Collaborative Research: The Road to Tomorrow: Cybersecurity Experimentation of the Future

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Community-based effort to study current and expected cybersecurity experimentation infrastructure, and to produce a strategic plan and roadmap for developing infrastructure that supports tomorrow's research

Collaborative effort by SRI International and USC/ISI

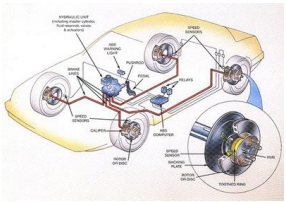
Funded by NSF CISE/ACI

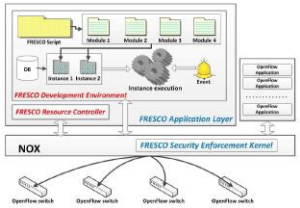
Motivation: Need Infrastructure to Support Scientific Experimentation

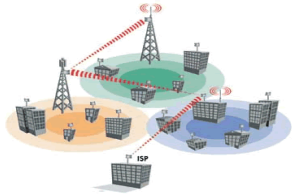
- Cyberspace is rapidly evolving with nearly every aspect of society moving toward pervasive computing and networking
- These changes bring real and wide-ranging cybersecurity threats and challenges that require new solutions based on sound scientific principles
- The scale and complexity of the challenges require that researchers employ experimentation infrastructure to enable discovery, validation, and ongoing analysis

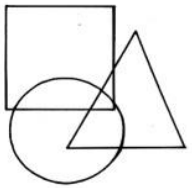
Motivation: Experimentation Infrastructure Is Not Keeping Pace with Cyber Technology

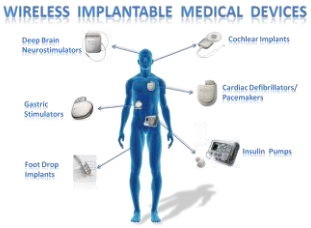
- Today's experiment infrastructure is struggling to meet today's needs, let alone anticipate and prepare for tomorrow's
- Some work extending existing infrastructure
  - Large-scale experimentation
  - Federated capabilities
  - Wireless
  - Software defined radio (SDR)
  - Etc.
- Need to move quickly to meet tomorrow's needs
  - Highly specialized cyber-physical systems (CPS)
  - Interdisciplinary experimentation
  - Modeling and reasoning about human behavior
  - Software defined networking (SDN)
  - Etc.
- Need for a broad, accessible, and multi-organizational cybersecurity experimentation capability



