

---

# **Information Assurance Metrics Highlights**

**Dr. Michael Schilderout  
Naval Security Group**

**REPORT DOCUMENTATION PAGE***Form Approved*  
*OMB No. 074-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503

<b>1. AGENCY USE ONLY (Leave blank)</b>		<b>2. REPORT DATE</b>	<b>3. REPORT TYPE AND DATES COVERED</b>	
<b>4. TITLE AND SUBTITLE</b> Information Assurance Metrics Highlights			<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> Schildcrout, Michael				
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b>  Booz Allen & Hamilton 8283 Greensboro Drive McLean, VA 22102			<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b>  Naval Security Group			<b>10. SPONSORING / MONITORING AGENCY REPORT NUMBER</b>	
<b>11. SUPPLEMENTARY NOTES</b>				
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release; Distribution unlimited			<b>12b. DISTRIBUTION CODE</b>  A	
<b>13. ABSTRACT (Maximum 200 Words)</b>				
<b>14. SUBJECT TERMS</b> IATAC Collection, information assurance, metrics, vulnerability analysis, penetration testing			<b>15. NUMBER OF PAGES</b>  17	
			<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> UNCLASSIFIED	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> UNCLASSIFIED	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> UNCLASSIFIED	<b>20. LIMITATION OF ABSTRACT</b>  UNLIMITED	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)

Prescribed by ANSI Std. Z39-18  
298-102

# Outline

---

- **Metrics Development Process**
  - **Joint Service Effort**
  - **DOT&E Sponsorship**
- **Risk Levels**
- **Remaining Issues**

# **Information Assurance Metrics for Operational Test & Evaluation**

---

- **Metrics for IA OT&E must be:**
  - **Physically observable**
  - **Measurable**
  - **Quantitative, when feasible**
- **Directly related to overall goal:**

