

# **STANAG 4439 : IS IT TIME FOR A CHANGE?**

**Mireille Le Roy, Doug Wagstaff  
Pilot IMEMG , Vélizy, France**

## **ABSTRACT**

The present version of STANAG 4439 (Edition 1) was implemented by a number of nations in the period 1996 - 1999 and continues to be an important document relating to MURAT / IM policy within those countries. However, during the period following implementation, it has been proposed that some aspects of the STANAG would benefit from clarification and in other cases, benefit from a complete change. In order to provide a forum for discussion of potential changes, a pilot working group (STANAG 4439 Pilot WG) has been set up to review STANAG 4439, to identify difficulties in implementation and propose a series of modifications. The Pilot Working Group has industrial representatives from France, Germany, Italy and the UK within its ranks.

The principle areas where changes are thought to be beneficial are detailed within this paper. Generally these fall into the categories of :

- 1) Identification of graduated levels of response at which IM classification can be attributed
- 2) The influence and standardisation of THA and its affect on IM assessment and implementation of the STANAG
- 3) Ensuring all implementing countries are able to apply the STANAG equally
- 4) Providing MURAT / IM goals which reflect the “state of the art” for commercially viable systems without imposing unachievable standards on munition manufacturers.
- 5) Develop an internationally recognised labelling system for MURAT / IM identification.

## **1 INTRODUCTION**

The first issue of STANAG 4439 was ratified by a number of nations in the period 1996-1999. The document was a first attempt to harmonise and rationalise IM / MURAT test methods and assessment throughout ratifying nations. Unlike some harmonisation exercises, differences between IM / MURAT test methods in each country were quite minor and there were only a small number of widely accepted test methods for IM available. This made the formulation of the Edition 1 of the document comparatively easy. Ratifying countries agreed to undertake the tests outlined in the STANAG to an agreed standard of test procedure (with each test method having its own specific STANAG). However, over time, it became apparent that there were some differences in both the interpretation and the scope of the first edition when applied in different countries. Some countries applied the document in such a way to set out absolute standards against which IM /MURAT character should be assigned; munitions which did not achieve the 4439 standards could not be labelled IM. Others used the document as a guide towards IM / MURAT, suggesting that IM / MURAT compliance was achieved if the munition had been tested by some of the 4439 methods and the munition response had indicated a minimum level (ie not showing a type I response). Obviously, these different interpretations between countries lead to disagreements in assignment of IM / MURAT character and highlighted that some improvement in the STANAG might be beneficial.

## **2 THE DEVELOPMENT OF THE STANAG 4439 PILOT WG**

In spring 2000, the NATO AC310 committee, sub-group 4, proposed that the formation of an Experts Working Group (EWG), with the task of Stanag 4439 enhancement should be set up. After initial discussion within the AC310 forum, France was appointed as the “custodian Country” of the EWG.

The initial role of the EWG was to produce a first draft of an updated STANAG 4439 and this was achieved in May/June 2000. Review was carried out to form a second version that was disseminated to Nato Experts Working Group National representatives for comment in September 2000. Finally, a third draft was prepared in February 2001.

Simultaneously with this work, CLUB MURAT contacted relevant industrial entities within the OCCAR (acronym) countries (France, Germany, Italy and UK) to gauge interest in the development of a European wide IM / MURAT forum. From these discussions, late in September 2000, the IMEMG (acronym) was formed. An expert working group was set up within this forum to look at the difficulties, which had been encountered with the 4439 Edition.1; this expert working group was called the STANAG 4439 Pilot WG.

## **3 THE ROLE OF THE STANAG 4439 PILOT WG**

Following discussion within the IMEMG forum, the objectives and tasks of the STANAG 4439 Pilot WG were defined as :

Items concerning Stanag 4439 edition 1

- to identify the present view in each country of the process of implementation of the STANAG
- to identify differences and dissatisfactions between countries, and

- to propose to the Executive Meeting, actions to lead to the convergence of international process and views of the STANAG

Items concerning Stanag 4439, drafts Edition 2, the group was tasked to :

- adopt and promote a common, internationally acceptable position on second edition successive drafts to propose as an updated version of the STANAG

The forum has had a number of meetings to discuss differences in interpretation and application of the STANAG and a number of areas for improvement have been identified : these potential improvements form the bulk of this paper. The forum has also reviewed the September 2000 and February 2001 drafts of Edition 2 to help move towards agreement of correct policy for further IM /MURAT activities. A number of draft Edition 2 documents developed by the Nato AC310 Group have also been examined and some suggestions have been made in methods to allow comments to be received from a wider international and industrial audience It is hoped that by combining ideas from AC310 and the 4439 Pilot WG, a significantly improved Edition 2 can be submitted for appraisal.

