Cyber-Physical System Security

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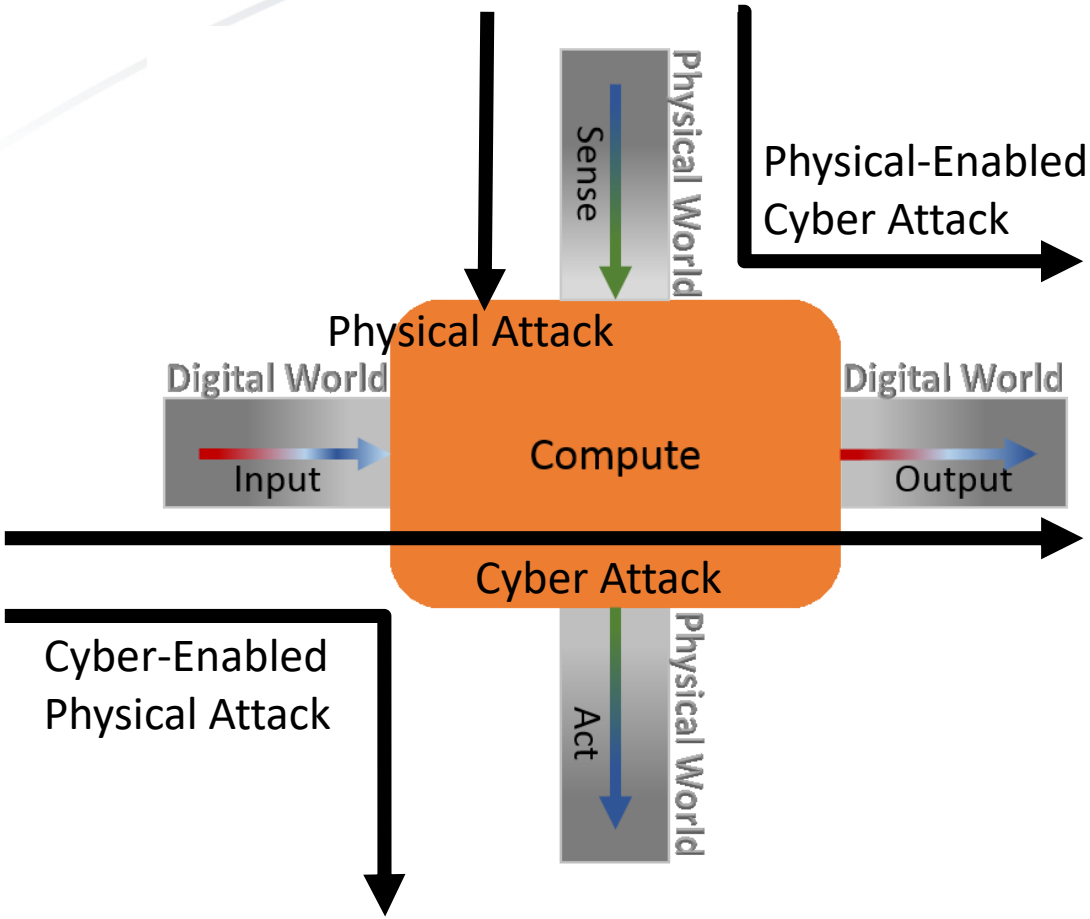
A Cyber-Physical Model



- Cyber Attack
- Cyber-Enabled Physical Attack [1]
- Physical-Enabled Cyber Attack [1]
- Physical Attack

1) J.Deploy et al., Sandia National Laboratories, ""Risk Assessment for Physical and Cyber Attacks on Critical Infrastructures", IEEE Military Communications Conference, 2005