**Protection of Information**

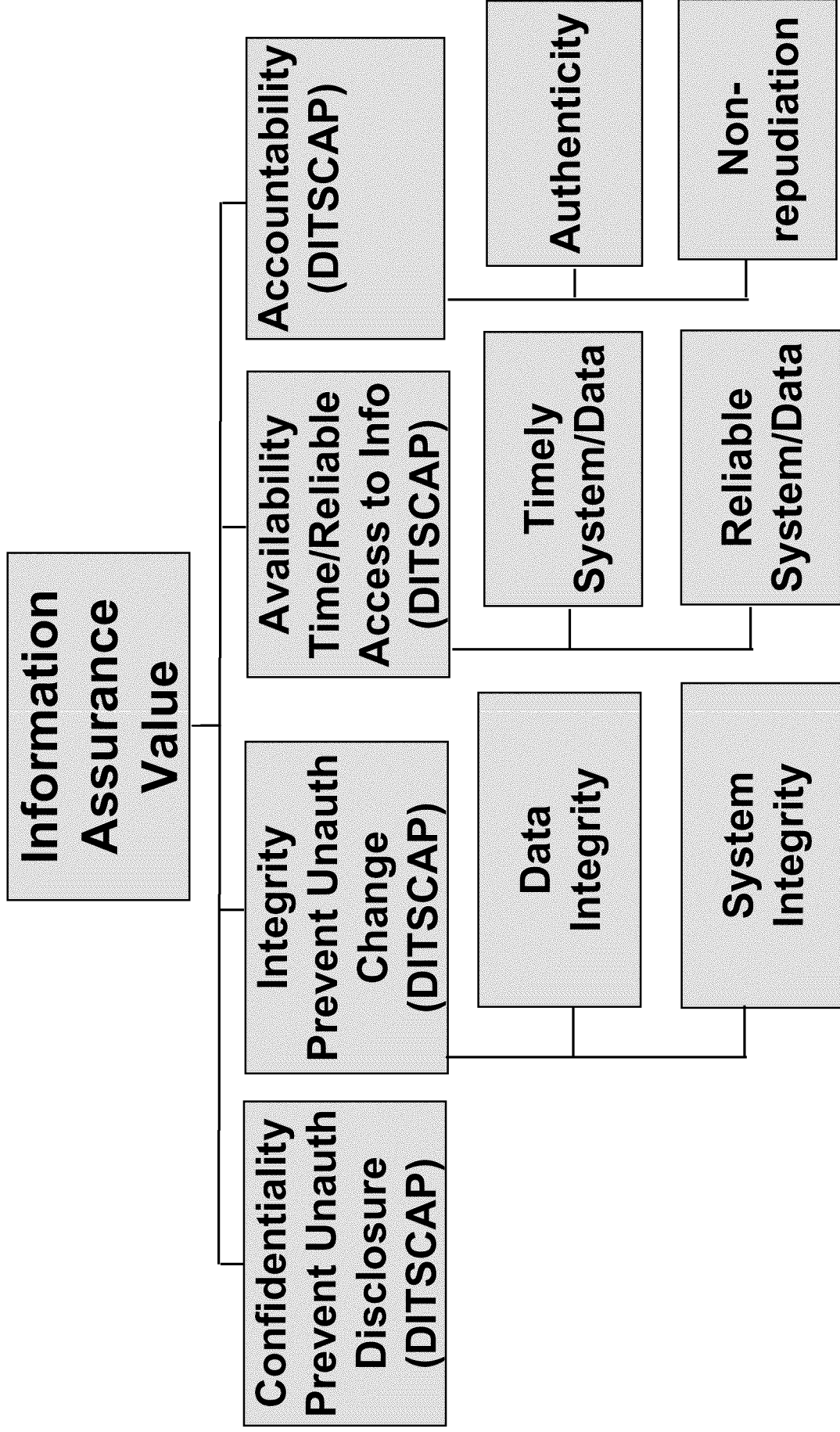
# DITSCAP

---

## DoD Information Technology Security Certification and Accreditation Process

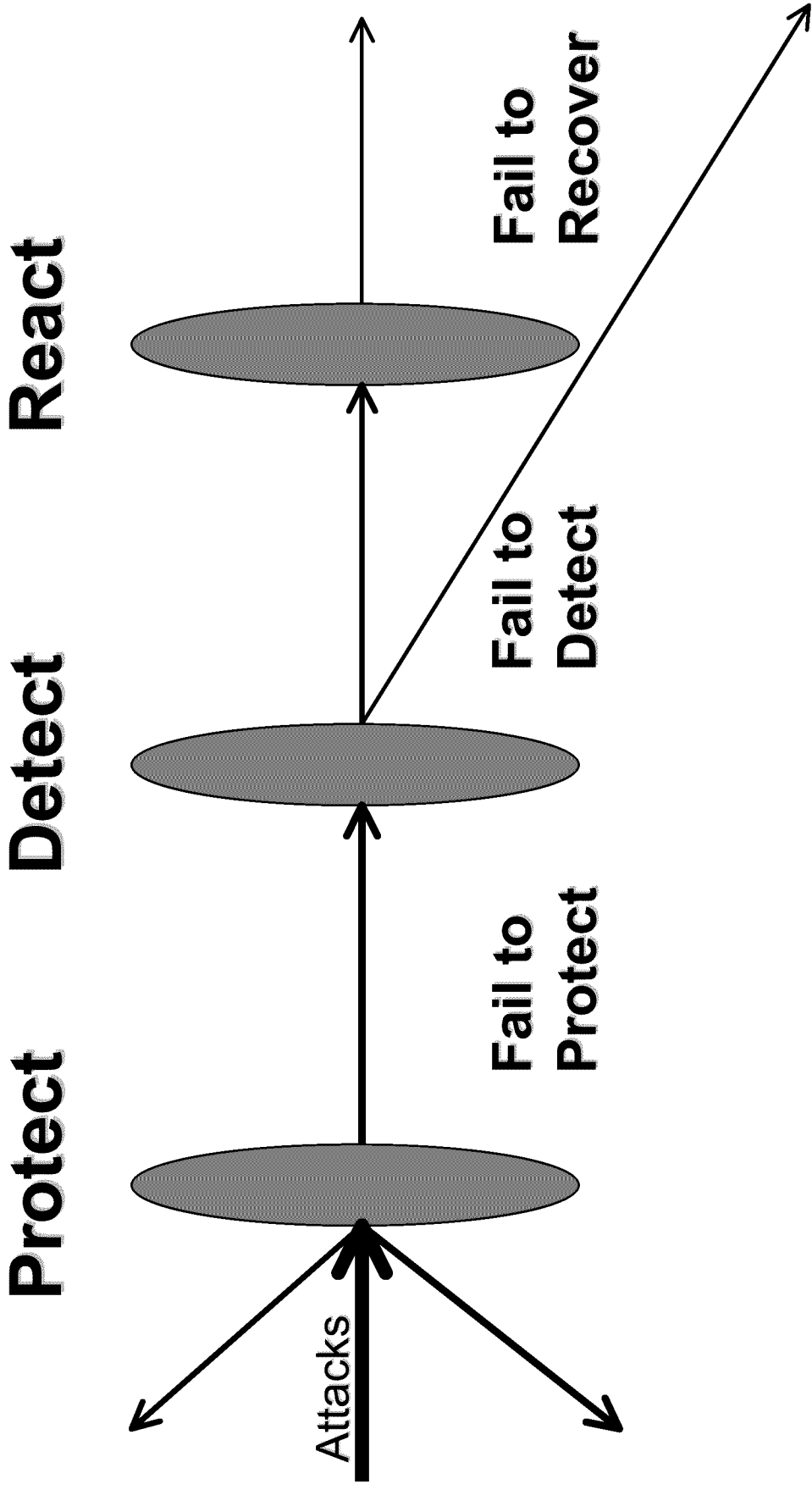
- Developed by the DT Community
- Four Phases. Each phase contains a stage of vulnerability assessment
  - Phase 1: Definition
  - Phase 2: Verification
  - Phase 3: Validation
  - Phase 4: Post-Accreditation

