this will increase both the time and cost of the FS.

4.3.4 Statement of requirement (SOR)

Based on the findings of the FS, the Sponsor should develop the STO into a Statement of Requirement (SoR). The SoR provides a detailed statement of the characteristics and performance expected of the equipment, based on the preferred solution. It provides those concerned with endorsing the project (be it at local, national or international level) with a full justification of the requirement, and a statement of estimated costs, technical factors and timings, as a basis for a decision on whether or not to proceed. The SoR also provides industry with sufficient detail for design work to be undertaken (or modification to be made to OTS equipment) including the need to satisfy all relevant standards.

At this stage it is vital that the Sponsor makes a clear distinction between essential requirements and *desirable* requirements. This distinction is important during the design and development stage when there is a need to focus on the *essential* requirements, sometimes at the expense of the *desirable* requirements. Failure to draw a clear distinction at this stage may result in a solution that is 'over-specified'; this invariably leads to additional costs and risk.

It is also necessary at this stage to make a clear distinction between *generic* requirements (i.e. the performance and environmental characteristics which will be common to all planned uses of the equipment) and *local* needs, (i.e. the performance and characteristics which reflect local environmental conditions, operating procedures and operational requirements). The aim should be to maximise the *generic* requirements. Wherever possible, the *local* requirements should be met by relatively simple adjustments or modifications to major assemblies (e.g. raising or lowering the ground clearance of vehicles), by the addition of appliqué sub-assemblies (e.g. adding ceramic armour against shaped-charge anti-tank mines) or by software changes (e.g. optimising the performance of sensors against a local mine threat).

The format and staffing of SoRs is discussed in detail in Annex F.

4.4 Development, testing and evaluation

The Development stage is normally further divided into a number of sequential activities and decisions which together provide effective management control of the project, particularly over costs and engineering risk. For most mine action equipment projects, two principal groups of activities can be identified: *preliminary development (PD)* and *full development (FD)*.

4.4.1 Preliminary development (PD)

PD involves the planning, design and engineering work necessary to explore areas of technical uncertainty and to provide detailed estimates of duration and cost before the decision to proceed to FD is made. During PD a relatively flexible relationship shall exist between the technical specification and the operational requirements. The aims of PD are:

- a) to verify the scientific and technical approaches identified during earlier feasibility studies, including the identification and investigation of high risk areas and problems that need to be overcome prior to FD;
- b) to analyse the possible trade-offs between performance, cost, in-use logistic support and manpower issues (numbers, qualifications and training needs). This may necessitate changes to the SOR; and

- c) to provide a realistic assessment of the cost and duration of FD, including trials and evaluation.

PD is normally undertaken by industry. For those equipment projects that originate from industry or academia, then the PD is likely to be conducted and funded by the originator. For other projects, funding may need to be identified and a contractor selected by the Sponsor, normally as a result of competitive tendering.

The depth and scope of PD depends on the size, complexity, degree of engineering risk and cost of the project. Indeed, for major projects it may be necessary to split PD into phases, with a review being conducted by the Sponsor at the end of each phase. This progressive approach allows close scrutiny of the development and minimises the commitment of funds during the period of greatest uncertainty.

The output of PD should be a comprehensive report prepared by the PD contractor, addressing the aims previously defined. This shall include detailed proposals for FD of the preferred technical solution, with risks quantified, and outline proposals for subsequent production, in-use logistic support and special training.

The Sponsor shall evaluate the PD report, if necessary with the assistance of independent technical experts. It is also possible at this stage that the Sponsor may need to make changes to the SoR based on lessons learned from the PD.

4.4.2 Full development (FD)

FD involves all the engineering processes, trials and tests to establish the detailed final design to enable full production to commence. This should include the manufacture of models, prototypes and in some cases pre-production equipment for User field trials. It should include the preparation of all necessary information, drawings, full logistic support in the form of handbooks, documentation, spares, test equipment, tools and a full User training package. It should also involve the necessary tests, trials and evaluation leading to Acceptance and/or Certification of the equipment.

4.4.2.1 Testing and evaluation

The purpose of a trial is to gather quantitative data. Whenever practicable, the quantity of data provided should be sufficient in statistical terms to ensure that the results have not arisen from chance. The data can thus be used with confidence to support valid conclusions and recommendations.

Testing and evaluation (T&E) of equipment should be conducted to prove and/or confirm system performance, or sub-system (component) performance before incorporation into new or modified equipment. The requirements, categories, conduct and management of T&E are discussed in detail in IMAS 03.40 Test and evaluation.

