

Information Assurance Metrics Highlights

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Outline

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

Information Assurance Metrics for Operational Test & Evaluation

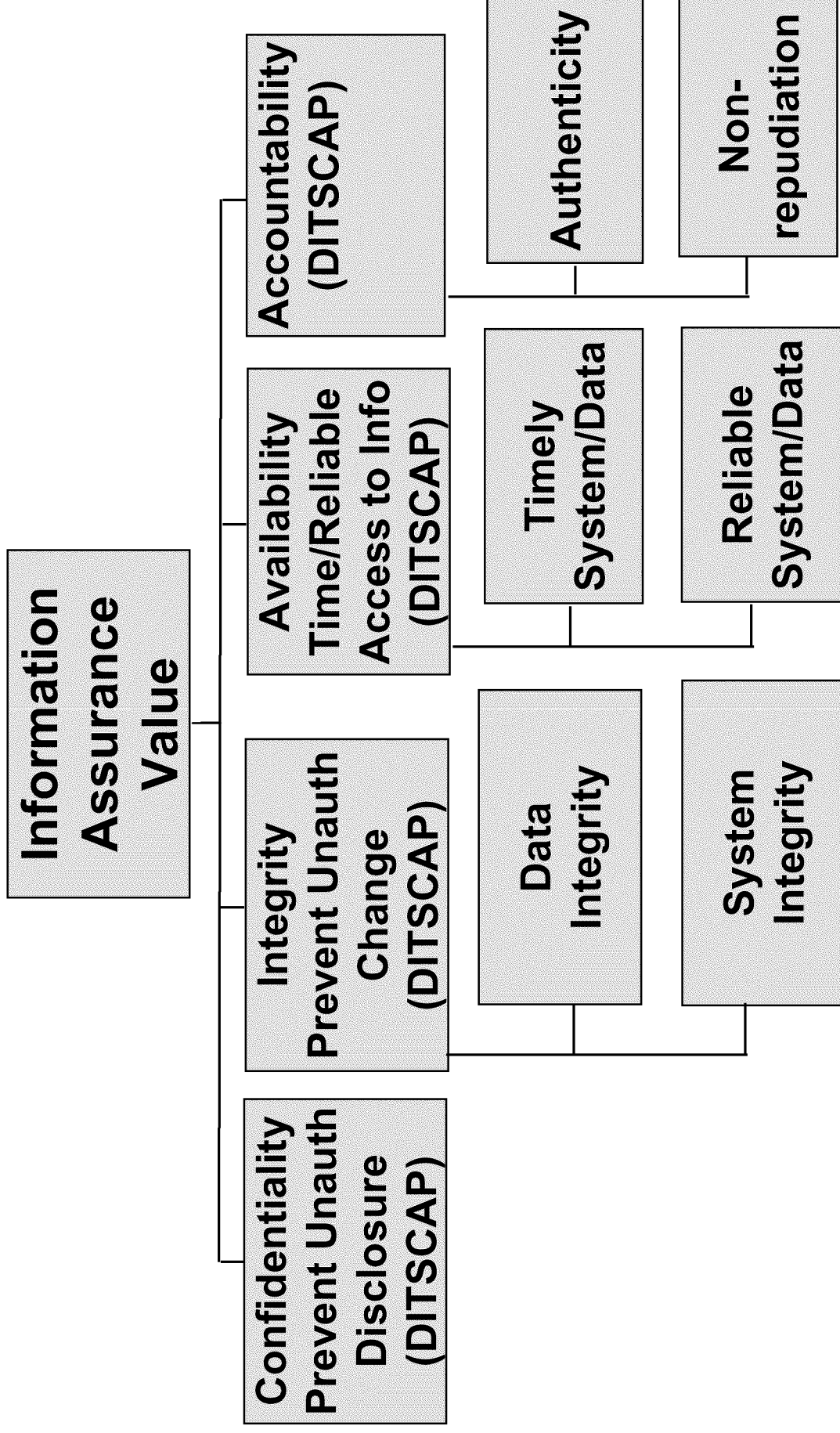
- **Metrics for IA OT&E must be:**
 - **Physically observable**
 - **Measurable**
 - **Quantitative, when feasible**
- **Directly related to overall goal:**