# IA Metric Components



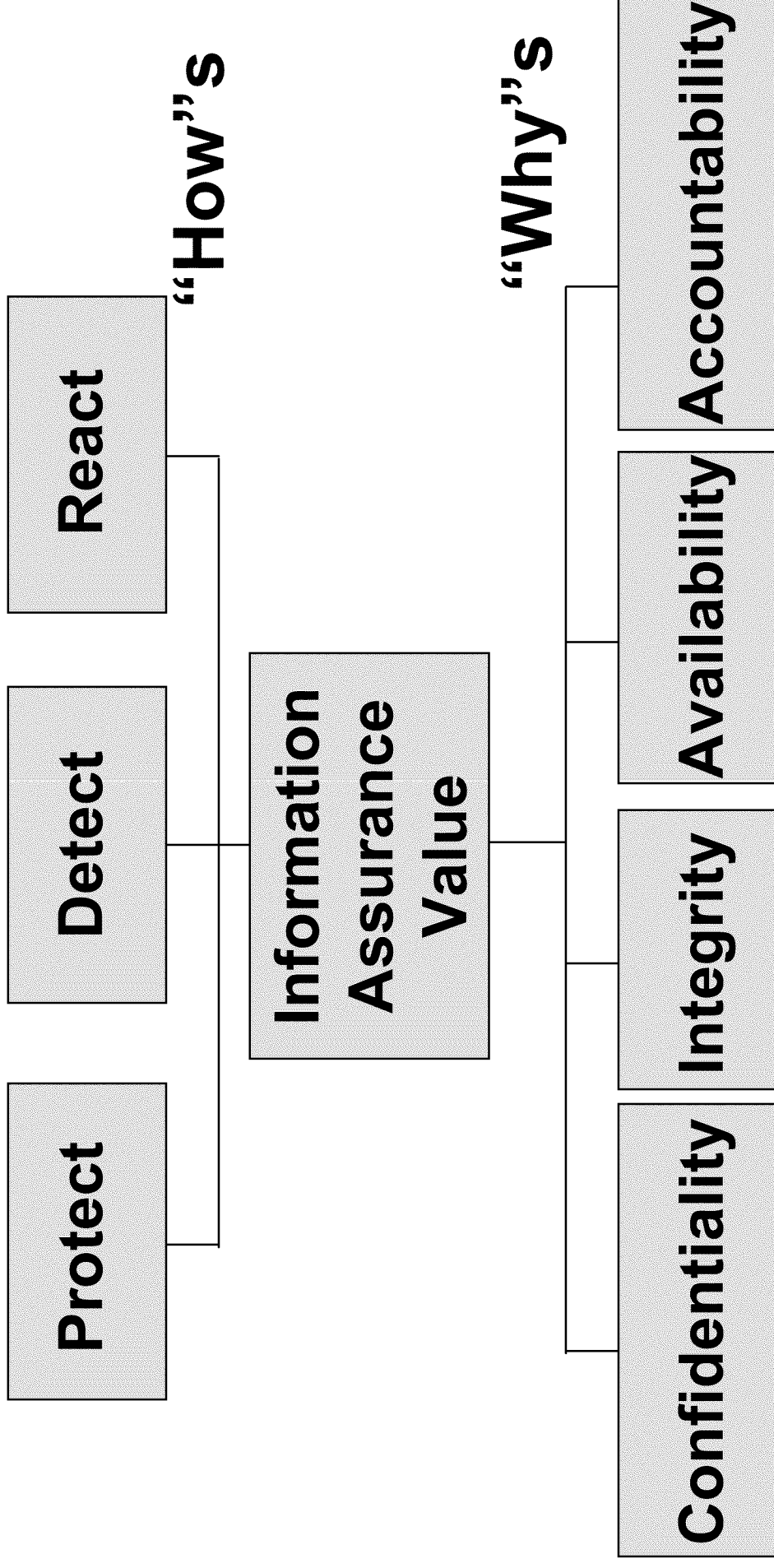
# Information Assurance Value

---



# “Why”'s to “How”'s

---





# **Streamlined Metrics**

---

- 1. Review / Inspection of Security Policy**
- 2. Effectiveness against Unauthorized Access or Disclosure**
- 3. Effectiveness against Attack on Data**
- 4. Effectiveness against Attack on System**
- 5. Effort to penetrate to a given level of Access  
(Privileged, Root, etc.)**
- 6. Effectiveness of Authentication**

# IA OT&E Test Standards

---

