

Evolving Threats

“How they Impact T&E Testing and Infrastructure”

By

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Background

If their economy is destroyed, they will be busy with their own affairs rather than enslaving the weak peoples. It is very important to concentrate on hitting the U.S. economy through all possible means.

The young men [of the Jihad] need to seek out the nodes of the American economy and strike the enemy's nodes.

Osama bin Laden

Background

- In early FY07, the Electronic Warfare Directorate, known as the 412th Electronic Warfare Group, at the Air Force Flight Test Center (AFFTC), Edwards AFB, commissioned a study on evolving threats.
- The resulting report, “Survey of Evolving Threats & Enduring Challenges” was delivered in October 2008.
 - 303 page draft report delivered – still needs some refinement and more information added on certain topics.
 - Evolving threats covered new areas out to 10-15 years and enduring challenges focused on existing known threats and their continued evolution.
- This study looked at both U.S. and foreign systems/threats.
- This study was completed by Cubic Applications Inc., Threat Technologies Division in conjunction with TYBRIN Corporation.

Background

- The focus of the study was two fold.
- It looked at existing and new evolving threats and how they could potentially impact T&E facilities security.
 - How a facility is planned and trained to confront these potential threats (disaster preparedness plans, etc.).
 - External and potential internal threats (insider).
- It also looked at how these evolving threats could potentially impact T&E testing (indoor, outdoor) and T&E infrastructure in the future.
 - Related to the type of T&E testing that might be required as the U.S. develops new weapon systems and counter measures to confront these evolving threats.
 - Support testing related to the Foreign Material Exploitation Program (FMEP).

Evolving Threats Study

- The study looked at a broad spectrum of both existing threats and new evolving threats.
- A threat description was provided for each threat examined.
 - What It Is and the Expected Effects
 - When Available.
 - Employment Method.
 - **Ease of Employment.**
 - **Credibility of Threat.**
 - Lethality and Range.
 - Likely Targets.
 - Typical Defense.

Evolving Threats Study

- The threat descriptions provided ratings for the “Ease of Employment” and “Credibility of Threat”.
- Ease of Employment ratings.
 - **Difficult**: Little or no potential for use due to one or more factors, such as lack of expertise, materials, or deliver system being readily available.
 - **Moderate**: Possible, but one or more factors may make it unlikely at the present.
 - **Unknown**: Ease of employment unknown.
 - **Easy**: Relatively easy to employ due to readily available technology and materials.

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- Credibility of threat ratings.
 - **Low**: Difficult to employ
 - **Moderate**: May be difficult to employ at present, but more likely as technology develops or other factors come into play.
 - **Unknown**: Credibility of the threat is unknown.
 - **High**: Likely to be employed.

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- The study also provided risk factors for each threat examined.
 - Potential impact on DoD-cognizant areas.
 - Likelihood to be used against critical support infrastructure.
 - Near term.
 - Long term.
 - Assessed Risk.
 - Near term.
 - Long term.

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- The risk factors identified for each threat provided ratings for the “Likelihood To Be Used” and “Assessed Risk”.
 - Likelihood To Be Used Against Critical Structures (both near term and long term risks).
 - **Low**: Little or no potential for loss of a given critical infrastructure segment, denials or disruption of service of same.
 - **Moderate**: May cause loss of a critical infrastructure segment, or denial/significant disruption of same.
 - **Unknown**: Unknown impact.
 - **High**: Likely to cause loss of one or more critical infrastructure segments, significant denial/disruption of service of same.

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- Risk factor ratings cont...
 - Assessed Risk (both near term and long term risks).
 - **Low**: Little or no potential risk for the time period indicated.
 - **Moderate**: Moderate potential risk for time period indicated.
 - **Unknown**: Unknown risk.
 - **High**: High potential risk for time period indicated.
- For each threat examined, additional information was provided.
 - **Threat Environment**: Detailed description of the threat itself and how, when and where it might be used.
 - **Key Judgments**: Brief description of the threat's applicability to T&E.
 - **Observations**: Additional information if necessary.
 - **Recommendations**: Information on how to address each threat, types of testing that may be necessary, further studies needed, etc.

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- Threat Description Table Example:

Table 18-1. Threat Description: Thermobaric Materials

What It Is	Enhanced blast and thermal explosive (similar to fuel-air explosives); burn temperature of 2,000°C, but blast effects are more serious than thermal.	
When Available	Now	From Russia, Bulgaria, Poland, Czech Republic, and China.
Employment Method	Same as any other explosive.	
Ease of Employment	Easy	Easily blended and transported; delivered like any other munitions.
Credibility of Threat	High	Cheap, simple process to produce, easy to employ.
Lethality and Range	More energetic and far greater radii of effects (impulse) than conventional explosives; flash intensity and duration can cause temporary blindness.	
Likely Targets	Especially effective within closed spaces, e.g. buildings and caves.	
Typical Defense	Barriers, distance, shock absorption.	