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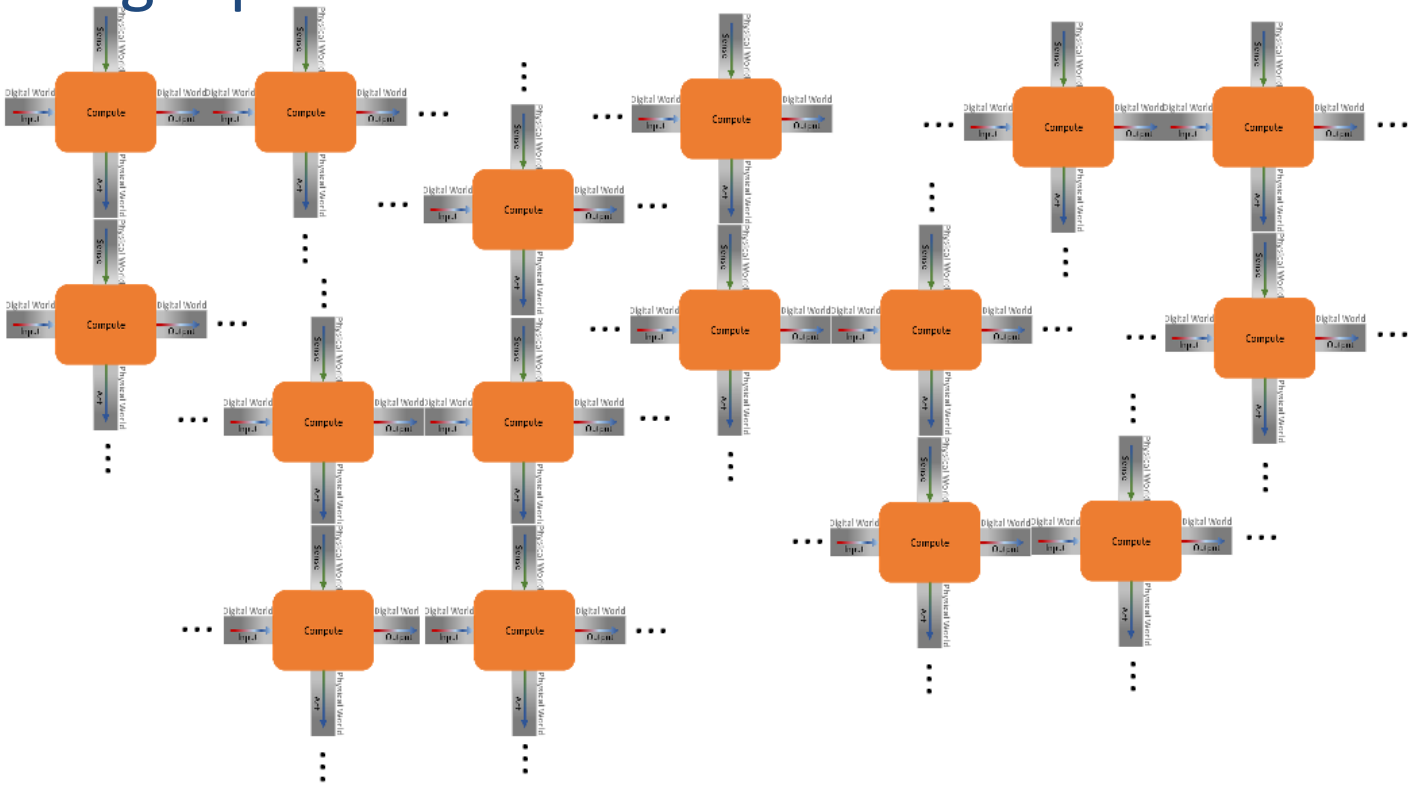
Cyber-Physical System

A network of coupled heterogeneous components in numbers that may expand and contract dynamically, a feedback system incorporating inputs and controls from each domain.



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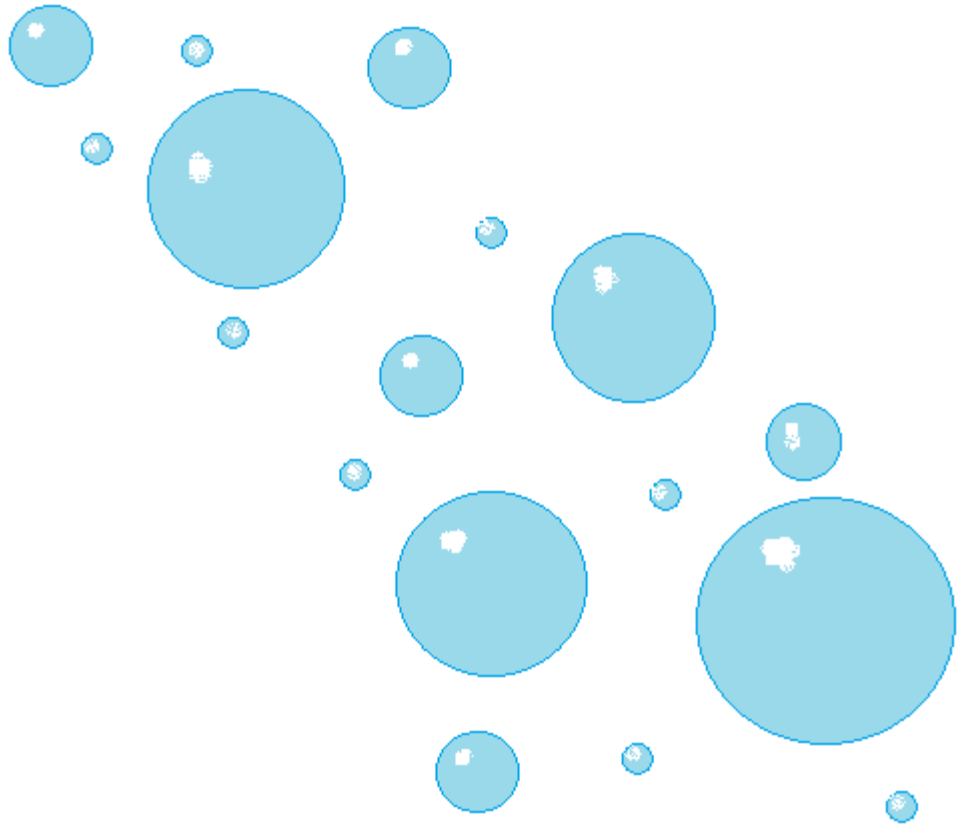
Basic Computer Hygiene



