A Rationale for Establishing Survivability Requirements for Objective Force Unmanned Army Platforms and Systems

8th International C2RT Symposium

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Outline

• Introduction

• The Army NWE survivability requirement

• The new susceptibility chart

• Example

• Conclusions
Introduction

• Legacy Force/Interim Force transition

• Objective Force – new systems and doctrine

• International NWE survivability interest
  - Quadripartite Standardization Agreement (QSTAG)
  - NATO Standardization Agreement (STANAG)
The Army NWE Survivability Requirement

- Only equipment supporting critical missions has a NWE survivability requirement

- Training and Doctrine Command establishes the requirement for Army ground equipment (typically mobile ground-based (MGB))

- Space and Missile Defense Command establishes the requirement for its equipment (typically missiles)

- Generally states the type of criteria (all or HEMP only) and the time frame (operate through or back on line after a specified time period)
The New Susceptibility Chart

- Approach follows QSTAG 1031
  - Five equipment classes
  - Criteria based upon the weakest link

- Rationale specified in QSTAG 2041
  - Allows for evolution of unmanned equipment design and usage
  - Weakest link is equipment, not man
The Army NWE Survivability Requirement

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The Army NWE Survivability Requirement

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# The New Susceptibility Chart

**Predominant * Susceptibility Chart for Five Unmanned, Legacy-Like Equipment Classes**

<table>
<thead>
<tr>
<th>CLASS I</th>
<th>CLASS II</th>
<th>CLASS III</th>
<th>CLASS IV</th>
<th>CLASS V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmanned Equipment Exposed</td>
<td>Unmanned Equipment in Shelters</td>
<td>Unmanned Equipment in MBTs</td>
<td>Unmanned Equipment in LAFVs</td>
<td>Unmanned Equipment in Airborne Systems</td>
</tr>
<tr>
<td>Blast</td>
<td>DPI&lt;sub&gt;class I&lt;/sub&gt;</td>
<td>DPI&lt;sub&gt;class II&lt;/sub&gt;</td>
<td>DPI&lt;sub&gt;class III&lt;/sub&gt;</td>
<td>DPI&lt;sub&gt;class IV&lt;/sub&gt;</td>
</tr>
<tr>
<td>Thermal</td>
<td>[fluence, flux]&lt;sub&gt;class I&lt;/sub&gt;</td>
<td>[fluence, flux]&lt;sub&gt;class II&lt;/sub&gt;</td>
<td>[fluence, flux]&lt;sub&gt;class III&lt;/sub&gt;</td>
<td>[fluence, flux]&lt;sub&gt;class IV&lt;/sub&gt;</td>
</tr>
<tr>
<td>INR</td>
<td>[total dose, neutron fluence, gamma dose rate]&lt;sub&gt;allclasses&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SREMP</td>
<td>Derived from [total dose, neutron fluence, gamma dose rate]&lt;sub&gt;allclasses&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEMP</td>
<td>ABCA Standard in Vol. II, QSTAG 244 and QSTAG 1031</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Dominating susceptibility, but associated effects criteria are also stated.

DPI: dynamic pressure impulse  
SREMP: source region electromagnetic pulse  
INR: initial nuclear radiation  
HEMP: high-altitude electromagnetic pulse
Example
Example

Unmanned Armored Scout Vehicle (USAV)

- A realistic, but hypothetical, system
- 15-ton wheeled replacement for the LAFV
- All digital electrics (IFF, C4ISR, WMD sensors)
- Remotely-controlled 60 mm EM rail gun
- USAV could be a part of the new Objective Force family of systems
Example

Objective Force Unit of Action (UA)

- 23-25 Future Combat System types, including 4 UAVs, 3 UGVs, and 3 unmanned sensors

- All types must be self-sufficient for 3-5 days
  - systems will be thrown away or maintained
  - goal is zero logistics line
Example

- Unmanned systems operating near (1 km or less) manned equivalents will have same criteria as manned equivalents (QSTAG 1031)

- Unmanned systems operating far from (more than 1 km) manned equivalents will have criteria from Susceptibility Chart
  - typically, INR effects on electronics will drive the susceptibility
  - blast damage will be limited to MOD 1 levels
Conclusions

- Unmanned equipment will become an integral part of future Army systems (Objective force and beyond)

- Unmanned MGB equipment will have a NWE survivability requirement if they support critical missions

- NWE hardening criteria for that MGB equipment will be based upon QSTAG 2041 rationale