

A Systems-based Approach to Insider Security

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July 15, 2009

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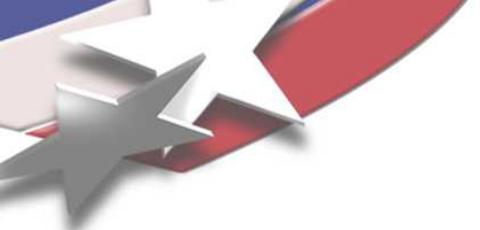
Introduction

- **Describe work we are doing to support the development of a systems-based approach for insider security**
 - Investigate, develop, and demonstrate formal systems engineering methods
 - Modeling and simulation
 - Create a process and architecture with principles, methods, and practices for designing, evaluating, and operating systems that are resistant to insider threats



Overview of Problem

- **Malicious insiders**
 - Among the most ubiquitous and capable security threats
 - Affect every organization in forms that range from petty theft and fraud to espionage and terrorism
- **Focus of previous efforts**
 - Characterize the insider threat
 - Review reported insider incidents
 - Advanced detection strategies
- **Current protections against malicious insider activity**
 - Expensive, intrusive, implemented piecemeal, and operate independently
 - Demonstrate varying levels of effectiveness
 - Little understanding of integrated protections and overall effective insider security
- **High asset facilities need to demonstrate effective insider security while also improving operational efficiency**
- **A significant need exists for improved insider security methods**



Systems-based Approach

- **View the problem as more than detection – instead consider all operational activities**
- **Consider the entire organization as a system that includes elements that not only provide protection against the insider threat, but also influence the insider's characteristics, motives, and capabilities**



Systems View of Insider Security

- **Organizational systems and operations that contribute to insider security – existing and others**
 - Mission and organizational requirements
 - Human resources (hiring practices, background checks, medical, benefits, employee assistance, vacation, sick leave)
 - Personnel security (clearances, visitor requests, travel)
 - Physical security
 - Cyber security
 - Counterintelligence
 - Information security
 - Intelligence community
 - Management
 - Waste, fraud, and abuse
 - Security incident management
 - Others...



Systems View of Insider Security

- **Key system element is the Employee Population – all “employees” are insiders**
 - Have some level of access, knowledge, and opportunity
 - Includes contractors, consultants, and service providers that are not direct employees of an organization
 - Of concern is the malicious insider



Systems-based Approach to Insider Security

- Consider how the insider threat would evolve throughout an employee's career (employee life cycle)
 - Motive, opportunity, and means
- Integrate information and practices from different security disciplines and operational processes
 - Important interactions and interdependencies
- Determine interactions of employee population with insider protection methods
- Explore system changes
 - Effectiveness and costs of different sets of protection measures
 - Changes in policies and practices
 - Impacts of new security technologies, policies, access controls



Results To Date

- **Insider detection and protection mechanisms**
 - Secondary component of other systems
 - Many are ad hoc
 - Operate independently of each other
 - Not well funded
 - Therefore, are results of individual efforts
- **Employee Life Cycle**
 - Modeled using system dynamics
 - Resonates with those working insider problem
 - Identifies transition points of employees
- **Glossary of insider terminology**



Path Forward

- **Modeling and simulation**
 - Employee Life Cycle
 - Map sensing, deterrence, and protections to transition points
 - Exercise using case studies
 - Determine shortfalls
 - Understand important interfaces
 - Information Protection and Control
- **Insider security system**
 - Determine or develop metrics
 - Security culture, deterrence, others
 - Develop notional system architecture
 - Develop or describe additional sensors or actions necessary to cover shortfalls
- **Process development**
 - Demonstrate application for design and evaluation
 - Apply to a range of organizations