Security, like cleanliness, must be a **process**

Security is well defined for information technology:

- Authentication and Encryption
- Defined and Known System
- Least Function
- Least Privilege
- Backups

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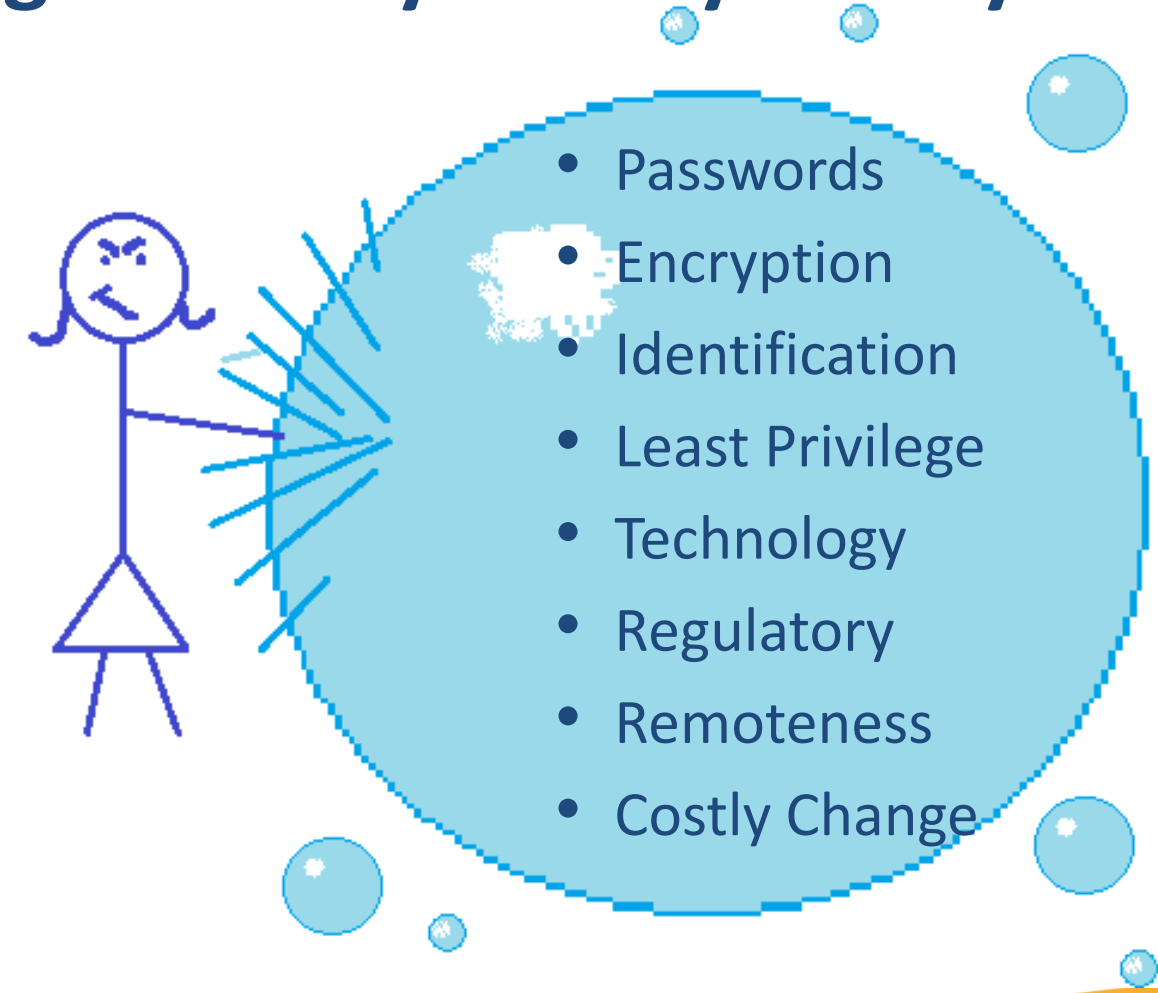
Basic Computer Hygiene in Cyber Physical Systems

