How Human Systems Integration (HSI) Contributes to System Architecture

National Defense Industrial Association
Human Systems Conference

March 7 – 8, 2017

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Science and Technology

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Introduction

- Architecture
- Framework
- Artifact

Why an Architecture?

- Complex Problems
- Dynamic World
- Authoritative Documentation
- Many Developers
- Many Types of Users
- “As Is” and “To Be”
- Detect Gaps and Overlaps

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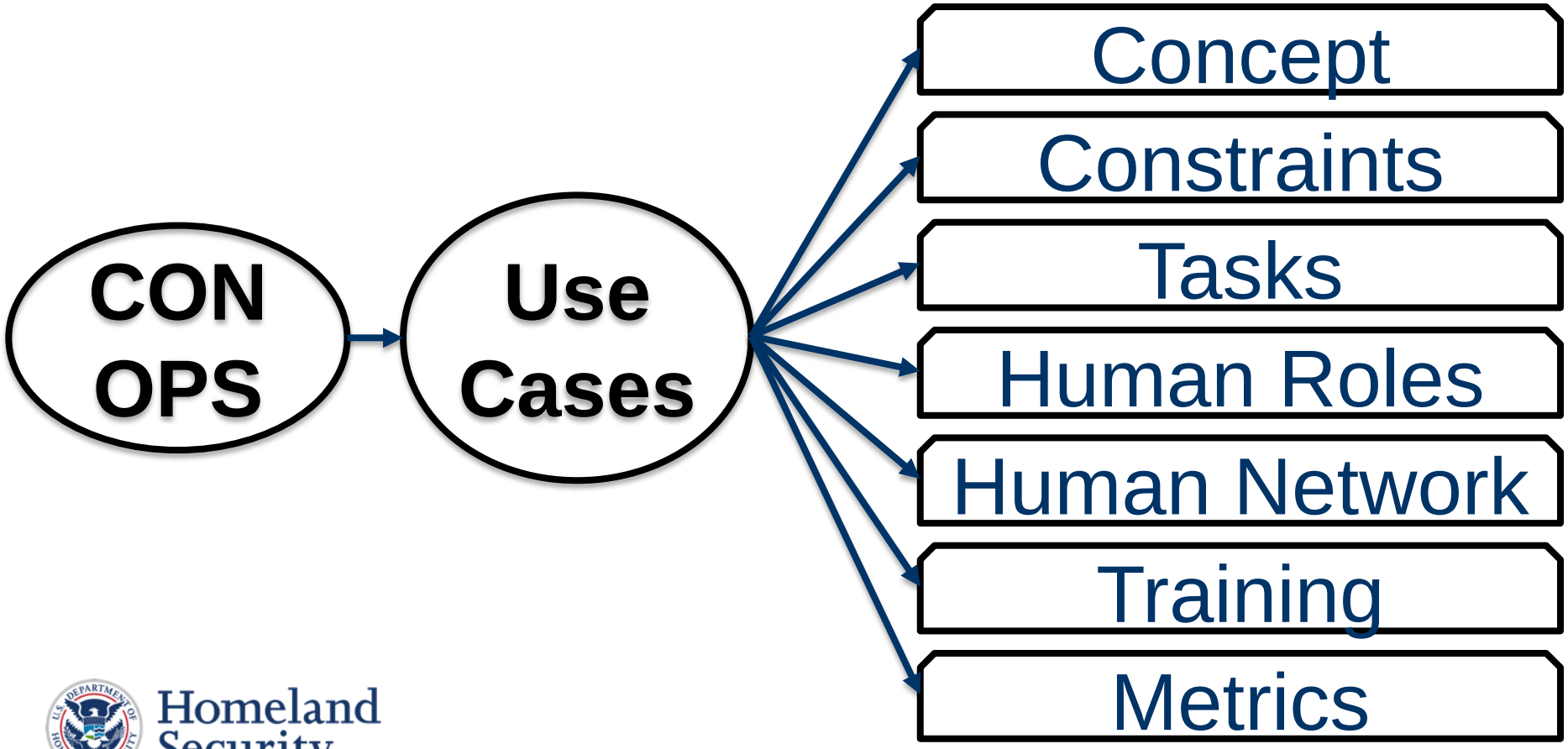
HSI In Architecture