4.4.2.2 Acceptance

The Sponsor is responsible for 'accepting' the equipment as suitable for universal use in mine action, having been satisfied through T&E that it meets the User requirement, as defined in the SoR, or if there are shortcomings that these are acceptable. Provisional acceptance may be given by the Sponsor pending the correction of identified problems. National acceptance restricts the equipment to national use only. Local acceptance restricts the equipment to local use only.

4.4.2.3. Certification

'Certification' is a particular form of acceptance normally initiated by an equipment manufacturer, (i.e. when a manufacturer has identified a potential requirement, has designed and developed a product, and seeks certification that it meets the predicted performance, satisfies the appropriate standards, is reliable and safe). Certification should normally be conducted at an approved T&E establishment. (See IMAS 03.40 Test and Evaluation). The manufacturer may be required to meet the full costs of certification, assisted as appropriate by donors or private venture funding.

4.4.2.4. Production

Planning for production is a key part of FD. This is essential not only to enable a smooth transition from development to production, but also to ensure that the final product is suitable for field use. Before the commencement of full production, development should have proceeded to the point where there is sufficient confidence that a standard acceptable to the User can be achieved. Resources committed to production should be kept to a minimum in order to reduce the risk of unnecessary expenditure, before confidence in the design has been established. If it is decided for operational or commercial reasons to commence manufacture before full development is complete, it is essential that the risk of so doing is quantified and the implications fully assessed.

4.4.3 Management of risk

The procurement of equipment for mine action programmes involves varying degrees of innovation, uncertainty and engineering risk. The effective management of risk by the Sponsor throughout the procurement process improves the likelihood of the equipment being delivered on time and to cost, and will meet its performance objectives.

4.5 Application of the process

This standard has described the 'ideal' procurement process for mine action equipment, and in theory every equipment project should pass through each stage of the process sequentially. In practice, the process is flexible, and some stages will overlap or may even be omitted, particularly in the case of small projects with limited engineering risk. Each project may be different and they shall each be treated on their relative merits.

5 Staffing

Projects are likely to be initiated by the national MACs, as they are closest to the needs of the User. For projects that are enabled through innovative technology, it may be appropriate for the developer of that technology to act (at least initially) as Sponsor. For global equipment requirements it is likely that UNMAS should be best positioned to become project Sponsor.

The Sponsor has overall responsibility for the project, from the identification of the need to acceptance of the equipment into service. The sponsor shall ensure that all documents are carefully drafted and are then circulated for comment to all those who can add value to the project. The documents should be amended to reflect the comments and observations.

At the Washington Conference on Humanitarian Demining in May 1998, it was agreed that UNMAS should act as focus, secretariat and 'clearing house' for all mine action technologies. This includes providing international visibility for all equipment procurement projects; it is particularly important that projects raised at local and national level are given wide visibility, as a similar need may exist elsewhere. UNMAS maintains a portfolio of all formal equipment projects, and Sponsors are encouraged to provide copies of all relevant documentation.

6 Responsibilities

6.1 United Nations

The United Nations shall be responsible, within available resources, for:

- a) the development of strategic policy for the development of mine action technology;
- b) the coordination between donors, users, sponsors and developers;
- c) the development of UN priorities and principles for investment in mine action technology; and
- d) the staffing and conduct of technical feasibility studies.

6.2 National mine action authority

The national mine action authority shall be responsible for

- a) establishing and maintaining national standards, regulations and procedures for the procurement of mine action equipment. These procedures should be consistent with IMAS, and other relevant national and international standards, regulations and requirements.

6.3 Mine action organizations / the Users

Mine action organisations (the Users) should:

- a) establish SOPs which enable mine action procurement projects to be conducted effectively and efficiently; and
- b) participate in the development of statements of operational need (SON) and statements of operational requirement (SOR).

6.4 Donors

Donors should:

- a) ensure that full and formal risk assessments are developed prior to investment in research and development activities; and
- b) ensure that the minimum duplication of effort exists between competing research and development programmes.

6.5 Research and development organisations and industry

The mine action technology research and development organisations and related industry should:

- a) liaise with research and development programmes in similar technology areas, (within the bounds of commercial confidentiality);
- b) try to establish complimentary and focused, rather than competing, areas of research.

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 03.10. Guide to the procurement of mine action equipment;
- b) IMAS 03.30. Guide to research of mine technology;
- c) IMAS 03.40. Test and evaluation of mine action equipment;
- d) DEF STAN 00-25; and
- e) DEF STAN 00-35 (Part 2).

