Systems Approach to Anti-Terrorism

July 30, 2002

SEITC
Anti-Terrorism International Working Group (ATIWG) Mission and Structure

ATIWG Mission: Involve entire membership in the creation of an INCOSE-wide product, which demonstrates the use of systems engineering principles, techniques, and practices to reduction and eradication of international terrorism

ATIWG Structure:
- Steering Committee
  - W. Mackey, TB and ATIWG Chair
  - H. Crisp, BOD
  - B. Ewald, BOD
  - H. Stoewer, Pres-Elect and Germany Chapter
  - A. Fairbairn, IEWG Cochair and UK Chapter
  - D. Cropley, INCOSE 2001 Tech Chair and SESA Member
  - Jas Madhur, INCOSE 1998 Symp Chair and Vancouver Chapter Member
  - P. Sweeney, SEITC Chair
- Volunteer members of INCOSE
Current Status

- SEITC Status:
  - Charter created Sept. 17, 2001

- ATIWG Status:
  - Charter created Sept. 18, 2001
  - Steering Committee formed

- Anti-Terrorism System Model - Proposed Strawman

- Questions to be answered - Proposed Strawman
ATWG Proposed Approach

- Step 1: Identify Customers and Stakeholders
- Step 2: Develop Problem Statement
- Step 3: Evaluate Issues
- Step 4: Establish Criteria for Project Selection
- Step 5: Identify SE Opportunities
- Step 6: Evaluate Alternative Opportunities
- Step 7: Select INCOSE Project(s)
Step 1: Identify Customers and Stakeholders

q Customers (any entity that addresses the terrorism issue through an INCOSE solution or product)
   - Government
     • Federal (e.g., USN, FAA)
     • State and Local
   - Non-Government
     • Commercial
     • Non-profit

q Stakeholders (any entity that benefits from the solution)
   - World governments
   - General public
   - Military
   - Government agencies
   - Associations
**Relationship Scenario**

- **Terrorists**
  - INCOSE-ATIWG
  - [projects] systems to-
  - suppression
  - interdiction
  - intervention
  - mitigation
  - recovery
  - prevention
  - regarding
  - selves
  - property
  - institutions
  - culture
  - values

- **Victims**
  - by

- **Governments**
  - Associations
    - social
    - professional
    - industrial
    - religious
    - neighborhoods

- **Selves**
The Anti-Terrorism System Model

System = “An interacting combination of elements viewed in relation to function”

Functions of the Anti-Terrorism System Model
- To reduce or eradicate the effects of international terrorism
- To eliminate the stimuli that initiate the development of international terrorism
### The Anti-Terrorism System Model (cont’d)

<table>
<thead>
<tr>
<th>q</th>
<th>Input</th>
<th>stimuli that initiate potential terrorists’ desires to commit acts of terrorism in order to satisfy their needs and requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>q</td>
<td>Output</td>
<td>the damages arising from loss of life, personal injury and destruction of property resulting from a terrorist’s activities</td>
</tr>
<tr>
<td>q</td>
<td>External constraints</td>
<td>international law, economics, environmental prohibitions, geography, etc.</td>
</tr>
<tr>
<td>q</td>
<td>Functions</td>
<td>the activities and processes conducted to prevent international terrorism</td>
</tr>
<tr>
<td>q</td>
<td>Mechanisms</td>
<td>people, technologies and processes used to prevent international terrorism</td>
</tr>
<tr>
<td>q</td>
<td>Feedback controls</td>
<td>the modifications that can increase or decrease terrorism activity</td>
</tr>
</tbody>
</table>
The Anti-Terrorism System Concept Model

Terrorism Stimuli

Initiate Terrorist Activities

Terrorist Threat

Execute Terrorist Activities

Risk Damages

Threats
- Bombings
- High-Jackings
- Nuclear Weapons
- Chemical Weapons
- Biological Weapons

Vulnerabilities of U.S. and World Population

• Loss of Life
• Human Injury
• Loss of Property

Conduct International and National Response

Attack Response

Modifications to Stimuli Through International and National Response

- Loss of Life
- Human Injury
- Loss of Property
Anti-Terrorism System of Systems Hierarchy

Anti-Terrorism System of Systems

Government Segment

Military Element
- Attack Elements
- Intelligence Elements
- Diplomatic Element
- Other

Non-Military Element
- Religious Leaders

Religious Element
- Other

Non-Government Segment

Commercial Element
- Airlines
- Petroleum Companies
- Other

Communications Media
- Telecommunications Element
- Other

Other
- Academic Element
- Judicial Element
Step 2: Problem Statement

NEED: Victims are seeking assistance and protection against threats and acts of terrorists from governments, industry and associations.

PREMISE: SE principles, techniques and practices can be effectively applied to reduce and eradicate the acts of terrorists.

OPPORTUNITY: A window exists to focus the application of SE on the integration and coordination of efforts that lessen the effects of terrorism.