NATO Human View Models



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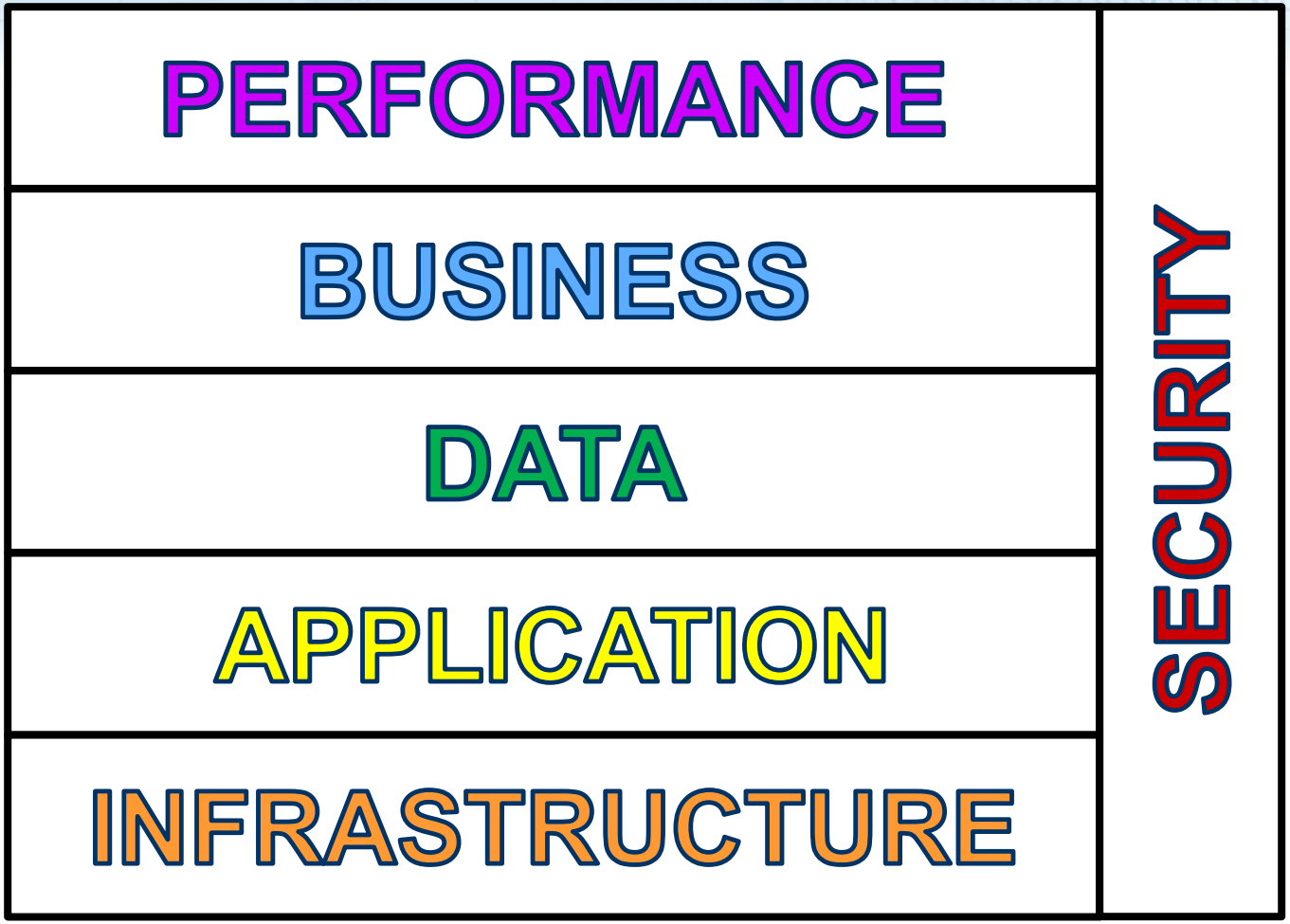
Federal Enterprise Architecture



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Design And Development

Automate all system functions without any consideration for human performance requirements (essentially attempting to design the human completely out of the system)

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A Train Wreck

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The Systems Engineering Approach

