OASIS/SRS

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DARPA/IPTO

Project Data (internal use only)

- Project Number: 0706D070VC
- Ceiling Source: DARPA
- Project Lead: Chris Do
- DARPA Office: IPTO
- FY06 Funding Level: $340,000

Problem

- **OASIS Dem/Val**
  - **Current mission-critical systems are operationally fragile. While under attack, these systems often fail to operate to specification**
- **SRS**
  - **Network-centric warfare demands robust systems that can respond automatically and dynamically to both accidental and deliberate faults**

Background

- Research Programs
  - OASIS Demonstration and Validation (Dem/Val)
  - Self-Regenerative Systems (SRS)
- Red teaming is the primary means to demonstrate and evaluate technologies
- Defined quantitative goals to measure success

Objective

Develop highly resilient systems that continuously improve their performance in the presence of attacks or faults

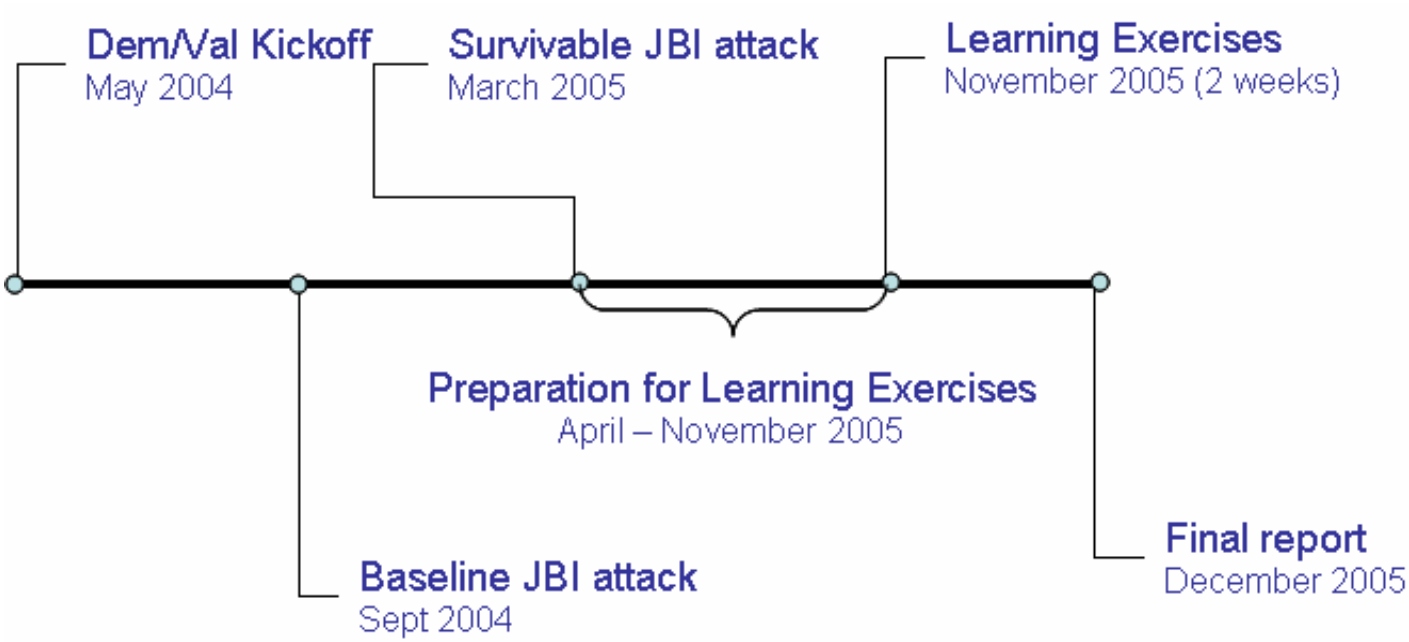
- **OASIS Dem/Val**
  - **Demonstrate system survivability in the presence of cyber threats and imperfect hardware and software**
- **SRS**
  - **Implement systems that always provide critical functionality and show a positive trend in reliability**

Activities

- OASIS
  - Phase 1: Point solutions
    - Focused on point solutions for exploits against various classes of vulnerabilities to the five security attributes of confidentiality, integrity, availability, authentication, and non-repudiation
  - Phase 2: Integration
    - Integrated many OASIS-developed technologies and other research results into new architectures to allow development of the next level of secure and survivable information systems
- SRS
  - Four research thrusts:
    - Biologically inspired diversity: automatically generate numerous diverse software versions
    - Cognitive immunity and self-healing: cyber immune response and system regeneration
    - Granular, scalable redundancy: dramatically reducing the time required to achieve consistency among replicas
    - Insider threat: preempt insider attacks and detect system overrun

