UK MOD IM INSERTION STRATEGY –
THE ROUTE TO A SAFER INVENTORY

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UK MOD IM Policy is not new!

- First promulgated in OB Pillar Proc in 1990
  - Less of a requirement, more of an aspiration
- Major revision to mandate compliance with STANAG 4439 - 1996
- Top level endorsement – 1996
  - But no effective means of publication due to re-organisation
- Top level review and re-endorsement by DOSB/JCB in 2001
- Formally published in 2001

Lesson learned: momentum was lost at a critical time through failure to publish endorsed policy
UK MOD IM POLICY

• The vulnerability of the munitions in the MOD inventory will be reduced over time to meet the requirements of STANAG 4439.

  – All new munitions requirements are to stipulate compliance with the criteria for IM set out in STANAG 4439.

  – All legacy munitions are to be kept under review to identify opportunities to achieve IM compliance (e.g. mid life update, refurbishment and re-provisioning programmes).

  – Formal 2-star dispensation is required for any non-compliance (for both new and legacy munitions).
2-STAR IM WAIVER PROCESS

Objective is to provide a clear audit trail demonstrating that:

- The reasons for any non-compliance have been identified, evaluated and justified,
- The operational and safety implications of the non-compliance have been properly evaluated
- Risks have been fully understood, particularly by the User, and reduced to ALARP.

- All waivers are reviewed by IM Assessment Panel and Director DOSG
- 2-star endorsement is not a rubber stamp process
IM ASSESSMENT PANEL (IMAP)

- Set up in 2002, reports to JIMSG
- Chaired by DOSG-ST6 (Peter Barnes) with permanent expert members from DOSG, QinetiQ, Health & Safety Executive, Defence Academy
- Associate Members – Safety Adviser, IPT, Design Authority, Range Staff – relevant to each munition
- IMAP tasks
  - To provide advice on assessment and achievement of IM compliance at any stage of a munition programme.
  - To provide an assessment of IM test plans before full-scale testing takes place.
  - To categorise the results of IM full-scale tests and assign an IM signature.
  - To review the scientific and technical aspects of draft IM waiver submissions
IMAP

- IMAP has now assessed all 600+ munitions in the UK MOD Inventory
- IMAP uses the ‘body of evidence’ approach advocated in AOP-39 and does not rely solely on full-scale test results
- Using the same experts to assess all munitions has introduced consistency; IMAP’s processes have improved
- IMAP is taking the lead on combining UK IM and Haz Class testing
- Joint IMAPs have been held with the French MOD (DGA) on munitions of common interest (SCALP/Storm Shadow, Aster, Meteor)
IM DATABASE

• IM database has been developed progressively over 7 years
• Currently contains data on over 200 munitions
• Being expanded and reformatted to include all 600 munitions in the inventory
• Data includes:
  – Description of munition and major components
  – Details of energetic materials
  – Full details of all IM tests
  – IMAP assessment and rationale
  – IM signature
• Wide range of users, both MOD and Industry
IM INSERTION PLAN (IMIP)

- IM Insertion Plan (IMIP) addresses every munition in the inventory
- IMIP includes:
  - IM Signature (IMAP assessed)
  - Non-compliances and associated risks
  - Opportunities for IM insertion (mid life update, re-procurement….)
  - Required technology and its availability
  - Indicative costs
  - IPT plans for IM upgrade
  - Progress achieved
- IMIP is a living document
<table>
<thead>
<tr>
<th>Munition/ IPT</th>
<th>IM Signature</th>
<th>Energetics/ Design</th>
<th>IPT Comments</th>
<th>JIMSG Comments</th>
<th>Technology Implications</th>
<th>Funding Implications</th>
<th>OSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sky Rocket AAM (ALM IPT)</td>
<td>AUR: FH: IV SH: II BI: III FI: I SR: I</td>
<td>Warhead: 5.4 kg Comp B92 Motor: 31.5 kg SRZ6 composite propellant in monolithic steel case</td>
<td>This is a UK developed and produced missile for which there is a planned mid life update in 2011 when the motor becomes lifex. The opportunity will be taken to introduce a new, IM-compliant motor. A TDP to demonstrate the required technology is due to complete in 2008. The design authority has been asked to provide costed proposals for an IM-compliant warhead as part of the mid life update programme.</td>
<td>The Mid Life Update provides an excellent opportunity to introduce IM technology. DOSG has funded a TDP to develop an HTPE-filled composite case motor and test results so far indicate that it should provide full IM compliance.</td>
<td>For the motor, existing technology is unable to provide full IM compliance. The suitability of HTPE and composite case technology is being explored. For the warhead, filling with a PBX such as Rowanex 1234 in place of the TNT-based Comp B92 should achieve IM compliance without any loss in performance.</td>
<td>Motor TDP Programme (Funded): £4.6M Design Authority estimate of likely additional costs: Motor development and Qualification: £8.4M Warhead development and Qualification: £5.3M</td>
<td>2021</td>
</tr>
</tbody>
</table>
## IMIP STATUS as at 16 Oct 07