1. ID system functions, then requirements for performance
2. Decompose functions
3. Continue until next level requires means to perform
4. Allocate functions (human/automation/combination)

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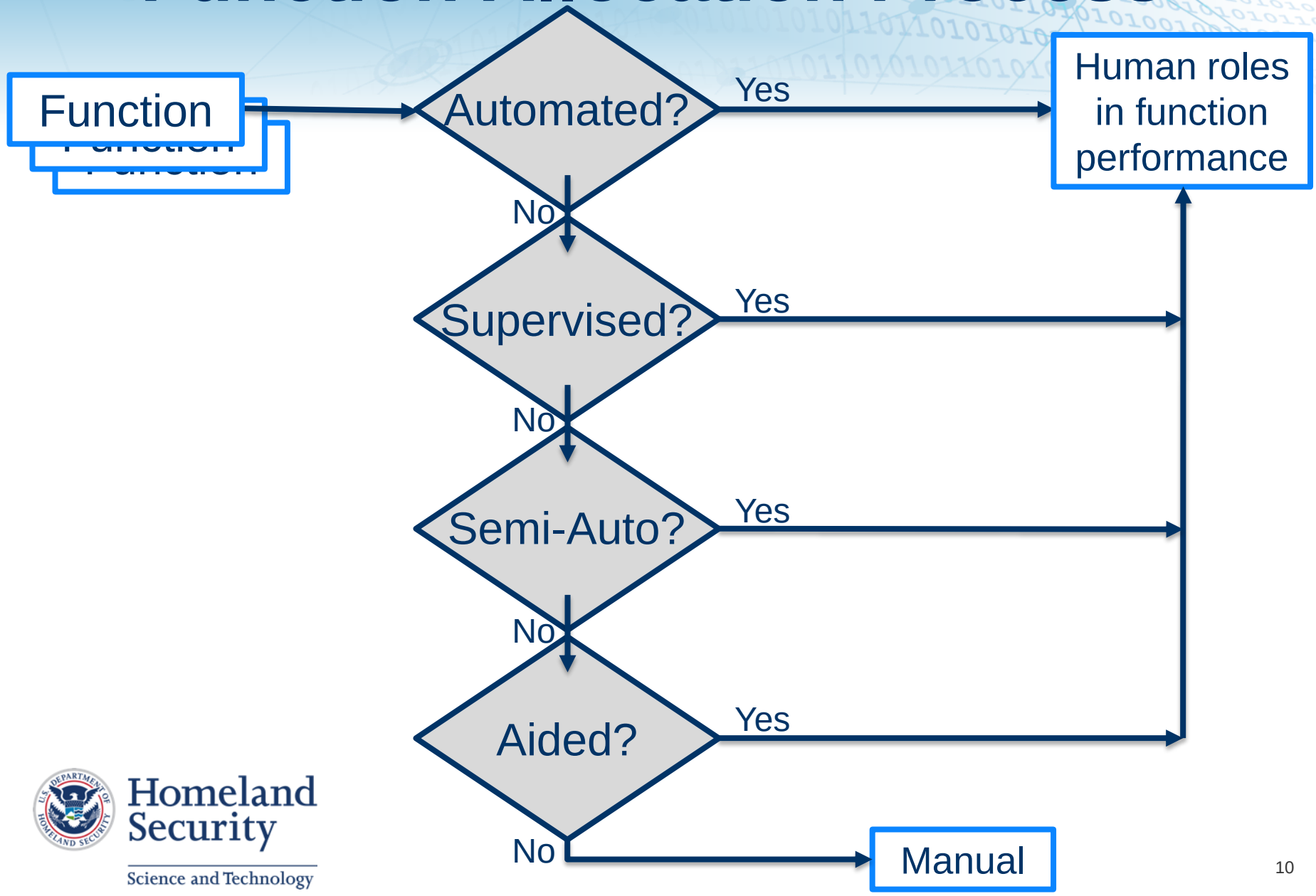
Requirements

Action	What actions must the system execute
Decision	What decisions must be made
Information	What the system must know
Resource	What support must the system have

Function Allocation Process



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Function Allocation

1. Identify human performance mandatory; automation prescribed
2. Identify human roles in all functions, even automated/semi-automated
3. Identify requirements for human roles
4. Identify requirements for human-automation interaction