Protection of Information

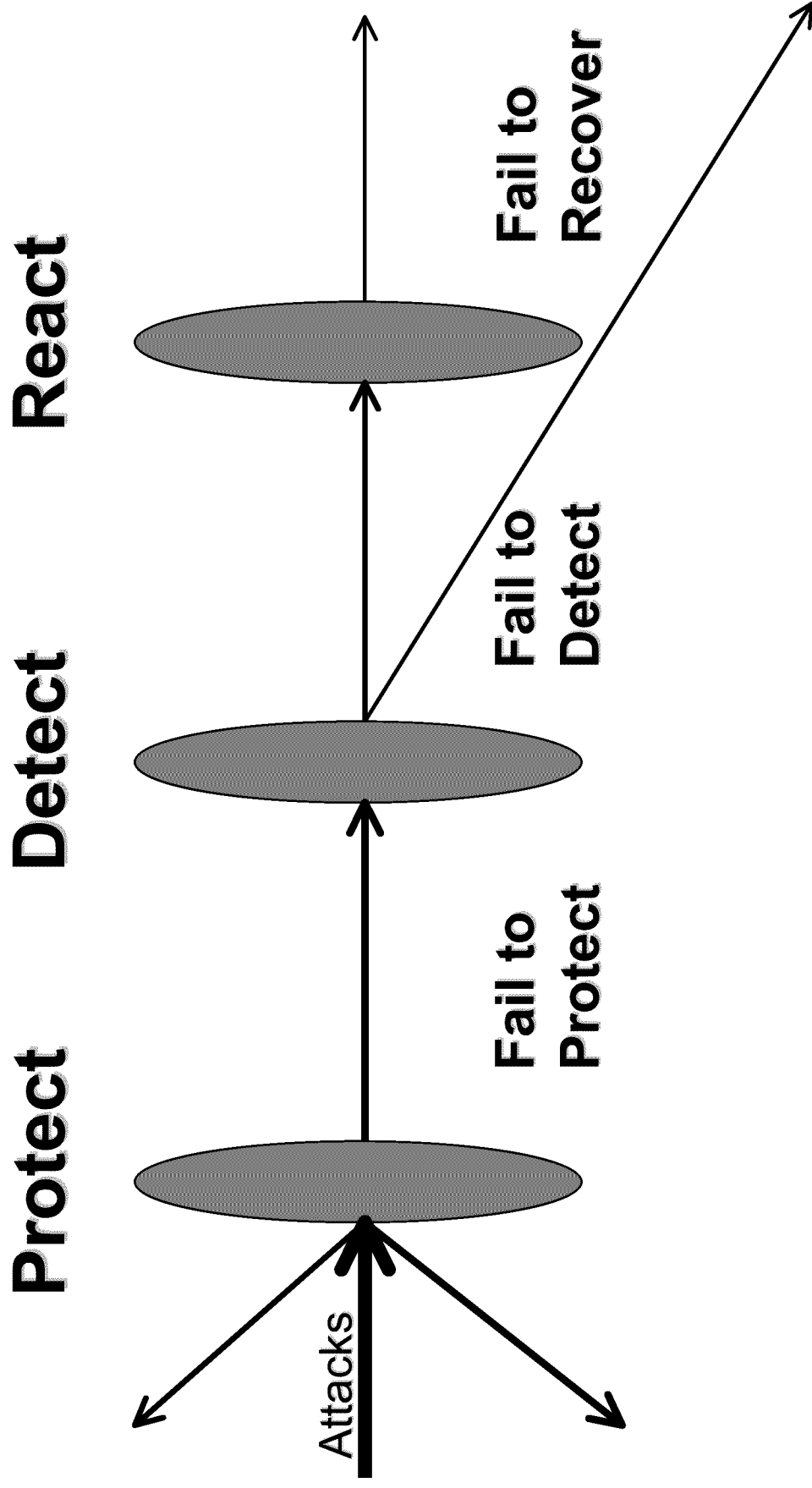
DoD Information Technology Security Certification and Accreditation Process

