



Mission Assurance: Analysis for Cyber Operations

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Working Group 1

Situational Awareness

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WG Purpose/Focus

Purpose:

- Define the problems & approaches in greater fidelity based on input from panels
- Develop courses of action or methodologies to reconcile issues identified
- Develop recommendations for DoD leadership on the process / steps needed to develop the structure for and methodology to perform cyber SA assessments

Focus:

- Develop potential characteristics of an initial framework that will enable the scoping and prioritization of cyber SA assessments
- Using the initial framework, develop a proposed scope of DoD cyber and the system attributes for which SA must be assessed
- Using the initial framework, develop a proposed scope for adversary cyber and the system attributes for which SA must be assessed
- Identify potential cyber SA assessment families of tools



Step 1: Top Cyber SA Needs for Mission Assurance

1 – Cyber Environment (INFOCON)

- Abnormal Activity
- Normal Activity

2 – Cyber Health & Status

- Ours
- Partners/Coalition/Commercial

3 – Cyber Capability Impact

- Availability of Forces/Assets
- What is lost if supporting cyber capability goes down?
- What is the impact to an adjacent capability?
- Tradeoff Space? Mitigation Costs?

4 – Mission Impact

- What is the probable degradation to the intended mission?
- What is the likelihood of success?
- Tradeoff Space? Mitigation Costs?

5 - Adversary Cyber Profile

- Who are they? What are they capable of? What are their TTPs?
- What are their vulnerabilities?
- Temporal aspects

6 – Cyber Resiliency

- Reconstitution
- Redundancy
- Mitigation
- Continuity of Operations (COOP)

7 – Cyber Relationships (Authorities)

- Supported
- Supporting
- External (Commercial)



WG1: What we found

- **Developing the formal framework that will enable scoping and prioritization of cyber SA assessments is difficult**
- **Network Management (NM), Computer Network Defense (CND), and Computer Network Attack (CNA) are separate functions that require tailored approaches**
 - **Clear definitions and delineation are a necessity**
 - **Responses and reactions vary depending on visibility and mission impact**
 - **Patti's computer/comms aren't as important as the CC's**
 - **Urgency, as a function of the mission, needs to be captured**
 - **Mission assurance and criticality drive system prioritization**
- **Current Cyber SA is very limited**
 - **Modeling framework must be flexible so that criteria can be added/subtracted or modified for different scenarios**
- **Automated data collection and visualization are imperative**
 - **Allow time to analyze and understand the data to provide insight**
 - **Reduce latency in decision-making, comprehension, and response**
 - **Provide a better comprehension of the situation/cyber geography**



WG1: Key data questions

• Mission Needs

- What is the relevance of the data to the mission?
- Which data has a higher priority?
- Who should have access to the data?
- How to filter/compartmentalize sensitive data in a Coalition environment?

• Sources

- What source provided the data?
- Can we trust the data source and/or the consolidation of the data?
- With whom can we share the data?
- With what frequency is the data provided/refreshed?
- How can we improve visibility into coalition/partner/service data?

• Attributes

- Is the data available?
- How valid is the data?
- What is the lifespan of the data?
- Can access to/analysis of the data be automated...Can you trust the algorithm?

Cyber SA Needs

- 1- Cyber Environment
- 2- Cyber Health & Status
- 3- Cyber Capabilities Impact
- 4- Mission Impact
- 5- Adversary Cyber Profile
- 6- Cyber Resiliency
- 7- Cyber Relationships



WG 1 - Open Questions

- **What are the Legal/Policy issues affecting our ability to have the SA we need?**
 - Domestic, International, Title Issues
 - National, Departmental, Unit, etc.
- **How can we improve Cyber-focused Wargame engagements?**
 - Depth of Cyber Order of Battle understanding
- **How would we best implement a DIRCYFOR?**
- **How do we anticipate vulnerabilities associated with emerging technologies?**
 - Cloud computing, mobile, social networking, etc.
- **Can we define the full spectrum of cyber impacts from the Human Element?**
 - Social engineering, shaping/influencing opinions, attack vectors, etc.
- **How would we establish a concept/doctrine/process for Cyber Deterrence?**
- **How do we determine adversary's intent?**



WG 1 - Potential Cyber SA Assessment Capabilities

- Comprehensive Cyber Assessment Framework (MOEs & MOPs)
- Cyber Common Operating Picture (COP)
- Cyber Dashboard
 - Supporting Tools
 - Data Collection and Aggregation Tools (**Collection point for data from multiple sources; correlation analysis**)
 - Visualization Tools, i.e. Malicious Activity or Network Management
 - Techniques
 - Pattern Recognition (**Abnormal pattern detection**)
 - Neural Networks, Anomaly Detection, Statistical Process Control
 - Epidemiology Modeling (**Worm or Malware propagation**)
 - Predictive Modeling (**"Cyber Weather"??**)
 - Agent-based Modeling (**Impact of network activity**)
 - Game Theory (**Risk Analysis**)



WG 1 – Way Ahead

- **Analyze gaps/shortfalls in cyber support to current missions**
- **Investigate means for quickly determining lines of authority responses given suspicious activity at known locations (IP addresses)**
 - **Speeds interagency coordination and decisions on legal implications**



WG 1 – Recommendations

- **Develop a comprehensive framework that will enable the scoping and prioritization of cyber SA assessments**
- **Sponsor a study to develop a cyber SA framework**
 - **Establish a sharable baseline of cyber data to support warfighter analysis**
 - **Drive POM inputs for cyber capabilities, tools, etc.**