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Allocation Decision Criteria

- ✓ **Systems Engineering**: tech risks, maturity, feasibility, performance
- ✓ **Operations**: command authority, mission risks, situation awareness, operational constraints
- ✓ **HSI**: human capability and workload, level of uncertainty, safety

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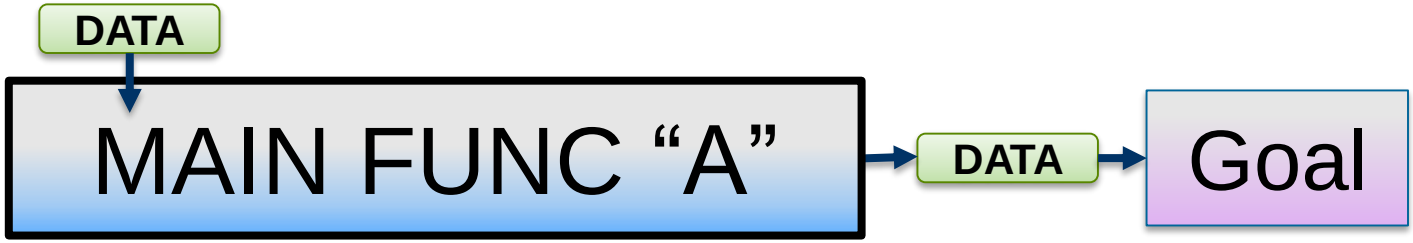
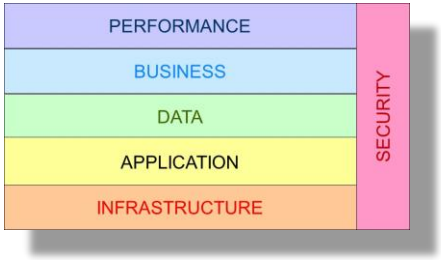
Architecture at the Task Level

- Task Sequences
  business model workflow
- Task Relationships
  task network simulation
- Task Performance Requirements
  drive *system design*

Architecture Decomposition





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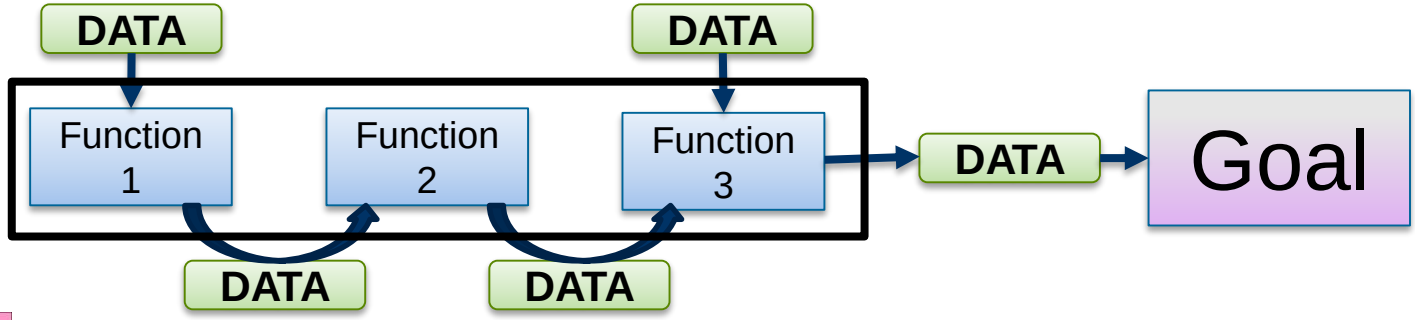
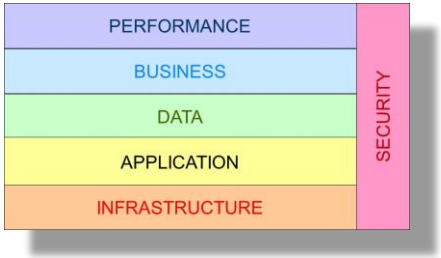
Architecture Decomposition