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/). National mine action authorities, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

Annex B (Informative) **Terms and definitions**

B.1.1

acceptance

the formal acknowledgement by the sponsor that the equipment meets the stated requirements and is suitable for use in mine action programmes. An acceptance may be given with outstanding caveats

B.1.2

collaboration

in the context of mine action equipment procurement, the term refers to an activity which applies solely to the **procurement** of common **equipment** by two or more organizations.

B.1.3

commercial off the shelf (COTS)

in the context of mine action equipment procurement, the term refers to an **equipment** that is available direct from the manufacturer and requires no further development prior to introduction into service apart from minor modifications.

B.1.4

commonality

in the context of mine action equipment procurement, the term refers to a state achieved when groups of individuals or organizations use common procedures and/or **equipment**.

B.1.5

compatibility

in the context of mine action equipment procurement, the term refers to the capability of two or more components or sub-components of **equipment** or material to exist or function in the same environment without mutual interference.

B.1.6

concept formulation

the first stage in the procurement process, and covers the period of the emergence of the idea to the initial statement of the operational need.

B.1.7

cost-effectiveness

an assessment of the balance between a system's performance and its whole life costs.

B.1.8

development

the stage of the project (and its associated costs) prior to production concerned with developing a design sufficiently for production to begin.

B.1.9

donor

all sources of funding, including the government of victim states.

B.1.10

equipment

a physical, mechanical, electrical and/or electronic system which is used to enhance human activities, procedures and practices.

B.1.11

feasibility study

a study to establish the feasibility of the Statement of Tasks and Output (STO) in terms of technology, costs and time.

B.1.12

full development (FD)

the procedure containing all of the engineering processes, trials and tests necessary to establish the final detailed design to enable full production to commence.

B.1.13

generic requirement

the performance and environmental characteristics which will be common to all planned uses of the proposed equipment.

B.1.14

hardware

equipment with physical size and mass; as opposed to **software**

B.1.15

International Organization for Standardization (ISO)

Note: A worldwide federation of national bodies from over 130 countries. Its work results in international agreements which are published as ISO **standards** and **guides**. ISO is a NGO and the standards it develops are voluntary, although some (mainly those concerned with health, **safety** and environmental aspects) have been adopted by many countries as part of their regulatory framework. ISO deals with the full spectrum of human activities and many of the tasks and processes which contribute to **mine action** have a relevant standard. A list of ISO standards and guides is given in the ISO Catalogue [www.iso.ch/infoe/catinfo/html].

Note: The revised mine action standards have been developed to be compatible with ISO standards and guides. Adopting the ISO format and language provides some significant advantages including consistency of layout, use of internationally recognised terminology, and a greater acceptance by international, national and regional organizations who are accustomed to the ISO series of standards and guides,

B.1.16

investment appraisal

the process of defining the objectives of expenditure, identifying the alternative ways of achieving those objectives and assessing which way is likely to give best value for money.

B.1.17

local requirement

the performance and characteristics of the proposed **equipment** which reflect local environmental conditions, operating procedures and operational requirements.

B.1.18

memorandum of understanding (MoU)

a document used to facilitate a situation or operation when it is not the intention to create formal rights and obligations in international law but to express commitments of importance in a non-binding form.

B.1.19

national mine action authority

the government department(s), organization(s) or institution(s) in each mine-affected country charged with the regulation, management and coordination of **mine action**.

Note: In most cases the **national mine action centre** (MAC) or its equivalent will act as, or on behalf of, the national mine action authority.

Note: In certain situations and at certain times it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all the functions, of a national mine action authority.

B.1.20

operational analysis

operational research

a field of research that applies scientifically based quantitative and qualitative analysis to assist management decisions.

B.1.21

operational research

see operational analysis.

B.1.22

post design services (PDS)

further services such as ongoing development and modification of **equipment**, subsequent to the acceptance of the **equipment**.

Note: PDS may be used after the initial contract in order to update the equipment in response to changing circumstances and requirements.

B.1.23

preliminary development (PD)

the planning, design and engineering work necessary to explore areas of technical uncertainty and to provide detailed estimates of duration and cost before the decision to proceed to full development is made.

Note: During PD a relatively flexible relationship must exist between the technical specification and the operational requirements.

B.1.24

preliminary study

a study to give an indication of the practicability of the idea in terms of technological possibilities and cost.