- **Review / Inspection of Security Policy and Procedures**
- **System Scans**
- **Penetration Tests**
  - **Insider**
  - **Outsider**
- **Password Cracking**
- **Detection/Recovery Time**

# Threat-Risk Assessment Matrix

(Higher Level = Higher Risk)

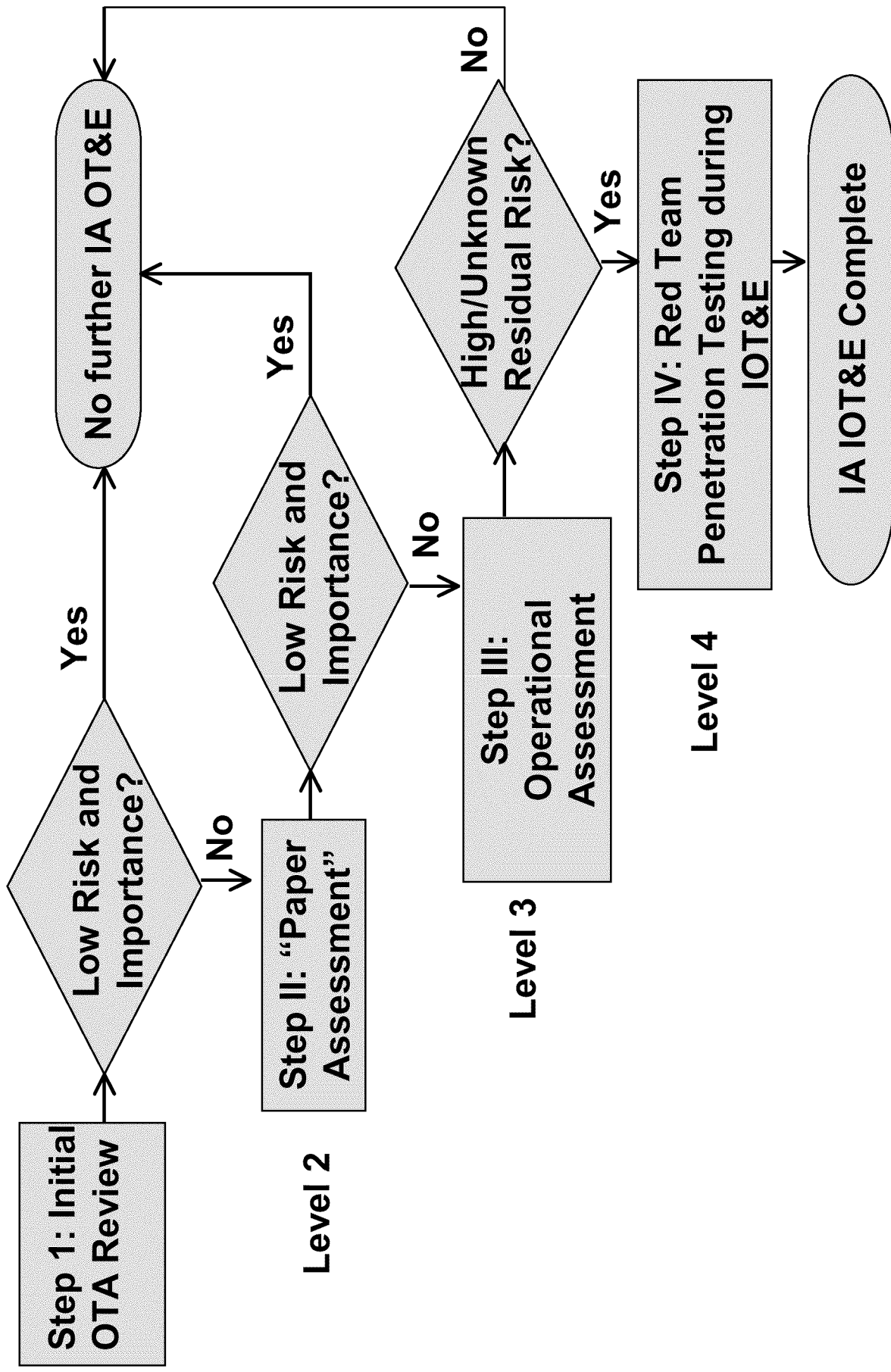
Threat Impact	Likelihood of Threat Penetration		
	Low	Medium	High
Low	Level 1 (None)	Level 2 (Low)	Level 3 (Moderate)
Moderate	Level 2 (Low)	Level 3 (Moderate)	Level 4 (High)
Severe	Level 3 (Moderate)	Level 4 (High)	Level 4 (High)