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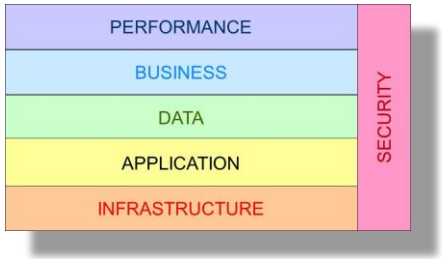
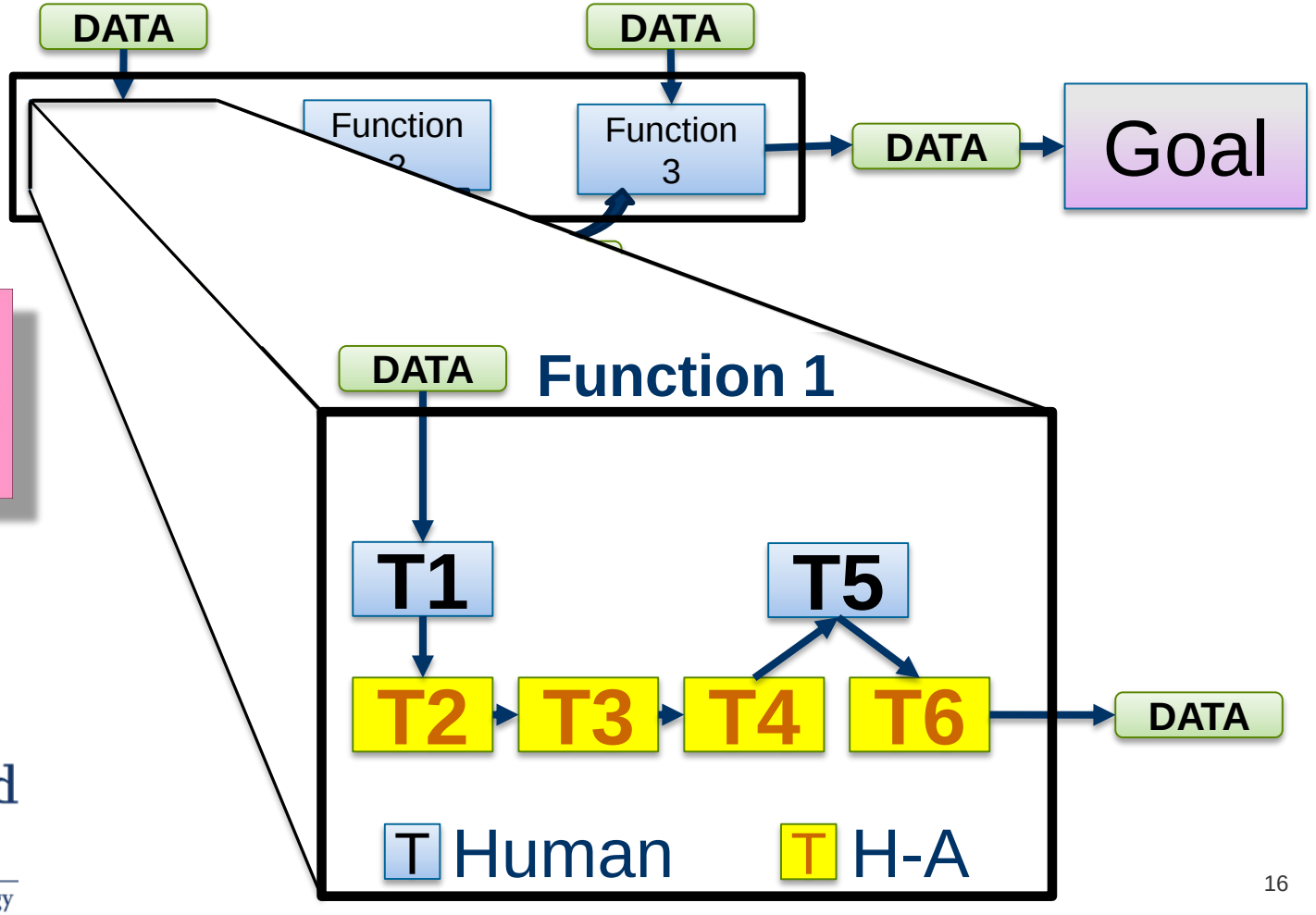
Architecture Decomposition