B.1.25

procurement

the process of research, development and production or purchase which leads to an **equipment** being accepted as suitable for use, and continues with the provision of spares and post design services throughout the life of the **equipment**.

B.1.26

prototype

an equipment, component or sub-component built as nearly as possible to the final design and build standard.

Note: Prototypes are used to aid development of the final production standard and/or to demonstrate performance or specification compliance.

B.1.27

reliability

the ability of an equipment, component or sub-component to perform a required function under stated conditions for a stated period of time.

B.1.28

research

the systematic inquiry, examination and experimentation to establish facts and principles.

B.1.29

sponsor

the sponsor of an equipment trial is the authority requiring the trial to be carried out.

Note: This is most likely to be an international organisation, national mine action centre, donor or demining organisation.

B.1.30

standing operating procedures (SOPs)

standard operating procedures

instructions which define the preferred or currently established method of conducting an operational task or activity.

Note: Their purpose is to promote recognisable and measurable degrees of discipline, uniformity, consistency and commonality within an organization, with the aim of improving operational effectiveness and safety. SOPs should reflect local requirements and circumstances.

B.1.31
statement of need (SON)

the document that describes the User's operational needs.

Note: The SON should be prepared by the User who has identified the need, or by a Sponsor acting on a User's behalf.

B.1.32
statement of requirement (SOR)

the document that provides a detailed statement of the characteristics and performance expected of the equipment, based on the preferred solution.

B.1.33
statement of tasks and outputs (STO)

the document that articulates the User's needs in broad terms, giving the tasks of the equipment and the key characteristics, with the emphasis on the output required rather than the means of achieving it, so as to enable full consideration of alternative solutions.

B.1.34
test

determination of one or more characteristics according to a procedure. [ISO 9000:2000]

B.1.35
test and evaluation (T&E)

activities associated with the testing of hardware and software.

Note: Activities include the formation and use of procedures and standards, the reduction and processing of data and the assessment and evaluation of test results and processed data against criteria such as defined standards and specifications.

B.1.36
trial

a series of **tests** organised in a systematic manner, the individual results of which lead to an overall evaluation of a component, **equipment** or system.

B.1.37
United Nations Mine Action Service (UNMAS)

the focal point within the UN system for all mine-related activities.

Note: UNMAS is the office within the UN Secretariat responsible to the international community for the development and maintenance of International Mine Action Standards (IMAS)

B.1.38
user

the individual or organisation that will operate the equipment.

Note: For the purpose of mine action, the user could also be defined as "a composite body of informed and authoritative opinions on the needs of national commercial and NGO users, today and in the future".