- 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

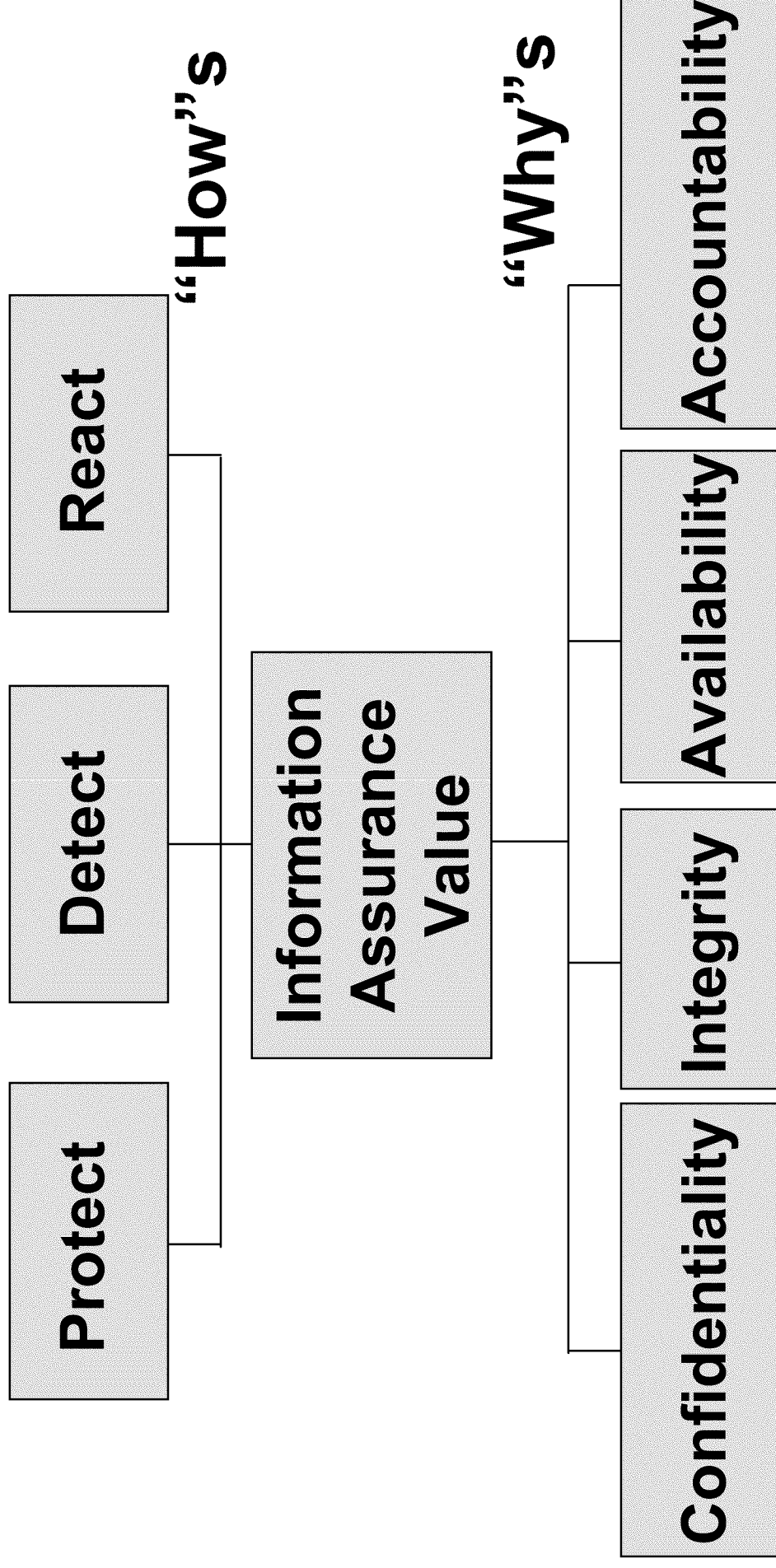
IA Metric Components



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