INTENTION: INCOSE will apply SE to provide selected services and products that respond to and prevent current and future acts of terrorism.
Step 3: Evaluate Issues

- Should the project be Classified or Unclassified?
  - Agreed to Unclassified

- To what extent does this WG make its products open and visible to the public?
  - Agreed to open and visible

- We will Bound the Problem
  - Agreed that we have a well constrained problem for our initial activity(s); Allow us to build INCOSE reputation/integrity
  - Address a problem that reflects future view (a postulated view of the terrorist threat)

- Should the WG be concerned about the personal risks?
  - Agreed that this is not material provided that we adhere to the above guidelines
Step 3: Evaluate Issues (cont’d)

- What are the cultural and political issues?
  - Desire for cultural diversity in WG constituency
  - Prior agreement on international composition of WG must adhere to INCOSE regulations (per US Law)

- How do we separate security issues from anti-terrorist issues?
  - Anchor point is anti-terrorism
Step 4: Establish Criteria for Project Selection

The project should:

- Have international applicability
- Be amenable to systems engineering
- Be of interest to the INCOSE membership
- Have a customer
- Add value and not duplicate existing efforts
- Be capable of being performed by volunteers
- Fit within the scope of the Working Group
- Be a well bounded problem
- Be unclassified, unrestricted, open and visible
Step 5: Identify SE Opportunities

- Partnership with American Society of Naval Engineers
  - “Maritime aspects of Homeland Security” Workshop or Conference this Fall to address long term solutions
- NSWCDD (Dahlgren)
  - Develop significant concepts
- Coastal System Station, NSWCDD (FL)
  - Protection of maritime assets
  - Building a virtual port to test capabilities of “first responders”
- FAA
  - Rosetta stone translation and taxonomy effort for INFOSEC
- Expand and refine the Anti-Terrorism Exploration Concept Document
Step 7: Select INCOSE Projects

“The Role in Combating Global Terrorism” Panel at INCOSE 2002

- Panelists may include:
  - FAA representative
  - Former military and commercial pilot
  - DOD and/or contractor representative
  - ATIWG representative(s)
  - Ft Detrick biotechnology expert (?)
  - Prof. Aguillar network evaluation expert (?)
Format for the System Concept Model Concept Exploration Document

- Context of the Discipline (e.g. economics, political science, religions and culture, psychology and sociology, geography and geology, international law, etc.)
- Issues and questions addressed
- Discussion of each issue
- Findings
- Systems engineering challenges
- Conclusions and recommendations
- Experts and contacts
- References
- Author of segment
The Terrorist Activity Stimuli

- Economics
- Religion
- Culture
- Psychology and Sociology
- Politics and Struggle for Power
- Geography and Geology
- Energy Production, Distribution and Consumption
THE ANTI-TERRORISM RESPONSE SYSTEM

THE ANTI-TERRORISM RESPONSE PROCESS IS A TRADITIONAL SYSTEM WITH FEEDBACK RESPONSE

INPUT
• Terrorist Attack

OUTPUT
• Reduced Terrorist Problem

FUNCTIONS/ PROCESSES
• International Law and Courts
• Military Response
• Security Measures
• Economic Means
• Legal Prosecution

FEEDBACK
MODIFICATIONS TO INTERNATIONAL AND U.S. NATIONAL RESPONSE PROCESSES
Example Expertise Required to Address Challenge

- Economics
- Political Science
- Religions and Culture
- Psychology and Sociology
- Geography and Geology
- Military and Defense
- International Law
- Terrorism and Counter-Terrorism
- Intelligence Collection, Analysis and Distribution
- Telecommunications and Computer Engineering
- Aviation and Space Technologies and Engineering
- Security Engineering
- Biological, Chemical and Nuclear Technologies and Engineering
- Energy Production, Distribution and Consumption
Association for Enterprise Integration (AFEI) Conference on – Systems Approach to Terrorism

George Washington University
July 15-16 2002
AFEI Conference Summary

- A two day conference designed to explore a systems approach to fighting terrorism.

- The conference provided insight on how terrorism impacts different domains. Some domains addressed:
  - Geo-Political
  - Economics
  - Cyber-terrorism
  - Transportation

- The conference also provided insight into methods and tools that are or will be available to better analyze and combat terrorism.
Systems Approaches Discussed

- Address the problem at three levels:
  - Perimeter Defense (National Defense)
  - Interior Defense (Homeland Security)
  - Consequence Management (if the first two fail)

- Address not only the “Terror Act” but also the people committing the act.
  - Analyze why they pick certain targets, what methods could they use on those targets, and what factors influence when the event happens (timing)
This issue was addressed by several of the speakers.

MG Lawlor, Senior Director of Protection and Prevention, OHS

- Identify assets by function.
- Develop criteria to determine asset criticality and prioritize
- Assess Vulnerabilities
- Develop Solutions

SE Challenges

- Identify interfaces of the critical assets
- Develop a “one to end” list of critical assets across functional lines.
SE Approach to Anti-Terrorism - Pitfalls

- Focusing on an event to develop strategy
- Discount the importance of analyzing the situation from the other sides point of view
- Emotional Responses and Opinions