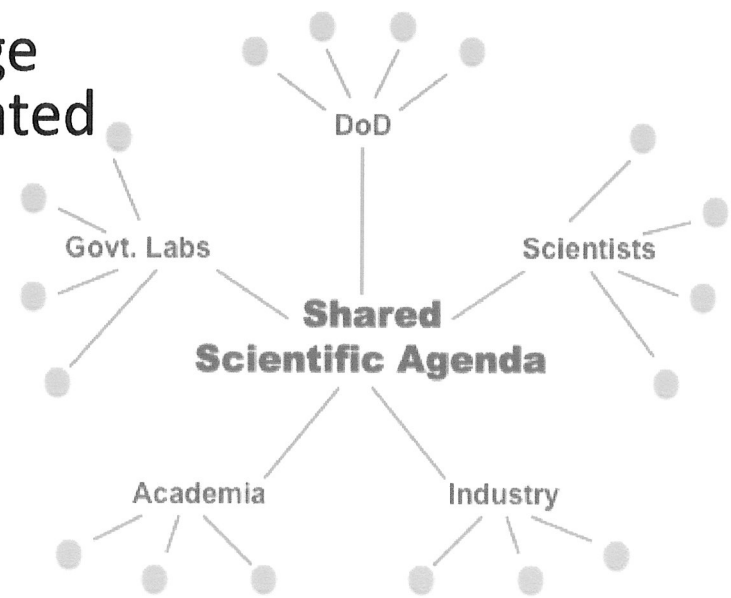
United States
Naval Research Laboratory

DATA TO DECISIONS: CHALLENGES TO ANALYTICAL INTEROPERABILITY TO MEET THE NEEDS OF NATIONAL SECURITY

4/29/2011

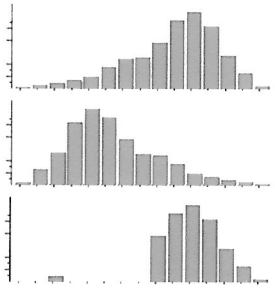
D2D Consortium Goals

- *JASON recommendation*: Create consortium focused on each challenge problem, where success is defined at the consortium level, not at the individual contractor level
- Consortium should be an integrated team conducting translational research
- Consortium addresses the challenge problems in a coherent and integrated team approach
- Consortium openly shares and documents modules within the consortium
- New modifications to modules are evaluated and managed by the consortium

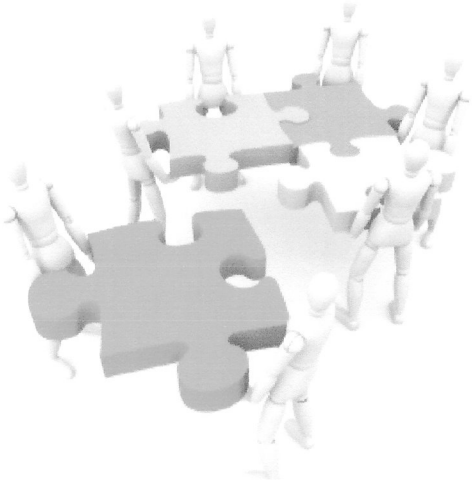


Consortium Challenges

- Consortium should be an integrated team conducting translational research
  - BAA response may:
    - Be skewed towards parts of the problem/challenge
    - Have a mix of complete and partial solutions
    - Have diversity in performer capability



- Consortium addresses the challenge problems in a coherent and integrated team approach
  - Team dynamics complicated by performance diversity (geo/temporal, organizational culture/capability, etc.) and individual incentives/agendas
  - Proprietary approaches may need integration with non-proprietary solutions in build
    - This is the reality of the field



Consortium Challenges

- Consortium openly shares and documents modules within the consortium
  - What will be the incentive to share as much or as genuinely as possible?