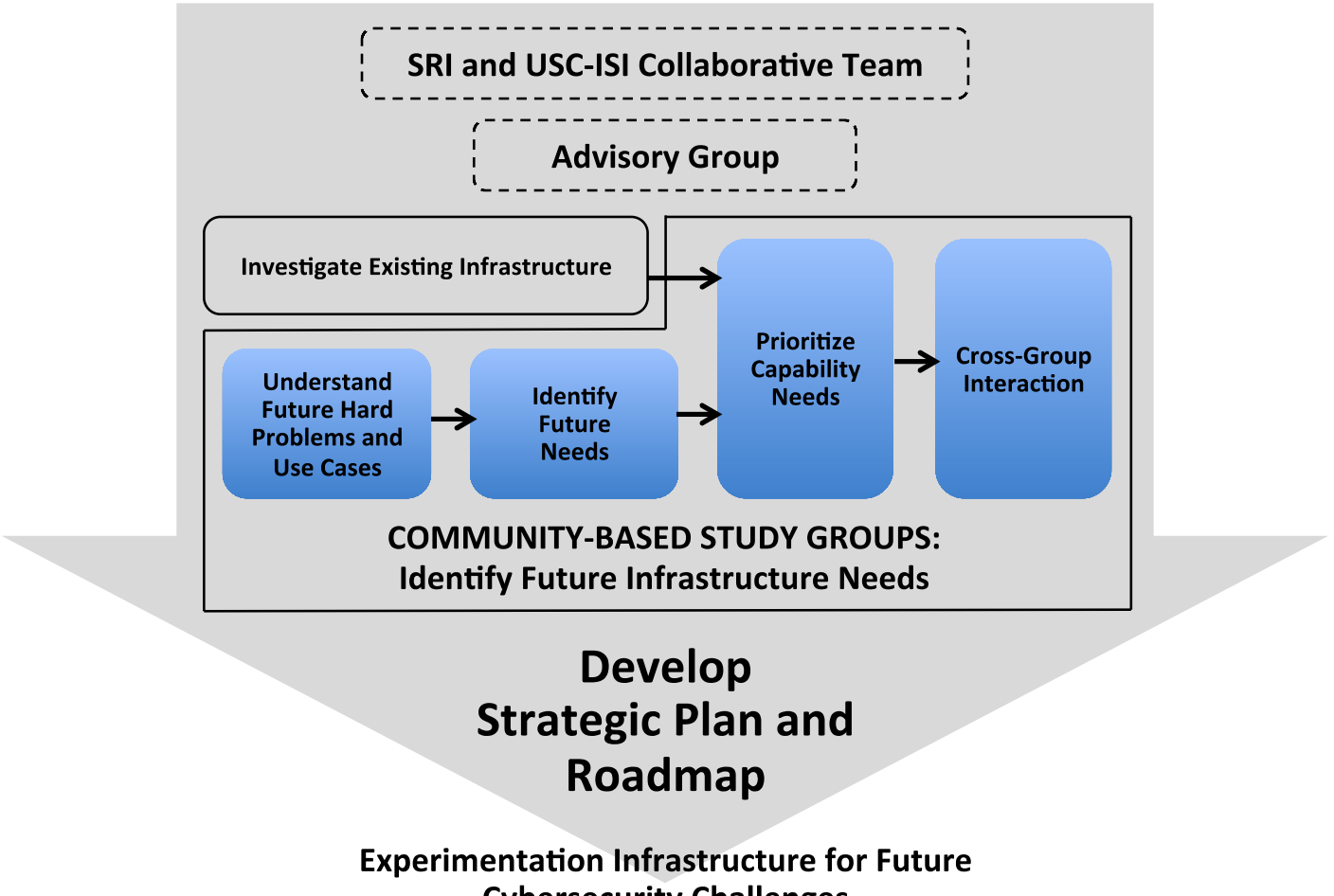








CEF: High-Level View of the Planning Effort



Questions / Comments?