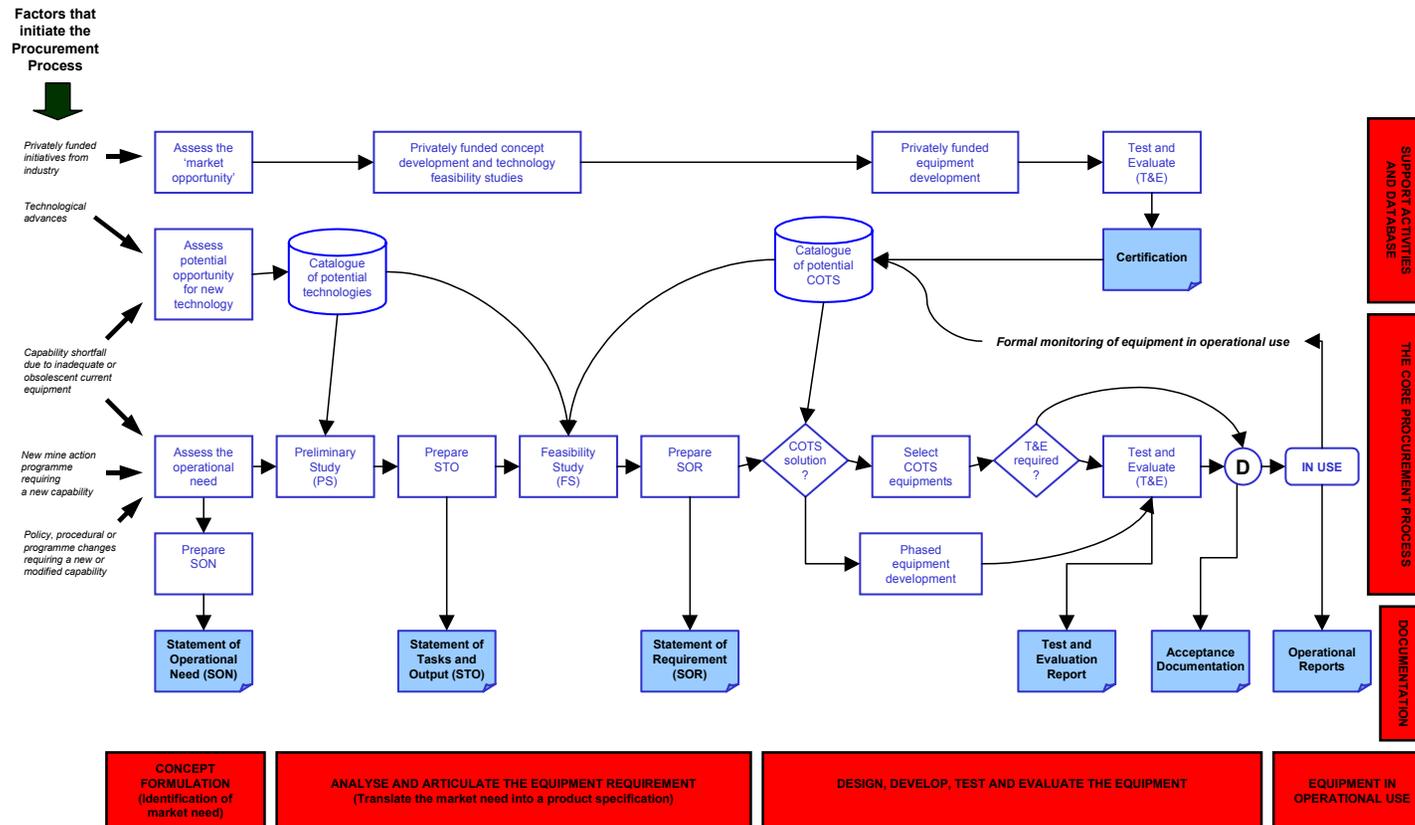
B.1.39
validation

the act of ratification that takes place after a process of verification.

B.1.40
verification

the process of test and evaluation that is planned to result in demonstration, or otherwise, of compliance with, or validation against, defined requirements.

Annex C (Informative) Ideal procurement process for mine action technology



Annex D (Informative) **Statement of operational need (SON)**

The purpose of the SON is, quite simply, to describe the User's operational needs. These needs may come from a change in policy or procedures requiring a new or modified capability, or the need to replace inadequate or obsolete equipment for reasons of safety and/or cost effectiveness, or in response to a new or re-defined threat.

The SON should be prepared by the User who has identified the need, or by a Sponsor acting on behalf of the User. The SON should not be too prescriptive at this early stage in the procurement process, as that could limit the range of possible solutions. The style and clarity of writing is important as many who read, comment and act on the document may have no detailed knowledge of mine action equipment, practices and procedures.

SONs should be based on the general format given at Appendix 1 to Annex D, modified as necessary to reflect the particular operational problem. The SON should be short and concise, normally no more than four pages, although additional detail can be added as an annex.

At this stage in the procurement process an attempt should be made by UNMAS to establish whether the SON is based on a local operational need or whether it has wider and more universal application. For global equipment requirements it may be appropriate for UNMAS, or an agency acting on behalf of UNMAS, to become project sponsor.

Appendix 1 to Annex D
(Informative)
Layout of statement of operational need (SON)

**Address Block
of the Sponsor**

Date

Statement of operational need
[Title]
[Reference number]

1 Introduction

General background and reason(s) for this new or changed operational need. The need may come from a change in policy or procedures requiring a new or modified capability, or the need to replace inadequate or obsolete equipment, or in response to a new or re-defined landmine threat.

Associated projects and other related SONs.

2 Sponsor

Sponsor's role and interest/involvement in the User's operational need.

3 Operational environment

3.1 Geographic environment

3.2 Security environment

3.3 Landmine threat and impact

4 Proposed operational need

This section should summarise briefly the operational need in terms of the overall objective(s) of the mine action programme, and the necessary tasks and processes. Proposed solutions should not be provided - emphasis should be given to 'defining and scoping the 'problem situation'.

5 Limitations of current solution(s)

Limitations of the current method of meeting the operational need. Limiting factors may include:

- a) safety;
- b) inadequate equipment, procedures, logistics or training;
- c) affordability / cost-effectiveness; and/or

- d) lack of standardization / harmonisation.

6 Justification

Contribution of this SON to the overall capability: is the operational need critical, significant or just marginal to the overall mine action objective.