#### **4 DIFFICULTIES WITH EDITION 1**

Table 1 shows the review that was carried out on 4439 Ed 1 and the areas of convergences and differences in interpretation between contributing nations. As can be seen from the table, contributing nations are in general agreement for the majority of items relating to the Edition 1 document and, where possible improvements have been identified, nations are again generally in agreement about the positive nature of those changes. It is however observed that the nature of some of the proposed changes would significantly change the emphasis of the Edition 1 of the document and thus a limited update of this document is not possible Thus the options for update are either to accept the document as it is at present or to totally redraft the agreement.

It should be noted that, where divergences in national views are present, it highlights the differences in interpretation and application of the document between different nations. These divergences can be summarised as :

- 1) Should Threat Hazard Analysis (THA) form a fundamental basis for the assessment of munitions tested under STANAG 4439
- 2) Does the document give a requirement against which IM character can be defined or is the document a guide by which IM character can be assessed.

These first two key questions lead onto a number of secondary questions including :

- 3) In what form (eg bare munition or in logistical packaging etc) should munitions be tested.
- 4) Is it ever acceptable to include a Type I response from an IM / MURAT test as a “pass” criteria
- 5) How does the IM / MURAT community want an IM / MURAT classification to be interpreted by in service personnel

- 6) Should the STANAG focus on a small number (eg 4) key threats (eg BI, SH, FH, FI) and require all munitions comply with testing of these four threats or should the focus be on all tests identified by standardised THA.
- 7) Should the emphasis of any new version of STANAG 4439 outline the method by which IM /MURAT classification is achieved (ie what testing is required) or should it outline the meaning behind the classification which is achieved (ie the meaning of \*, \*\* and \*\*\* classification). The first option would specify that for a munition to claim IM/ MURAT status it would have to have been tested by all of the test methods included within the document. The second option would specify that if a munition had been tested by specific test methods, then it would fall into the IM classes detailed within the STANAG.

These points were all discussed to attempt to reach a consensus within the group but in some areas (eg the application / non-application of THA), agreement has not been possible within all nations. With this last point in mind, the Working Group has examined the different drafts Edition 2 documents (September 2000 and February 2001) provided by AC310 via French DoD to again attempt to achieve consensus.

## **5 EDITION 2**

After gathering the views / opinions of the contributing nations on the 7 questions above, the Group suggested that the important points which should be considered for introduction into this draft Edition 2 are :

### **5.1 DEFINITION OF AN IM / MURAT SIGNATURE**

The draft STANAG details that the IM character of a munition against a series of standard threats is termed the IM / MURAT signature. By agreeing to comply with the STANAG, countries are required to produce (or have produced for them) an IM signature for each munition which they have or are planning to have in service (the specification of IM/Murat signature was already required in AOP 39). This IM/ MURAT signature of a munition is an important point of the interoperability in service.

### **5.2 LEVELS OF IMNESS / MURATISATION**

A series of possible IM / MURAT levels were proposed; these levels are given in table 2 but the absolute responses for each level are still to be agreed. Once a munition has been assessed under the conditions of the STANAG 4439, this assessment is specified within the document as the IM / MURAT signature of the munition. This signature is then compared against the 3 levels to assign an IM / MURAT classification.

The levels could be devised such that :

At Level 1, the IM / MURAT signature of the munition is the minimum for the munition response to be compliant with IM / MURAT. If a munition failed to achieve this level of response, then it could not be classed as IM / MURAT

At Level 3, the IM / MURAT signature of the munition should reflect the “state of the art” with regards to IM mitigation techniques presently available. This minimisation of response to “as low as is reasonably practicable” should be the ultimate goal for IM / MURAT of munitions at this time. As IM / MURAT mitigation techniques continue to improve, updated acceptance levels should be introduced to keep pace with new developments..

A Level 2, could be an intermediate IM / MURAT munition signature between levels 1 and 3. At this level, the munition IM / MURAT response will be more mitigated than at the minimum standard but would not reflect the “ultimate goal”.