# IA OT&E at the Different Risk Levels

---

- **Level 1**
  - Exempt from further testing
- **Level 2**
  - Paper Assessment based on system documentation. Similar in scope to DITSCAP Phase 1 vulnerability assessment
- **Level 3**
  - System level assessment similar in scope to DITSCAP Phase 2 vulnerability assessment
- **Level 4**
  - Similar in scope to DITSCAP Phase 3 vulnerability assessment (Level 3 plus Red Team penetration tests)

# IA Process with Risk Levels



# Remaining Issues

---

- **How complete are the metrics?**
  - **There will always be the need for flexibility**
- **How often must IA OT&E be repeated?**
- **How can compatibility with DITSCAP be improved?**
- **Which organization(s) will maintain the IA database?**
  - **What will be the format?**
- **Others?**

---

# Back-ups

# IA OT&E Metrics

1A. Effectiveness of security policy in preventing unauthorized access: all test standards met?
1B. Effectiveness of system's defense in depth: all test standards met?
2A. Effectiveness of system in preventing unauthorized access (Insider and Outsider): acceptable or not acceptable?
2B. Effectiveness of system in preventing unnecessary disclosure of system information: acceptable or not acceptable?
3A. Ability to detect information degradation/corruption/attack: acceptable or not acceptable?
3B. Time (thresholds set by the user) to respond to information degradation/corruption
3C. Time (threshold set by the user) to restore degraded, corrupted information
4A. Ability to detect system degradation/corruption/attack: acceptable or not acceptable?
4B. Time (threshold set by the user) to respond to system degradation/corruption.
4C. Time (threshold set by the user) to restore critical functionality in a degraded, corrupted system
4D. Time (threshold set by the user) to restore full functionality in a degraded, corrupted system
5. Effort (low, medium, high) to penetrate to a given level of access
6. Effectiveness of authentication?



# Example IA Metric with Test Standards

<b>IA OT&amp;E Metric</b>	<b>Test Standard</b>
2A. Effectiveness of system in preventing unauthorized access (from both Insider and Outsider): acceptable or not acceptable?	<ul style="list-style-type: none"><li>• System Test - for low risk/low impact systems only</li><li>• Vulnerability Analysis / Penetration Test - all others (as required; degree TBD; Inside and Outside)</li><li>• List severity of Known Vulnerabilities; none, low, medium, or high</li></ul>
2B. Effectiveness of system in preventing unnecessary disclosure of information; acceptable or not acceptable?	<ul style="list-style-type: none"><li>• System Test - for low risk/low impact systems only</li><li>• Vulnerability Analysis / Penetration Test - all others (as required; degree TBD)</li></ul>

# IA Operational Test Level Process