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>No of Munitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strong Candidates, near term insertion opportunities, solutions available</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>Strong candidates, insertion opportunity some years away, solution yet to be developed</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Candidates for insertion if solution becomes available.</td>
<td>84</td>
</tr>
<tr>
<td>4a</td>
<td>Out of Service within 5 yrs</td>
<td>14</td>
</tr>
<tr>
<td>4b</td>
<td>No insertion opportunity</td>
<td>15</td>
</tr>
<tr>
<td>4c</td>
<td>IM replacement already in procurement</td>
<td>10</td>
</tr>
<tr>
<td>4d</td>
<td>Close to IM compliant</td>
<td>235</td>
</tr>
<tr>
<td>5</td>
<td>IM compliant</td>
<td>186</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>
IM COMPLIANCE FORECAST

IM COMPLIANCE FORECAST (100 key IMIP MUNITIONS)
PERCENTAGE COMPLIANT (PI SCORE >75)
JOINT IM STRATEGY GROUP (JIMSG)

- Responsible for developing MOD IM Policy and monitoring its implementation
- JIMSG brings all key stakeholders together, to ensure a coherent approach
- Stakeholder groups represented include:
  - DOSG, Capability (Requirements) staff, Front Line Commands, Munitions IPTs, Science and Technology staff, Hazard Classifiers, IMAP, Research Organisations and Industry
- JIMSG is responsible for developing and maintaining the IM insertion Plan and categorising each munition
- JIMSG maintains oversight of the IM Waiver Process
- The IM Assessment Panel reports to JIMSG
• IM education and publicity through a range of activities:
  – IM brochure
  – One-day IM symposia (‘Stakeholder Days’) for MOD and Industry staff, held every 18 months
  – IM briefings and tutorials to smaller groups of key MOD personnel (Capability Staff, IPTs, Safety Advisers) and Industry
  – IM module included as part of a munitions MSc course at the Defence Academy, Shrivenham.
  – Guidance on IM and implementation of policy (JSP 520)
INTERNATIONAL DIMENSION

• Links with other nations have been essential component of UK IM Policy development and implementation
  – US/UK bilateral (IEA)
  – Fr/UK bilateral
  – MSIAC Workshops and publications

• A continuing challenge: Articulation of costs and benefits of IM, despite much good work, eg
  – MSIAC Cost Benefit Workshop 2001
  – CBAM
ACHIEVEMENTS

• Storm Shadow – IM compliant (and HD 1.2.3)
• Close to IM compliant:
  – Next Generation Light Anti-Armour Weapon NLAW
  – Anti Structures Munition ASM
  – Paveway IV PGB
• PBX fillings for artillery and general purpose applications
• Sting Ray lightweight torpedo – replacement warhead
• ROXEL Smokeless Large Insensitive Motor – IM compliant solution for Hellfire/Brimstone class missiles
• Packaging solutions for smaller stores – eg Detonators
CONCLUSION

• Significant progress achieved 1996 – 2007
  – Clear and pragmatic IM policy
  – Much improved IM assessment process
  – Every munition in inventory now assessed

• IMIP provides a practical means of managing IM insertion across the inventory

• Strong support from the highest levels of the MOD

• Better understanding of the risks

• Acceptance of the need for IM – now part of core business

• Bottom line: The Inventory is becoming progressively safer
QUESTIONS?