Thoughts on Information Operation Detection as a Nonlinear, Mixed-Signal Identification Problem: A Control Systems View

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Feedback control concept for Autonomic Information Assurance

- Multidimensional Policy
  - Policy Specification
  - Policy Projection
- Correction Function
  - Algorithms
  - Actuators
- State Estimation
- System
- Attack
Army Enterprise Architecture

- **Operational Architecture (OA)** is the total aggregation of missions, functions, tasks, information requirements, and business rules.
- **Technical Architecture** is the “building codes” upon which systems are based.
- **Systems Architecture** is the physical implementation of the OA, the layout and relationship of systems and communications.

Joint Interoperability
A Course of Action
Abstract of a Battlefield Environment
Tank Motion Model (Continuous Dynamics)
Command and Control (Discrete Dynamics)

Staff Actions
- Receive Mission
- Discuss Mission
- Prepare Staff Estimates
- Develop Alternative Courses of Action
- Prepare Plan/Order

Commander and Staff Actions
- Staff Estimates Commander's Estimate
- Preferred and Other Alternatives
- Selected Course of Action

Commander Actions
- Analyze Mission/Restate Mission/Prepare Guidance
- Prepare Commander's Estimate
- Decide on Courses of Action

Execution
- Feedback to Higher Staff
- Guidance From Higher Staff
- Feed back From Subord Staff

Coordination
- Coordinate

Plan
- Plan

Control
- Control

Direct
- Direct

Feedback From Subord CDR
- Feed back From Subord CDR

Guidance/Warning Order From Higher CDR
- Guidance/Warning Order From Higher CDR
Fixed and Mobile Networks

AN/PSN-11
AN/VRC-89D
TANK PLT SGT
AN/VSQ-2B(V)1
AF701
BCIS-4
FBCB2
AF701
AF701
CO A 1st AR BN 1st AR BDE
Information Operations

- Need to “understand” the commander’s concept of the operation
- Need to “understand” the status of executing that concept
- A possible effect of Information Operations is to change the perception of the situation
- This is a “mixed-signal” problem with feedback loops