Implications of failing to meet the operational need - the 'do nothing' option.

Refer to any relevant studies and OA that quantifies the operational need.

7 Funding

Indicate whether funding has been made available, or 'earmarked' for this SON.

If possible, indicate the funding priority vis-a-vis other related SON(s).

8 Schedule

State the urgency, indicate the required in-use date and explain the implications of failing to meet this date.

**Signature Block
of Sponsor**

Annexes:

As required.

Distribution:

As required.

Annex E (Informative) **Statement of tasks and output (STO)**

The STO should be prepared by the Sponsor based on the findings of the Preliminary Study. Its purpose is to articulate the User's needs in broad terms, giving the tasks of the equipment and the key characteristics, with the emphasis on the output required rather than the means of achieving it, so as to enable full consideration of alternative solutions.

The STO should explain the anticipated concept of use of the equipment. It should define the target parameters of the equipment solution, such as the critical weight and dimensions (for transportation), manpower constraints (numbers and skills available), in-service date and predicted life span. An indication of likely target costs for the project should be given.

STOs should be based on the general format given at Appendix 1 to Annex E, modified as necessary to reflect the particular operational problem. Principles should appear in the main body of the document, with detail relegated to annexes. The STO will be circulated widely to industry and donors, and will be read by some with limited understanding of mine action practices or current equipment. As such, the style and clarity of writing is important. Jargon and local terminology should be avoided.

Annex E (Informative) **Format of statement of tasks and output (STO)**

**Address Block
of the Sponsor**

Date

Statement of tasks and output

[Title]

[Reference number]

References:

- A. SON.
- B. As required.

1 Introduction

1.1 Background

Refer to SON. Give the general background and operational imperatives that have led to this equipment requirement. Outline the equipment's likely contribution to the overall mine action capability.

1.2 Objective

A concise definition of the operational requirement.

1.3 In-use Date

The required in-use date.

2 Limitations of current equipment and procedures

Refer to SON. Summarise the main limitations of the current equipment and procedures. Limiting factors may include:

- a) safety;
- b) inadequate equipment, procedures, logistics or training;
- c) affordability / cost-effectiveness; and
- d) lack of standardization / harmonisation.

3 Concept of use

3.1 Environment

Geographical and security context. Landmine threat and impact. If the proposed equipment is to be used in more than one mine action programme then the environmental conditions for all likely areas/locations should be given.

3.2 Organization(s)

Organizational framework(s) within which the proposed equipment will be used.

3.3 Procedures

Anticipated procedures and operational use of the proposed equipment. Indicate the necessary changes to existing procedures, management and operator skills.

4 Operational tasks and output

This is the most important section of the STO. It should list the tasks that the equipment must be able to perform to achieve the objective(s) given in Clause 1. Emphasis should be given to defining the output required rather than the means of achieving it. The means of achieving the tasks will be addressed in the subsequent Feasibility Study (FS). The tasks should be listed in two groups, as follows:

4.1 Essential Tasks

In priority order, list the *essential* tasks. For each task, define the target performance and output.

4.2 Desirable Tasks

In priority order, list the *desirable* tasks. For each task, define the target performance and output.

4.3 Variation

If the priority, performance and output for each task varies between mine action programmes, then it will be necessary to make clear this variance - probably in the form of a matrix.

5 Standardization

This section of the STO should define the level of standardization required within and between mine action programmes: i.e. compatibility, interoperability, interchangeability or commonality.

It may be appropriate to define the levels of standardization in terms of the minimal level and the optimal level.

6 Design standards

This section of the STO should define the design standards. At this stage in the procurement process only the critical standards, which may become 'design drivers' and will therefore need to be explored in the FS, should be addressed.

These will include the standards necessary to satisfy:

- a) safety issues;
- b) the essential tasks listed in Clause 4.2 above;
- c) limiting factors such as operator skills, logistic support, transportability, reliability, maintainability and repairability;
- d) climatic, environmental and storage requirements; and
- e) the minimal and optimal levels of standardization defined in Clause 5 above.

7 Associated equipment and training

The issue of associated equipment and training will be addressed later, in the Statement of Requirement (SoR). At this stage only critical issues, which may become 'design drivers' and will therefore need to be explored in the subsequent FS, should be addressed.

8 Funding

Indicate whether funding has been made available, or 'earmarked' for the procurement of the proposed equipment.