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- Risk Factors Table Example

Table 18-2. Risk Factors: Thermobaric Materials

Potential Impact on DoD-Cognizant Areas			
	Personnel affected, but in relatively small area, e.g. buildings and blocks; structures and materiel destroyed or severely damaged.		
Likelihood To Be Used Against Critical Support Infrastructure			
	Near-Term:	Moderate	Simple technology, materials, and little knowledge needed.
	Long-Term:	High	High, especially if terrorist attacks on U.S. soil accelerate after U.S. begins drawdown of U.S. forces from Iraq.
Assessed Risk			
	Near-Term:	Low	
	Long-Term:	High	
<ul style="list-style-type: none"> Thermobaric materials are of greatest utility in destroying structures from within. Could be used against DoD structures, personnel, and other parts of the national security infrastructure. 			

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- Threats examined by this study and their projected impacts.

Potential Impact On Security	Potential Impact on T&E Infrastructure	Potential Impact on Both Security & T&E Infrastructure	No Expected Impact
Biological Agents	Chemical Warfare Agents	Toxic Industrial Chemicals or Materials	Interhalogen Oxidizers (IHO)
Metal Embrittlement Materials	Improvised Explosives	Improvised Explosive Devices (IED)	Vehicle-Borne Improvised Explosive Devices (VBIED)
Platter Charges	Explosively Formed Projectiles (EFP)	Energetic/Reactive Materials	Thermobaric Materials
High-Energy-Density Materials (HEDM)	Hafnium Bombs and Isomer Grenades	Information Operations/Cyber Attacks	Power Disruption Ordnance
General Nuclear Devices and Weapons	Fourth Generation Nuclear Weapons	Radiological Dispersal Devices (RDD) and "Dirty" Bombs	General Radio Frequency Weapons (RFW)

Evolving Threats Study

- Threats examined by this study and their projected impacts.

Potential Impact On Security	Potential Impact on T&E Infrastructure	Potential Impact on Both Security & T&E Infrastructure	No Expected Impact
Charged Aerosol	Active Denial System (ADS)	Short-Pulse Radars	Foreign RFW Programs
Hypersonic Guns	Electromagnetic Rail Guns	Electrothermal Chemical Guns (ETC)	Electric Coil Guns
Acoustic Guns	Metal Storm	Laser Weapons	Dynamic Pulse Detonation (DPD)/Plasma Acoustic Shield System
Particle Beams	Weather Modifications	Asymmetric Warfare	Unrestricted Warfare
Strategic Indirect Warfare	Political Warfare	Economic Warfare	Anti-Satellite Weapons (ASAT)

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Appendices

- The report also contains eleven different appendices.
 - **Appendix A: Bibliography** – A detailed 10 page list of all the sources of information used to compile this report.
 - **Appendix B: Glossary** – A list of all the unique Terms/Acronyms used in the report and their definition.
 - **Appendix C: Threat Environments & Municipalities** – This appendix contains 5 pages of information that correlates information from Table C-1 of the original document to when they become viable and whether or not they may effect DoD and T&E functions.
 - **Appendix D: Correlation of Adversary Categories of Concern Goals, Attack Approaches, Evolving Threats, and DoD T&E Missions:** Five pages of documentation regarding the categories of concern, attack goals, attack approach, and weapons of choice versus DoD T&E missions.

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Appendices

- The report also contains eleven different appendices (cont...)
 - **Appendix E: Evolving Threats versus Critical Infrastructures** – A detailed 7 page report that lists the pros and cons of various styles of attack versus the targets of choice, delivery means, likelihood of target choice versus effect, and most likely/least likely conflict spectrum.
 - **Appendix F: Weapons of Information Operations & Cyber Warfare** – A three page detailed report of how cyber warfare affects the U.S. and specifically T&E ranges.
 - **Appendix G: Uranium Enrichment, critical Mass, and Potential Sources of Special Nuclear Material** – This appendix contains 6 pages of information about the percent of uranium enrichment, who has it (especially the Highly Enriched Uranium (HEU)), and the availability of this material for weapon programs underway around the world.
 - **Appendix H: Foreign RFW Program Summary:** This appendix contains 15 pages on the state of foreign radio frequency weapons programs with regards to who has them, how far along they are in the development and deployment, and to what extent they pose a threat to the U.S.

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Appendices

- The report also contains eleven different appendices (cont...)
 - **Appendix I: Radio Frequency Weapon Technology** – This appendix contains 13 pages of information on the types of technology being looked at by the various nations around the world for creating radio frequency based weapons.
 - **Appendix J: Understanding Radio Frequency Weapons (RFWs)** – This appendix contains 16 pages of information that explain why RFWs are so important; why the threat is so great; details on specific RFWs known to exist; how they interact with their intended target; and which types of targets are most vulnerable to this evolving threat.
 - **Appendix K: Vulnerability Mitigation Program Lessons Learned** – This appendix contains 6 pages of information on nuclear induced Electromagnetic Pulse (EMP) effects; current protection levels; and where we need to focus on protection for future generations of nuclear induced EMP.

Summary

- *“Survey of Evolving Threats and Enduring challenges”*
 - Currently in a draft state.
 - Final report due out later this year.
 - Contains classified supplements.
- Comprehensive report on existing and new threats.
- Provides detailed information on each threat addressed.
- Provides an analysis on how each threat potentially impacts T&E.
 - Facility security concerns.
 - Potential T&E infrastructure shortfalls.