The vocabulary and technology are designed for IT security.



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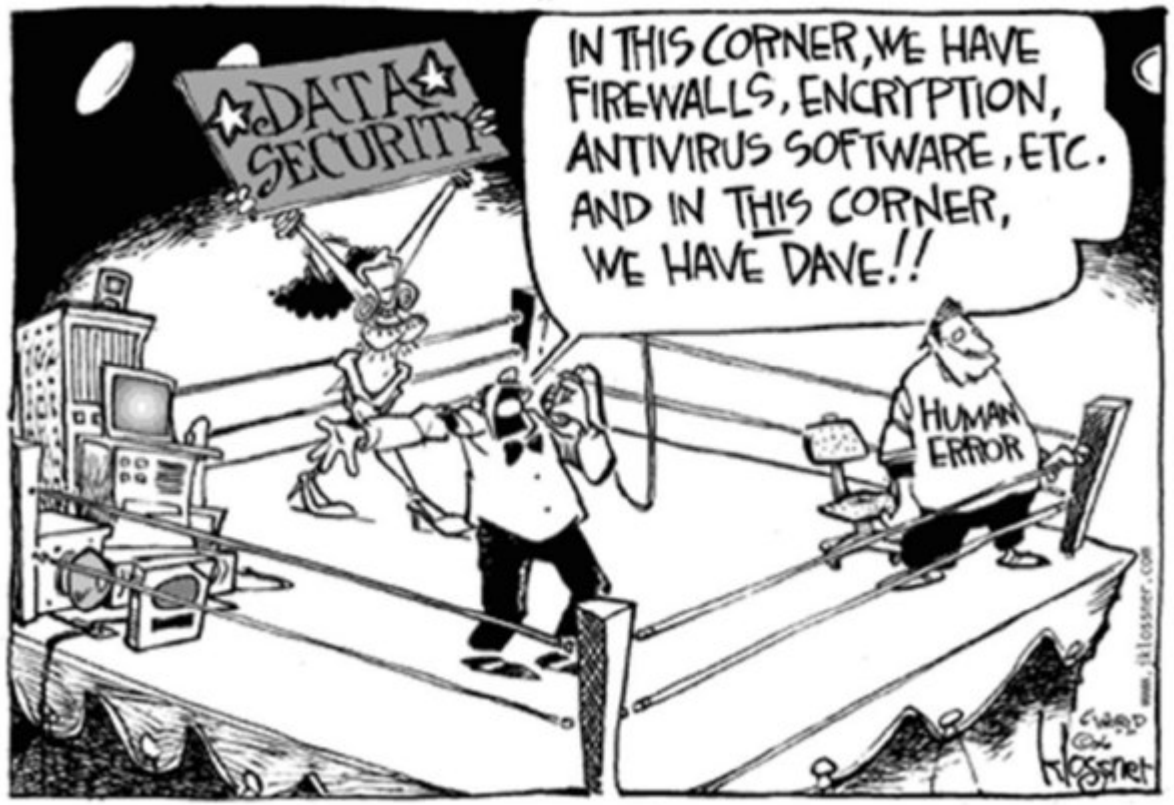
Human Error



Subject Matter Experts (SME) are not trained in cybersecurity, but are more aware of system anomalies.

John Klossner, http://www.jklossner.com/humannature/ For presentation only, not publication.

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Path Forward

Computer Hygiene Awareness

- Regular inspection
- Cross functional analysis
- Redundancy

Training

Novel research

Confidentiality, Integrity, and Availability (CIA) of systems must also support the need for stability, controllability, and observability.

Authentication research at LANL, Physical Unclonable Function (PUF)

Questions?

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