9 Outline timings

State the urgency, indicate the required in-use date (see Clause 1.3 above) and explain the implications of failing to meet this date

10 Feasibility study

If it is deemed necessary to conduct a FS before drafting the SOR, then this section should outline the reasons for the FS, its scope and timescale. One of the major tasks of the FS will be to identify the degree of harmonisation that can be achieved and how technology can best be applied to meet the different requirements of each mine action programme.

Detailed terms of reference should be set out in an annex. The aim should be to proceed swiftly to a firm SOR, subject to the outcome of the FS and the availability of funding.

**Signature Block
of Sponsor**

Annexes:

- A. Terms of Reference (TOR) for the Feasibility Study.
- B. As required.

Distribution:

As required.

Annex F (Informative) Statement of operational requirement (SOR)

Based on the findings of the Feasibility Study, the Sponsor will develop the STO into an SOR. The purpose of the SOR is to provide a detailed statement of the characteristics and performance expected of the equipment, based on the preferred solution. It should also fully address all relevant environmental, manpower, training and logistic issues. These all have to be carefully considered, defined and recorded in the SOR since the document forms the baseline against which the equipment will be evaluated, and eventually accepted for use.

The SOR provides those concerned with endorsing the project (be it at local, national or international level) with a full justification of the requirement, and a statement of estimated costs, technical factors and timings, as a basis for a decision on whether or not to proceed. It also provides industry with sufficient detail for design work to be undertaken (or modification to be made to OTS equipment) including the need to satisfy all relevant standards.

It is vital that the Sponsor makes a clear distinction between *essential* requirements and *desirable* requirements. This distinction is important during the design and development stage when there is a need to focus on the *essential* requirements, sometimes at the expense of the *desirable* requirements. Failure to draw a clear distinction may result in a solution that is 'over-specified'; this invariably leads to additional costs and risk.

It is also necessary to make a clear distinction between generic requirements (i.e. the performance and environmental characteristics which will be common to all planned uses of the equipment) and *local* needs (i.e. the performance and characteristics which reflect local environmental conditions, operating procedures and operational requirements). The aim should be to maximise the generic requirements. Wherever possible, the *local* requirements should be met by relatively simple adjustments or modifications to major assemblies (e.g. raising or lowering the ground clearance of vehicles, or adding swamp tracks), by the addition of appliqué sub-assemblies (e.g. adding ceramic armour against shaped-charge anti-tank mines) or by software changes (e.g. Optimising the performance of sensors against a local mine threat).

SoRs should be based on the general format given at Appendix 1 to Annex F, modified as necessary to reflect the particular operational problem. Principles should appear in the main body of the document, with detail relegated to annexes.

**Annex F
(Informative)
Format of statement of operational requirement (SOR)**

**Address Block
of the Sponsor**

Date

**Statement of operational requirement (SOR)
[Title]
[Reference number]**

References:

- A. SON.
- B. STO.
- C. Feasibility Study
- D. As required.

1 Introduction

1.1 Background

Give the general background and operational imperatives which have led to this equipment requirement - as defined in the Statement of User Need (SON) and the Statement of Tasks and Output (STO). Outline the equipment's likely contribution to the overall mine action capability.

1.2 Objective

A concise definition of the operational requirement.

1.3 In-use date

The required in-use date.

2 Concept of use

2.1 Environment

Geographical and security context. Landmine threat and impact. If the proposed equipment is to be used in more than one mine action programme then the environmental conditions for all likely areas/locations should be given.

2.2 Organization(s)

Organizational framework(s) within which the proposed equipment will be used.

2.3 Procedures

Anticipated procedures and operational use of the proposed equipment. Indicate the necessary changes to existing procedures, management and operator skills.

2.4 Scenario

An indicative scenario(s) should be defined. The scenario should represent the likely use of the equipment over a prescribed period of time. This may include:

- a) an operating cycle, distinguishing between continuous and intermittent running;
- b) for vehicles, give the distances travelled in the scenario, including the average speed on roads, tracks and cross-country;
- c) routine servicing and maintenance; and
- d) periods of non-use, i.e. parked, garaged or in storage.

The indicative scenario is most important. It will be used during the design and development stage to optimise the performance of the equipment to the scenario. It will also be used during subsequent testing and evaluation, including assessment of OTS equipment.

3 Operational tasks

This section should list the tasks that the equipment must be able to perform to achieve the objective(s) given in Clause 1.2. Details should be the same as those given in the STO, amended as necessary during the Feasibility Study (FS). The tasks should be listed in two groups, as follows:

3.1 Essential tasks

In priority order, list the *essential* tasks. For each task, define the target performance and output

3.2 Desirable tasks

In priority order, list the *desirable* tasks. For each task, define the target performance and output.

