



IM Overview

Patrick Touzé, MSIAC
IMEMTS 2009

Munitions Standards Database (MSAS)

- NATO STANAGs and Allied Publications
- United Nations Standards
- European Standards
- Some ITOPs (DEU / FRA / GBR / USA)
- Some National standards (GBR, SWE, USA)
- Some international treaties impacting on munitions



Munitions **Life Cycle regulations** (Transport, Storage, Disposal,...) should be harmonized and implemented

AASTP-5 by NATO AC/326



In **Normal** Environments, own munitions should remain safe and serviceable....





In **Extreme** Environments,
own munitions should react
as mildly as possible, or not at all
(Insensitive Munitions)...

STANAG 4439 by NATO AC/326

*Personnel were burning
excess artillery propellant
bags, about 9 ft from the
vehicle. The heat from the
fire induced a low-order
detonation of a 155 mm
round that was in the
vehicle.*





MSIAC

Or else...

Supporting
Muniti
Sa



Kirkuk, Iraq, 02/06/04 – USAF Base Attack

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As **Extreme** Environments
become less and less unlikely,
IM are more and more needed

IM is one of the Top Munitions Safety Priorities of AC/326 nations



RPG-7 available from 40+ Nations

In insensitive munitions make the military less accident-prone

Western European and US policy makers are placing greater pressure on defence forces to use safer or 'insensitive' munitions to inhibit their inadvertent detonation. **By Neil Gibson and Rupert Pengeley**

Eric Deschambault, Patrick Touzé and Duncan Watt

In sensitive Munitions – A Key Aspect of Improved Munitions Safety



Two dramatic images on the flight deck fire onboard the aircraft carrier USS ENTERPRISE (CVN-65) on 14 January 1969. A MK-32 ZUNI rocket warhead attached to an F-4 PHANTOM was overheated by the exhaust from an aircraft starting unit and detonated, setting off fires and additional explosions across the carrier. The fire was brought under control promptly when compared with previous carrier flight deck fires, but 27 lives were lost, and an additional 314 people were injured. The fire destroyed 15 aircraft, and the resulting damage forced the carrier to put in for repairs, primarily to repair the flight deck's armored plating.

...iving
...IM),
...ferred
...process
...on of
...rlers
...text,
...well-
... could also join given the consent of all NATO
...parties). Denmark, and two Partnership for
...Peace nations, Finland and Sweden, fol-
...lowed in 2000-02. Not being major ammuni-
...tion manufacturers, Denmark and Portugal
...have since opted to cease their contributions
...to NIMIC's EUR1.5 million (USD1.86 mil-
...lion) annual budget, but their place is being

aging issues. The technology remit is pro-
...gressively being expanded beyond insensitiv-
...ity to through-life munitions safety".

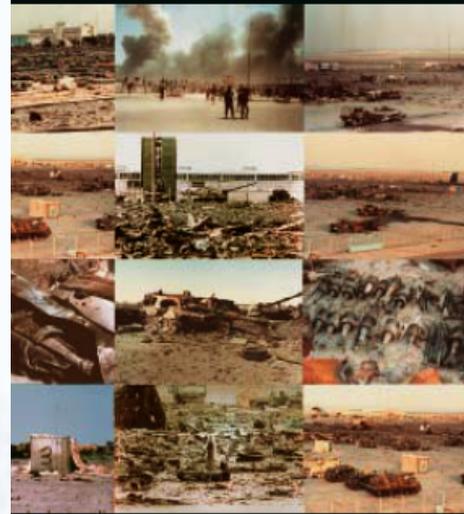
According to Touzé, the application of IM
...regulations has been patchy since 1988,
...nations having on a number of occasions
...applied waivers for reasons of expediency or
...necessity as a result of technology gaps.

However, this is less and
...less the case, especially in the US, where IM
...regulations have become
...enshrined in law.

