Exhibit R-2, RDT&E Budget Item Justification						Date February 2006		
Appropriation/Budget Activity RDT&E Defense-Wide, BA 7				R-1 Item Nomenclature: Net Centricity PE 0305199D8Z				
Cost ($ in millions)		FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost		124.376	8.254	8.746	10.585	13.096	1.535	30.920
Horizontal Fusion		116.992	0.000	0.000	0.000	3.081	0.000	20.211
GIG Evaluation Facilities (GIG-EF) and GIG End-to-End Systems Engineering Advisory Activities		7.384	8.254	8.746	10.585	10.015	1.535	10.709

A. Mission Description and Budget Item Justification:

This program element will support information management and information technology activities focused on the development, integration, testing and assessment of capabilities and applications in support of joint and coalition warfighter needs. Resources will support net centric collaborative development and operations to improve situational awareness, interoperability and operational planning efforts. This program is funded under Budget Activity 7, Operational System Development, because it supports engineering development and testing of RDT&E activities.

The Horizontal Fusion Project funding in FY 2006 and FY 2007 was realigned by the Department to support priority net centric transformation efforts such as information assurance, Multinational Information Sharing and Internet Protocol (IP) based capability into military communications satellites.

B. **Program Change Summary:** (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2005	FY 2006	FY 2007
Previous President's Budget	128.233	8.387	12.548
Current President's Budget	124.376	8.254	8.746
Total Adjustments	-3.857	-.133	
Congressional program reductions			
Congressional rescissions, inflation adjustments	-3.857	-.133	-3.802
Congressional increases			
Reprogrammings			
Transfer			
Program Increase			

Program Change Summary Explanation:
FY 2005: SBIR -3.288 million; STTR -.395 million; Atomic Energy -.100 million; WHS reduction -.074 million.
FY 2006: FFRDC -.013 million; Economic Assumptions -.036 million; Rescission -.084.
FY 2007: Non-Pay Purchase Inflation 198 million; Reduction Net Centricity -4.000 million.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Performance Metrics:

1. User Activity and Participation. A key measurement of GIG-EF success is the amount of participation and usage of the GIG-EF in support of Joint warfighting requirements. Performance metrics in this area would include:
   - Number of events, tests and experiments scheduled
   - Percentage of GIG-EF time active vs. idle
   - Total amount of in-kind funding from GIG developers and activities
   - Aggregate funding per test
   - Number of service and user participants in tests (jointness)

2. Contributions to GIG development and transition. The GIG-EF should also advance the state of the art in support of GIG implementation.
   - Number of independent test reports and limited objective experiments support major GIG architectural issues (IA, IPv6/MPLS, Routing, etc.)
   - Number of demonstrations in support of major GIG architectural issues (IA, IPv6, Routing, etc.)

3. Risk mitigation for the GIG.
   - Demonstrations in support of GIG overall goals (ex: IPv6 by FY 2008, 10 Gb Optical HAIPE by FY 2007, etc.)
   - Number of GIG E2E Systems Engineering Oversight working group requirements addressed via GIG-EF demonstration, experimentation and testing.

4. Tangible products such as frameworks and design guidance used for program assessments and reviews.

5. Specific modifications to Programs based on the frameworks and guidance that improve program compatibility and end to end performance.

6. A more collaborative environment where systems engineering organizations of individual GIG programs and the end to end systems engineering oversight organization mutually identify and solve issues related to maximizing end to end performance