3.3 Variation

If the priority, performance and output for each task varies between mine action programmes, then it will be necessary to make clear this variation - preferably in the form of a matrix.

4 Operational characteristics

The purpose of this section is to give the key performance characteristics that the equipment must meet in order to satisfy the essential and desirable tasks listed in Clauses 3.1 and 3.2 above.

5 MANPRINT

MANPRINT (MANpower and PERsonnel INTe-gration) is a management and technical programme that seeks to maximise the operational effectiveness of manned systems by integrating the five areas of organizational issues, skills, training, human factors engineering and safety. The application of MANPRINT should be encouraged for all new mine action equipment projects.

Note: MANPRINT is not a simple process, and it is not envisaged that it should be used for minor programmes or at a local level; rather that it continues to be implemented by those organisations who already have substantive experience with the system.

5.1 Organizational issues

The following manpower and organizational issues should be addressed:

- a) an assessment should be made of the new manpower and organizational requirements for the operation, maintenance and repair of the system, together with the training manpower implications. The full costs of this additional manpower must be exposed; and
- b) an assessment should be made of how these additional manpower requirements could be reduced. A trade-off analysis should be conducted.

5.2 Human skills

The following issues should be addressed:

- a) an assessment should be made of the aptitude and skills required by the operators, maintainers, repairers and suppliers of the new equipment; and
- b) an assessment should be made of the ability to hire suitably qualified staff, either locally or internationally.

5.3 Training needs

A training needs analysis (TNA) should cover:

- a) the knowledge, skills and ability needed by the User to operate, maintain and repair the equipment;
- b) the training requirements to ensure that the User is able to operate, maintain and repair the equipment. The full costs of such training must be exposed;

5.4 Human engineering

This should include:

- a) workspace design including layout, lighting, communication and management needs, stowage and maintainability;
- b) man-machine interface including displays, indicators and controls;
- c) workload; and
- d) human capabilities and limitations and their effect on performance, particularly under conditions of continuous personal risk.

Use should be made of appropriate ergonomic standards. (Reference may be made to DEF-STAN 00-25.)

5.5 System safety

This should address issues of equipment safety during storage, transport, operational maintenance and repair. Reference should be made to local health and safety standards, and is likely to include the identification of potential hazards to the User such as noise, shock, vibration, chemical substances, oxygen deficiency temperature extremes and trauma.

6 Standardization

This section of the SOR should define the level of standardization required of the equipment within and between mine action programmes. Details should be the same as those given in the STO, amended as necessary during the FS.

7 Transportability

This section should address the transportability needs of the equipment. Subject to the envisaged operational use' the requirements for movement by road, rail, sea and air (carried internally, underslung or airdropped) should be considered. In a post-conflict situation, however, there may be few cleared roads and limited (if any) rail facilities. A realistic appreciation of the situation must be made.

8 Environmental conditions

The climatic conditions that were summarised earlier in Clause 2.1 above should be amplified in this section. These may be described in detail, or reference can be made to international standards such as DEF STAN 00-35 (Part 2).

9 Reliability

The equipment reliability must be quantified. It should take into account the indicative scenario(s) defined in Clause 2.4 above and the findings of the FS. The requirements should normally be defined in terms of sub-system (or assembly) reliability, and the overall system reliability.

10 Maintainability and repairability

The ease of maintainability and repairability must be defined. This is particularly relevant for equipment that will be deployed at some distance from specialist repair facilities.

11 Design standards

This section of the SOR should define the design standards. Details should be the same as those given in the STO, amended as necessary during the FS.

These will include the standards necessary to satisfy:

- a) safety issues;
- b) the key performance characteristics detailed in Clause 4 above;
- c) the MANPRINT requirements detailed in Clause 5 above;
- d) climatic, environmental and storage requirements;
- e) the minimal and optimal levels of standardization detailed in Clause 6 above; and
- f) the maintainability and repairability requirements detailed in Clause 10 above.

12 Logistic support

The logistic support requirements must be fully exposed in the SOR. The main issues should be addressed in this section, with the details relegated to an annex.

13 Associated equipment

This section should address any specialist tools, stores and technical publications which may be required to calibrate, prepare, operate, maintain, service and repair the equipment.

14 Outline timings

State the urgency, indicate the required in-use date (see Clause 1.3 above) and explain the implications of failing to meet this date.

Signature Block
of Sponsor

Annexes:

As required.

Distribution:

As required.