Federal Cybersecurity Research and Development Strategic Plan

Ensuring Prosperity and National Security

February 2016

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President Obama
February 9, 2016
Cybersecurity National Action Plan

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Federal Cybersecurity R&D Strategic Plan

• Requested by Congress

• Expands the 2011 plan, *Trustworthy Cyberspace*

• Interagency writing group within NITRD

• Community input via an NSF and DHS S&T

• Released in February as part of CNAP
The Need for Cybersecurity R&D

• Cyberspace provides major benefits

• Advances in cybersecurity are urgently needed

• Cybersecurity accelerates innovation
Cybersecurity Assumptions

• Adversaries will perform malicious cyber activities

• Defenders must thwart malicious cyber activities

• Users will circumvent cybersecurity practices

• Technology cross-connects the physical and cyber
Fundamental R&D Challenge in Cybersecurity

Make cybersecurity less onerous while providing more-effective defenses

Evidence of Efficacy and Efficiency
Federal Cybersecurity R&D Goals

• Near-term, S&T for effective and efficient risk management

• Mid-term S&T for sustainably secure systems development and operation

• Long-term S&T for effective and efficient defensive deterrence
Cybersecurity Defensive Elements

• **Deter**
  Efficiently discourage malicious cyber activities

• **Protect**
  “Systems” efficiently resist malicious cyber activities

• **Detect**
  Efficiently detect and anticipate adversary actions

• **Adapt**
  “Systems” adapt to malicious cyber activities
Federal Cybersecurity R&D Strategic Plan

Continuously strengthening defensive elements improves success in thwarting malicious cyber activities
(Figure 1. in the 2016 Federal Cybersecurity Research and Development Plan)
R&D Objectives for Defensive Elements

• Twenty-one objectives to measure progress
• Objectives are not comprehensive

• Two examples
  – Deter, near-term: Establish quantifiable metrics of adversary level of effort needed to overcome specific cybersecurity defenses
  – Protect, mid-term: Create tools for static and dynamic analysis that reduce vulnerabilities by a factor of 10
Cybersecurity for Emerging Technologies

• Context-based analysis for any technology

• Specific R&D priorities given for
  – Cyber-Physical Systems
  – Internet of Things
  – Cloud Computing
  – High Performance Computing
  – Autonomous Systems
  – Mobile Devices
Critical Dependencies for Cybersecurity R&D

Success depends on advances in these areas:

- Scientific foundations
- Risk management
- Human aspects
- Transition to practice
- Workforce development
- Infrastructure for research
Plan Recommendations

1. Prioritize basic and long-term research
2. Broaden public-private participation in R&D
3. Accelerate evidence-validated R&D transition
4. Expand diversity of research expertise
5. Expand diversity in the workplace
What Does Success Look Like?

The cybersecurity research, development, and operations community will quickly design, develop, deploy, and operate effective new cybersecurity technologies and services.

Cybersecurity tasks for users will be few and easy to accomplish.

Many adversaries will be deterred from launching malicious cyber activities, and those that choose to proceed will fail or fail to impact users or organization’s mission.
Commission on Enhancing National Cybersecurity

Make detailed recommendations to strengthen cybersecurity in both the public and private sectors

• Develop recommendations regarding: (iii) further investments in research and development initiatives that can enhance cybersecurity
Information Available On-line

• Federal Cybersecurity Research and Development Strategic Plan

• National Challenges and Goals for Cybersecurity Science and Technology
  https://www.whitehouse.gov/blog/2016/02/08/national-challenges-and-goals-cybersecurity-science-and-technology

• Cybersecurity National Action Plan

• Commission on Enhancing National Cybersecurity