Tests may also be con-
...ducted differently, or
...their results interpreted
...differently, in different
...nations. In some the use
...of modelling is regarded
...as appropriate to provide
...the requisite assurance of
...compliance, while in
...others there is an insis-
...tence on live tests at
...every stage. The design-
...ated evaluation tests
...and procedures (see
...table) do have some flex-
...ibility, with alternative
...sub-procedures, bullet
...variations, and so forth.

One of MSIAC's
...objectives is to har-
...monise these rules,
...Touzé noting "there is a
...preference for perfectly
...harmonised rules and
...test criteria but it will
...take time to get there".

The NATO standardi-
...sation agreement
...(STANAG 4439 – see
...below) setting out the



... devastation precipitated by the inadvertent explosion of munitions aboard an M982
... supply vehicle at Camp Doha, the US Army's main base in Kuwait, in the aftermath of
... war. Note the presence of M29 depleted uranium anti-armour projectiles.

...D IM
...taken by Germany, whose accession is
...expected to be complete in October this year.

The name change to MSIAC was made in
...December 2004. As explained by MSIAC
...Project Manager Patrick Touzé, "the technol-
...ogy for IM did not exist originally, hence the
...creation of NIMIC. Now the technologies do
...exist and are available for most ammunition
...types. The need therefore now is not so much
...for further technology as for implementation
...and fielding, which leads on to life-cycle and

...general intent for IM was promulgated in
...1988 and it has been ratified by 12-15 nations
...to date. Associated with it is an application
...document (AOP39) which sets out the
...assessment and test methodologies. One of
...the original tests (shaped-charge jet spall
...impact) is being withdrawn.

In addition to the STANAG, Touzé told
...IDR, each nation maintains its own national
...policies which may be more detailed (see
...below). There are also differences between



An IM Success Story – US – 2005

FCO		SCO		BI	FI	SR
Red		Red		Red	Red	Red
Yellow	Green	Yellow	Green	Green	Green	Red

MK-82 mod 2 TP
BLU – 111/B

IM on the market

IM Technology

Customers

Compared IM Signature

Compared Performance

Compared Cost



Highlighted Land Systems

- 30-mm ammunition
- 40-mm 3P Round
- 60-mm Mortar (M720E1)
- 60-mm MAPAM
- 105-mm DPICM (M915)
- 105-mm Improved Ammunition (L50)
- Reactive Tile Armour for AFV
- Excalibur 155mm (XM982)
- 120-mm APFSDS (M829A3)
- DM63 for APFSDS-T 120mm
- TPCSDS-T 120mm training cartridge (XM1002)
- 120-mm cartridge (XM1028)
- 120-mm Mortar (M934A1E1)
- 155-mm Artillery Shell (LU-211M)
- Modular Artillery Charge System (MACS)
- Modular Artillery Top Charge Modules
- Modulares Treibladungssystem (DM72/92)
- 155-mm RH30
- Air Defence Missile VT1 01
- Anti-Personnel Obstacle Breaching System (APOBS)
- Formable explosive No. 3 Mk1
- Demolition block No. 4 Mk1
- Spider (XM7)





IM Gaps



- **IM Technology – MSIAC Workshop**
 - Surveys to identify gaps
 - Preliminary MSIAC Workshop 11 May 2009: prioritize gaps according to users' needs
 - Main MSIAC Workshop in 2010
- **IM “Enabling tools”**
 - Harmonized, objective, scalable, informative, relevant, environmentally friendly testing methods
 - Standardized and shared models and codes to predict energetic materials, components and munitions responses

IM Policy

- **STANAG 4439 Ed.2 and AOP-39 Ed.2 promulgated on 9 Feb 2009 (ref. IMEMTS 2006, R. Guégan)**
- **Ongoing work to update AOP-39 again**
- **Proposal to modify IM Response Descriptors (ref. IMEMTS 2009, T. Eich), with impact on STANAG 4439**



**The need for IM
is growing;
let's eat this big
technological
challenge two
bits at a time**