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The LASER Workshop

IFIP Working Group

January 2014

Sorrento, Italy

Learning from **A**uthoritative **S**ecurity **E**xperiment **R**esults

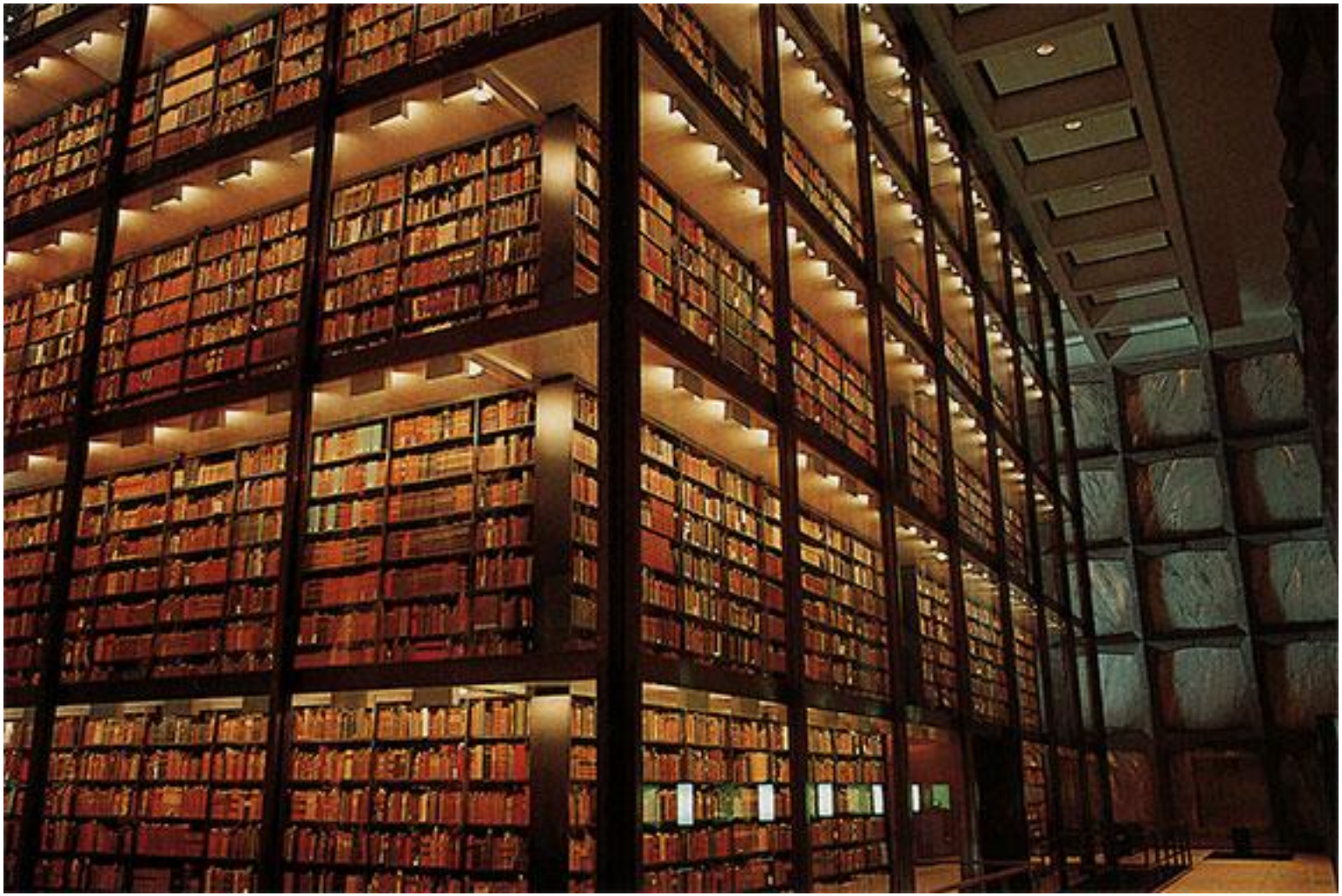
Help computer security community quickly identify and learn from both successes and failures in research

SRI International

Published papers typically document successful research

- Assertion: Unsuccessful research has value to other efforts
  - "Failures" provide clues
  - If well-documented, may provide good place to begin new research
  - Help prevent repetition of failures

- LASER 2012: July 18-19
  - Venue to study / learn from negative security research results, document findings, discuss
    - Paths that were unfruitful – and why
    - Confounding issues in research that may have yielded unexpected results or invalidated experiments – and why
    - Inability to reproduce prior work
    - Problems with data sets
    - Experimental methods that proved unsuitable to specific research problems
  - Mini-conference format
  - Papers: 20 submitted, 6 accepted (30%)
  - Student scholarships: 6 (1 International)

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- LASER 2013: October 16-17
  - Venue to study / learn from negative security research results, document findings
  - *Moved to USENIX publishing for open access*
  - *Requirement for structured abstracts and papers*
  - *Open, free live Internet stream, videos being archived on site*
  - *Workshop/breakout format, adding "Works in Progress" (WIP) sessions*
  - Papers: 13 submitted, 4 accepted (31%), 4 WIP (31%)
  - Student scholarships: 7 (1 International, 2 HBU)

- Works in Progress (WIP) Sessions
  - Interesting research that isn't quite ready to publish
  - Friendly, collegial environment to help researchers identify issues in experiments, brainstorm solutions
  - Small groups (8-10 people), preplaced based on topic and background

"I've never gotten this level of discussion and comments on my work. I wish I had gotten this a long time ago." – Professor of Computer Science

- LASER 2014
  - Early stages of planning
  - Targeting September 2014
  - Soliciting input from community

Questions

For more information, visit
www.laser-workshop.org