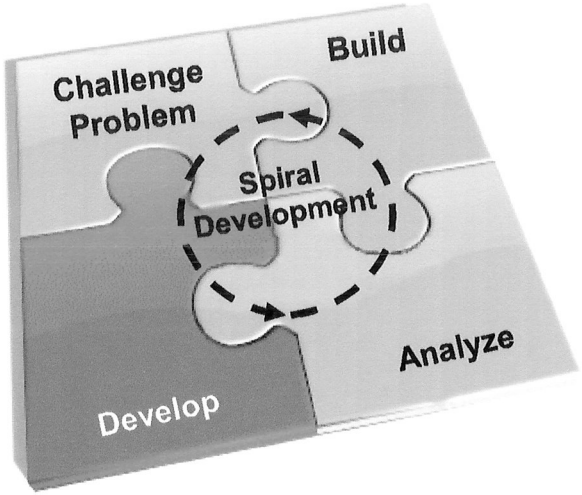
- New modifications to modules are evaluated and managed by the consortium
  - This implies consensus across the consortium and may present threats to new performers over time

FY11 Broad Opportunity

- Opportunity to take advantage of testbed "process" information
  - Early ad hoc consortium support mechanisms and processes will establish practices that set precedent for FY12+
  - Changes to program operations will be more difficult to implement without the necessary methods and infrastructure in place to control and manipulate the testbed and spiral development process over time
    - Some research is necessary to determine appropriate architecture, methods and metrics for FY12+

What Can be Done in FY11 to Support D2D Consortium Infrastructure Elements?

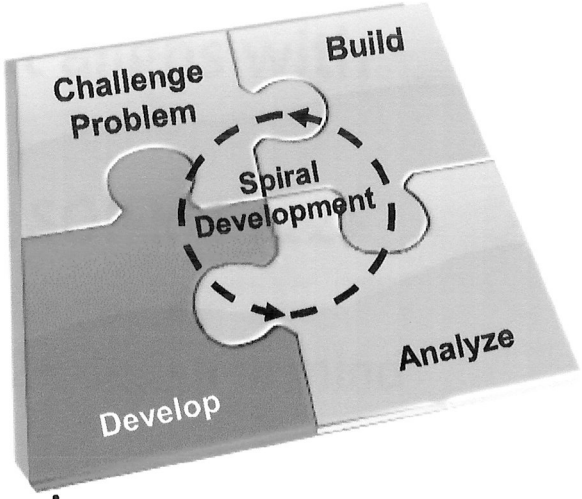
- FY11 represents an opportunity to evaluate mechanisms to enable the defined D2D Program Organization (Spiral Development)



  - Tri-service Data-to-Decisions Collaborative Working Group (D2D-CWG)
    - Establish requirements and practices for consortium support
  - Testbed (FY11 variant, FY12 final)
    - Evaluation and development of test harnesses and gatekeeping infrastructure for access

What Can be Done in FY11 to Support D2D Consortium Infrastructure Elements?

- Data Analysis Center (FY12)
  - Development of metrics management infrastructure and innovative multidimensional visualization techniques
  - Investigate ATR WG and other prior-work/techniques for challenge problem development, metrics, and ongoing management



- Data Coordination Center (FY12)
  - Develop solutions for administrative management (core services) and their impact on extended core services and analytics (R. Avent Data Management Layer SOA)
  - Assess Data management layer reliability/sustainability requirements

Near Term (FY11 & Early FY12) Strategy

- Capabilities to service enabling solutions
  - View the BAA products' performance data as data to be managed
    - Performance dashboards and visualizations
    - Directory service for descriptive registration of performers' approaches
  - Structure the end-to-end testing process as an orchestration
    - Algorithm revision control and annotation
    - Develop documented testing metrics and orchestration
      - Formalize challenge problem metrics process
      - Test harnesses
      - Open-source test suites and orchestrations
    - Attention to integration and transition to/from "build" (beyond evaluation)
  - Develop an administrative collaboration workspace
    - Example: Discussion blog/wiki/document management

Long Term Vision Ideas

- Exploit the D2D Program Organization (Spiral Development) and testbed meta process information space
  - Capture intra-algorithm/module metrics, share trends and identify gaps
    - Develop *technical transition metrics*
      - Technical transition metrics: ideas of semantic consistency, tri-service interoperability, data format supportability, etc.
    - Use information from the meta process to drive performer motivations (collaboration, disclosure, FY12+ consortium policy)
  - Provide a quantitative framework to manipulate FY 12+ consortium management functions and program/testbed CONOPS
    - Adapt and extend prior work from ATR WG (Westerkamp et al. 2002; Ashby, Blasch, et al. 2002), DISA FDCE (Federated Development and Certification Environment), and others

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