A New Impulse for the French MURAT (IM) Policy

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OUTLINE

- The French Organization
- Background
- MURAT Current Issues
- MURAT Policy Update
- Related Implementation Guides
- Axes of Endeavour
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The French Organization

For Munitions developed / bought by DGA:
- Safety Authority is DT/head of “Munitions, Weapons and Nuclear Systems Division”
- Safety qualification is given after mandatory advice from IPE

For Munitions directly bought by the Forces:
- Safety Authority is the Head of Staff
- He could ask for advice / support from IPE

IPE has a key role regarding Ammunition Safety
IPE role and missions are directly given by the MoD
IPE responsibilities regarding Ammunition Safety

- Give mandatory advice for Munitions Explosive Safety Qualification
- Give expertise on Munitions Explosive Safety
- Give mandatory advice for Energetic Materials Qualification
- Assign HD Classification to Munitions
- Assign MURAT Labels
- Participate to the preparation of Explosive Safety Regulation
French MURAT Policy: a 20 years old history

- End of the 80’s, first thoughts within NATO through munitions interoperability work
- 1989: Recommendation of CGA (general MoD controller) for a concerted endeavor of both Forces and DGA on the IM/MURAT concept.
- DGA letter n° 100816 (March 1992) and DGA/IPE reference instruction n° 260 (July 1993).
- Assignment of MURAT labels by the Inspector for Propellants and Explosives
- MURAT massive investment for the nuclear aircraft carrier Charles de Gaulle
- Ratification of STANAG 4439 edition 1 in 1999 and successive revisions (now ed3)
MURAT Policy in 2011: a contrasted Balance

- A real success from a technical point of view (mature technologies for most of our Munitions families, EIDS, mitigation devices…), even if remaining issues (SRM, gun propellants…)

- A prime necessity concept in our evolving world:
  - Political perception and implication of Safety, judiciary consequences of any accident, interoperability in joint operations…
  - Drastic increase of operational logistical constraints.

However today, most of our munitions inventory have:
- No complete IM signature
- No MURAT label
- Even no IM characteristics
Concerns with initial Policy

- Initial **non stringent** policy:
  - Policy only described in a DGA decision letter
  - A stand alone DGA/IPE Instruction with no link with other Ammunition Acquisition Document

- Explosive Safety Regulations harmonization difficulties (NATO, UN, National) – need to better translate explicitly the logistical benefits …

- Differences between MURAT and Munition Safety Assessment methodology when shipped on nuclear platforms (aircraft carrier)

- IM/MURAT and collateral damage : lack of data for vulnerability studies

- Lack of guidelines for the MURAT Signature Specification
Update of the French Policy

- **In 2010, IPE decision to prepare a MURAT Policy Document**
  - **At the Minister of Defense level**
  - **In line with STANAG 4439**
  - **Defining logistical benefits of MURAT characteristics**

- **End of 2010, preparation of the policy document under the responsibility of an editorial team involving:**
  - **IPE (chairing the team)**
  - **Armed Forces joint staff**
  - **SIMu (ammunition joint office)**
  - **DGA (IPTs and technical Experts)**
The new MoD MURAT policy instruction has been finalized in 2011:

*Instruction DEF n°211893 issued 21st July 2011*

- Reference (STANAG) Requirements specified in any acquisition
- Any waiver to the MURAT Reference Requirements must be justified using risk-based analysis methods.
- IM Signature Assessment generalized (including inventory Munitions) to give Forces information and a better understanding of explosive hazards in operations.
- Implementation of the policy should create a MoD common dialogue tool to insure the coherence between Operational Needs and R&T priorities
New MoD MURAT instruction

Additional IPE instructions (technical guides) under preparation to describe/clarify the new policy implementation

1 - Specification of MURAT level
    (document in approval process)

2 - MURAT signature assessment methodology

3 - MURAT data base management
Initial Specification

Reference (STANAG) Requirements must be specified in any acquisition

(Flexible) waiver process implementation:

Process involving Project Team (DGA) - IPE - Armed Forces (end user)

Minimum IM signature – risk based methodology (mainly focused on consequences on warfighter and assets) to be conducted by IPT

- If important residual risk -> IPE advice and Chief of Staff approval
- If minor residual risk -> IPE approval

IM signature to be contracted -> minimum acceptable IM signature

- Potential logistical benefits (costs) through explosive safety regulations (HD or QRA) – IM signature in the equation of explosive safety

Exclusion for Munitions with low risk in logistics phases (HD filtering)
Implementation Guide 2: MURAT signature assessment

- Necessary Coherence and Communality between HD and IM Level:
  - For Testing / Evaluation
  - Complementarity between HD (maximum credible event focused) and MURAT signature (risk based) for a better Management of Risks during Logistical & Operational Phases
  - Final IM signature to be considered as any other S3 Requirement
  - Confidence level assign for each Threat considered in the IM signature
  - MURAT Labels (★, ★★ and ★★★) slightly modified to better link with STANAG 4439 and HD regulation
For all new munitions:
IM signature, HD classification, S3 assessment compiled in a Global Safety Datasheet

For (families of) inventory munitions:
IM signature assessed or estimated in order to:

- Inform the Forces about risks associated with already in service Munitions
- Create and maintain a database of IM signatures of Munitions in service in French Forces
- Use it as a MoD common dialogue tool to insure the coherence between Operational Needs and R&T / Retrofit Priorities
MURAT and explosive safety regulation

- Munitions spend most of their life in a context strongly regulated in terms of explosive safety.

- Risk attenuation allows:
  - Logistical constraints reduction (storage, maintenance, transport)
  - Benefits through explosive safety regulation

- Introduction of quantitative risk assessment in explosive safety regulation gives more explicit gains for MURAT munitions than with traditional separation distances (QD).

<table>
<thead>
<tr>
<th>French Organization</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>MURAT Current Issues</td>
<td>MURAT Policy Update</td>
</tr>
<tr>
<td>Related Implementation Guides</td>
<td>Axes of Endeavour</td>
</tr>
</tbody>
</table>
1 ton of 155 mm in ISO container – IBD distance (m)

<table>
<thead>
<tr>
<th>French QD approach (current regulation)</th>
<th>QRA approach (1% of being hit by a fragment)</th>
</tr>
</thead>
<tbody>
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<td>165</td>
</tr>
</tbody>
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**QRA methodologies should be introduced in French Explosive Safety Regulation to better translate logistical benefits of MURAT**
QUESTIONS ?