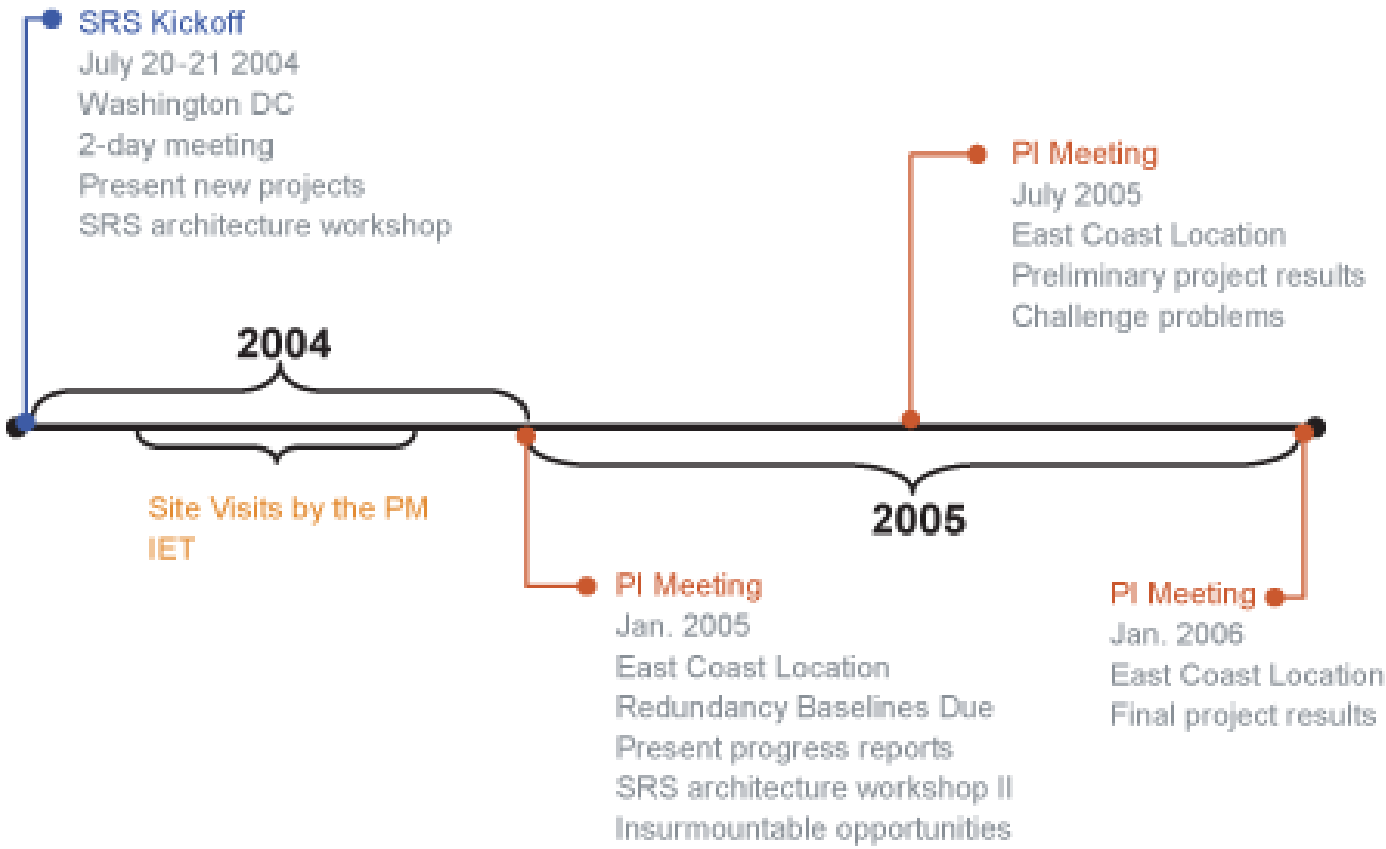
Highlight – OASIS

- **Phase 1 (OASIS)**
  - **3 years**
- **Phase 2 (Dem/Val)**
  - **1 year design, 1 year implementation, 1.5 years Red team exercise**



Highlight – SRS

- **Phase 1: 9 Red teaming exercises occurred during October–December. Each was 1–2 days in length.**
- **Phase 2: Planning in progress**



Impacts

- **Provide overall coordination and management of the Red team exercises to:**
  - **Demonstrate the capabilities and limitations of different technologies involved in SRS and OASIS Dem/Val programs**
  - **Develop lessons learned**
  - **Identify technologies that are ready for operational use**
  - **Create a level playing field for the Red teaming exercise to allow DARPA to effectively assess each technology and the program**
- **Provide source selection support and assist in structuring program phases**

Future Plans

- OASIS Dem/Val - Completed
- SRS
  - Phase 1 (prototypes and Red teaming) completed
  - Phase 2:
    - Improve technologies that demonstrated potential and integrate selected technologies into a military application
    - Integrated solution using subset of solutions in Phase 1 (maybe classified)
- Potential support to new program
  - Application Communities seeks to develop a software execution infrastructure for COTS programs to collaboratively diagnose/respond to software problems and generate a community situation awareness gauge