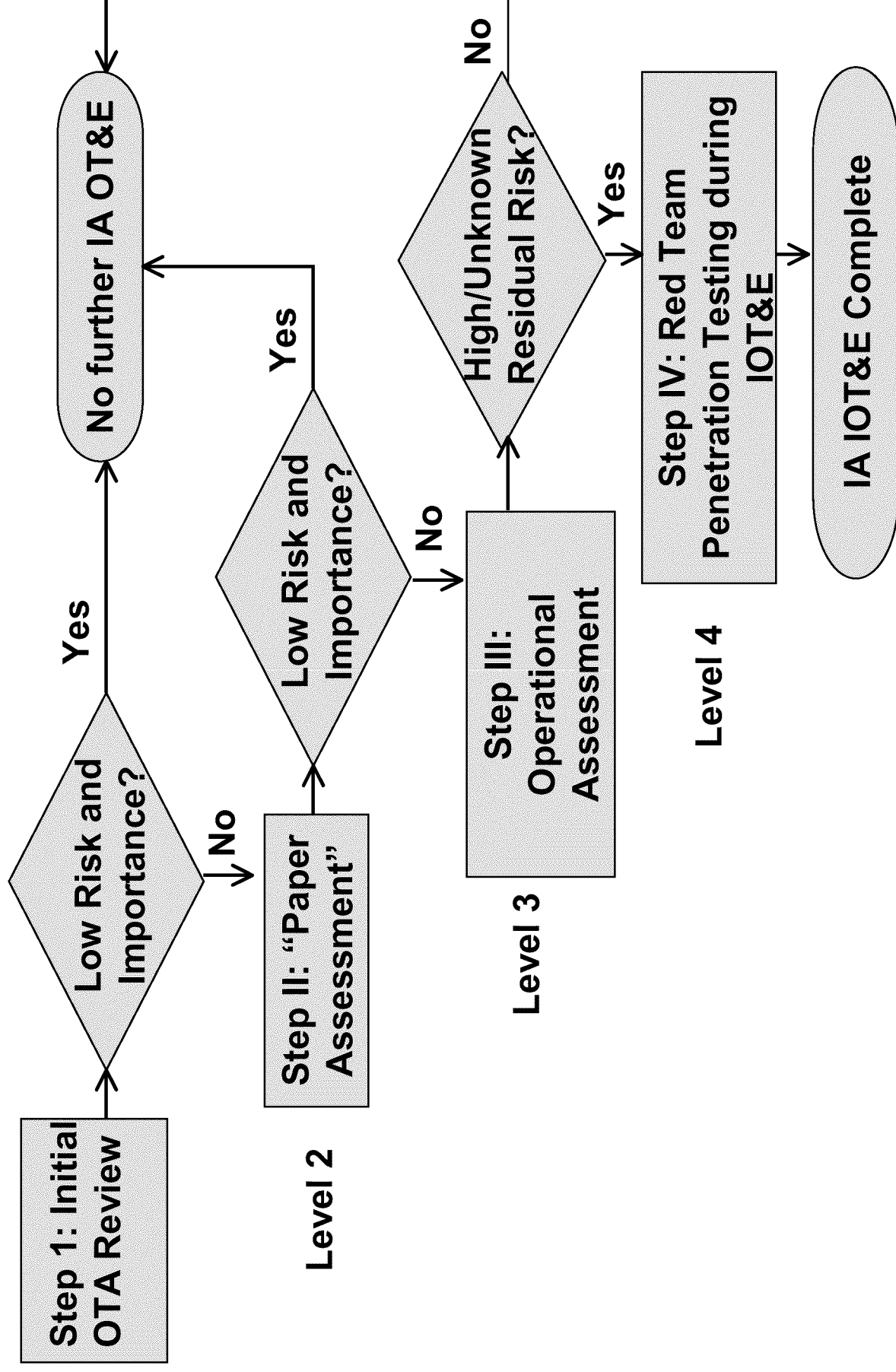
(Higher Level = Higher Risk)

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

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

IA Operational Test Level Process