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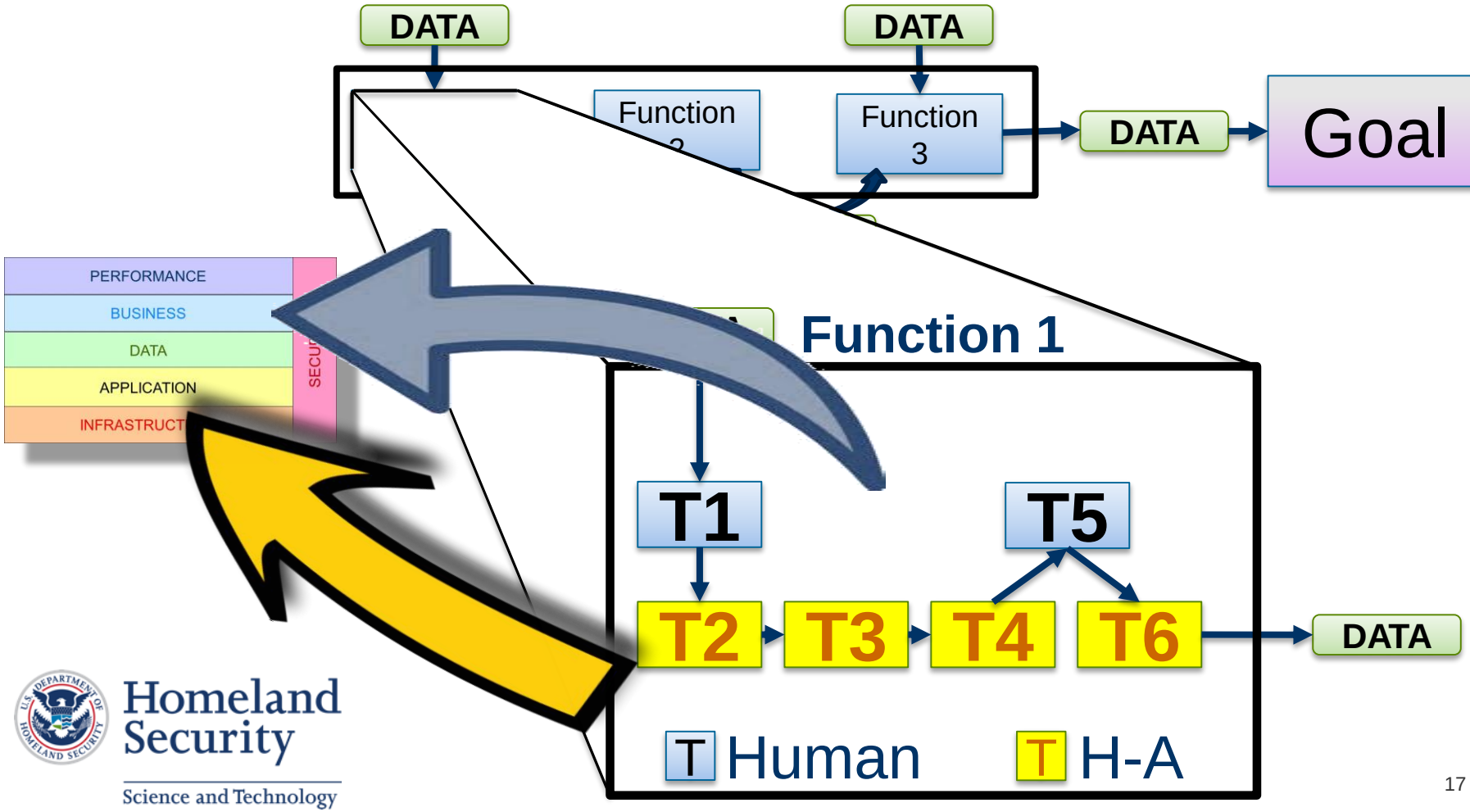

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HSI Within The Architecture
SUMMARY

Just as a system is composed of people, hardware, and software...

System performance is composed of human performance, machine performance, and interactions.

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HSI Within The Architecture

SUMMARY

Specifying the roles
of automation and humans
in system performance
is an important step in
defining the architecture

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HSI Within The Architecture

SUMMARY

A Major Element Of Systems Architecture Is Performance: Performance of Humans, Performance of Automation, and the Interaction of the Two

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