It is identified that, in some cases, a munition’s IM / MURAT signature will not fall directly under one of these levels (ie might easily pass 4 out of 5 of the requirements but fail badly on the other 1) . Guidance rules to assign when a munition’s IM / MURAT signature complies (or fails to comply) with these levels are still to be completed.

### **5.3 SEPARATION OF THA FROM THE STANAG**

As identified earlier, the introduction (or not) of the definition of THA process within STANAG 4439 is an area in which there has not been agreement between nations. The February draft specifies in paragraphs 7 and 8 that :

“The safety and suitability for service (S3) assessment defined in Stanag 4297 and AOP 15, demonstrates the compliance of the munition with the user requirements. A THA might be conducted as part of S3 assessment to identify specific threats associated with the munition specified life cycle. Test conducted to support this assessment are S3 test”, and

“The aim of the IM/Murat assessment is not to demonstrate the safety and suitability for service of a munition. It provides the user with a higher confidence on the munition safety level.

This assessment complements the S3 assessment by giving intrinsic safety characteristics on the munition itself. As a result it is totally independent from the munition life cycle and use...”

However, the interpretation and application of these two paragraphs is one area, which is keenly disputed between nations. It is believed that greater clarification of the STANAG 4439 wording relating to THA and tighter links to the definition of THA as listed in AOP 39 would help to improve the new draft STANAG. However, this clarification has still to be agreed within the working group and the emphasis may change with subsequent meetings.

This moves the STANAG 4439 document towards being a document that classifies munition IM / MURAT response against categories rather than suggesting that compliance relies solely on the munition having been tested against the requirements of the STANAG.

## **6 CONCLUSIONS**

The STANAG 4439 Pilot Working Group with industrial representatives of France, Germany, Italy and United Kingdom all of which has put in evidence all the difficulties they have with the application of Stanag 4439 Edition 1

Updated draft editions of the STANAG 4439 have been examined and discussed by the WG.

These new drafts may help to remove many of the inconsistencies which were present within Edition 1 whilst adding a new dimension of a three level, graduated IM / MURAT classification.

It is hoped that this multinational work will help to guide the different AC310 National Representatives in any future plans to build the final Stanag 4439 Edition 2. It is also hoped that the new version of the STANAG will aid the introduction and appreciation of IM / MURAT technologies throughout both developers and users of modern day munitions whilst ensuring that all nations can apply the IM classification equally.

**Table 1 : Convergences / Divergences Between Nations on Edition 1**

<b>CONVERGENCES</b>	<b>DIVERGENCES</b>
Some Objectives of Iss 1 can not be met with current or visible technology	
The analysis mentioned in Paragraph 9 should be THA	
There is a need to define the THA process	<p>Industrial representatives of 2 countries don't wish for THA introduction into STANAG 4439 Ed 2</p> <p>However others of one country wish for THA assessment to be standardised and included in Ed 2</p>
There is an ambiguity between paragraphs 3 and 6	<p>Some interpretation of the STANAG Paragraph 3 is that the Annex gives no definition of the NATO IM requirement.</p> <p>An other is that the Annex sets requirement goals for NATO IM requirement</p>
There is an ambiguity between paragraphs 6 and 17 relating to replenishment.	
If labelling is be used (as suggested in Paragraph 13) an international recognised marking system should be devised and used.	

**Table 2 : Proposals for Different Levels 1,2 and 3 for IM / MURAT Classification within STANAG 4439 Ed 2**

**Proposals for STANAG 4439 Levels**

**Concept :**

**Level 1 : Minimum Acceptable Level for a Munition to be Designated MURAT**

**Level 2 : Intermediate Between level 1 and 3**

**Level 3 : Correspond to the Visible Technology (ie all commercially and S<sup>3</sup> viable mitigation systems functional within munition)**

<b>Option</b>	<b>FH</b>	<b>SH</b>	<b>BI</b>	<b>SR</b>	<b>FI</b>	<b>SCJI</b>	<b>Spall</b>	<b>Comments</b>
<b>1a</b>	III	III	III	III	III	I	No Req	Unpackaged
<b>1b</b>	III	III	III	III	III	III	No Req	Packaged
<b>1c</b>	III	III	III	III	III	III	No Req	Only SCJI Packaged
<b>2a</b>	Mimic US 1.2.3 ★ Requirements (as proposed during the June 2001 NIMIC Workshop)							
<b>2b</b>	Intermediate between Chosen Level 1 and 3							
<b>3a</b>	V	V	V	III	V	III	V	Unpackaged