Exhibit R-2a, RDT&E Project Justification								Date: February 2006
Appropriation/Budget Activity RDT&E, Defense-Wide, BA 7				Project Name and Number: Horizontal Fusion/0305199D8Z				
Cost ($ in millions)		FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Name: Horizontal Fusion		116.992	0.000	0.000	0.000	3.081	0.000	20.211
GWOT - Horizontal Fusion		6.300	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Secretary of Defense approved the establishment of the Horizontal Fusion Portfolio as one of his top ten priorities to make net-centric operations and warfighting a near-term operational reality consistent with the vision of force transformation. The Horizontal Fusion program also supports activities focused on the development, integration, testing and assessment of net centric capabilities, including those Information Assurance R&D activities necessary to implement the IA component of the GIG architecture essential to the transformation of the GIG. The participants that make up the Horizontal Fusion portfolio are primarily existing programs of record, which require strict procurement and requirements control under traditional acquisition policy. The Horizontal Fusion portfolio maximizes these ongoing efforts by integrating existing capabilities and, therefore, leveraging the DoD's resources while accelerating their inclusion in the net-centric environment. The selection for participation in the HF portfolio is based on 1) highest priority programs for net-centric joint warfighting (to include coalition and allied efforts) and GIG transformation on 2) time and cost to implement 3) the Joint Forces Command matrix of required capabilities to meet near-term joint warfighting conops and 4) the requirements of the IA component of the GIG architecture. Today, the US Army in Iraq is using tools developed as part of the Horizontal Fusion portfolio, such as the unattended ground sensor arrays. These acoustic sensors successfully locate mortars used to fire on US troops. These capabilities were demonstrated as part of the Army Research Lab's (ARL) Warrior's Edge project within the Horizontal Fusion Portfolio prior to being used in Iraq. Other HF operational capabilities, such as the acoustic sensor, are under development within the HF portfolio. Further, Horizontal Fusion provides for the practical net-centric implementation of interoperability and information assurance required to achieve the Secretary's vision of transformation. It is a critical element in the successful implementation of the GIG architecture (and its IA component), Net-Centric Enterprise Services (NCES), DoD Data Management Strategy (DDMS) and the services oriented architecture for Information Assurance (IA). These programs support the idea of accelerating, "Revolutionary technologies that 'change minds' and ways of doing things.

B. Accomplishments/Planned Program

		FY 2005	FY 2006	FY 2007
Accomplishment/ Effort/Subtotal Cost		116.992	0.000	0.000
RDT&E Articles Quantity *(as applicable)				

FY 2005 Accomplishments: ($116.992 million)

FY 2005 efforts will focus on implementation of net centric capabilities and processes directly to the warfighter and analysis of the operational baseline. As a result of funding constraints, no additional initiatives will be added to the horizontal fusion portfolio to further expand net centric capability. In addition, operational support to the existing portfolio will be curtailed.

- Transitioned HF demonstrated capabilities to operations by supporting the deployed forces of the XVIII ABC and OED community.
- Continued the net-centric implementation of GIG architecture.
- Continued the implementation and development of the IA component of the GIG architecture.
- Coordinate with Combatant commanders for their attaching to "the net."
- Located and incorporated the additional operationally relevant information sources (both tactical and national for bi-lateral information sharing).
- Continued to refine the HF environment and services (i.e., Collaboration tool suite interoperability).
- Transitioned the next generation of NCES pilot services to operational enterprise infrastructure.
- Leveraged the GIG Bandwidth expansion to refine information sharing and net-centric processes.
- Investigated and incorporated, as appropriate, multiple end users platforms (low end – palm computing to high-end desktops and servers).
- Continued to address and streamline security policy/certification and accreditation implementation with evaluation and testing of security technologies emphasizing cross-domain information exchange.
- Addressed the tactics, techniques and procedures for net-centric operations within the Service schools and exercises.
- Continued to evaluate the parameters of the physical and logical edge of tactical data environments.

FY 2006 Plans: ($0.000 million)

N/A

FY 2007 Plans: ($0.000 million)

N/A

C. Other Program Funding Summary:

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Total Cost
O&M, DW (PE0902198D8Z)	5.909	0.000	0.000	0.000	0.000	0.000	0.000	5.909
Proc, DW (PE 0902199D8Z)	10.102	0.000	0.000	0.000	0.000	0.000	0.000	10.102

D. Acquisition Strategy. N/A

E. Major Performers: None

Exhibit R-2a, RDT&E Project Justification							Date: February 2006	
Appropriation/Budget Activity RDT&E, Defense-Wide, BA 7				Project Name and Number: GIG-EF/PE 0305199D8Z				
Cost ($ in millions)		FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Name: GIG Evaluation Facilities (GIG-EF) & GIG End-to-End SE Advisory Activities		7.384	8.254	8.746	10.585	10.015	1.535	10.709

A. Mission Description and Budget Item Justification:

The Global Information Grid (GIG) Evaluation Facilities and E2E Systems Engineering (SE) Advisory Activities project provides resources needed to test key systems in an end-to-end manner, including providing for system engineers, test-bed hardware, software and fiber optic connectivity at the Naval Research Laboratory and several other test locations in the U.S. The evaluation facilities will be used to demonstrate interoperability of multiple Transformational Communications programs including but not limited to the Joint Tactical Radio System (JTRS), Global Information Grid Bandwidth Expansion (GIG BE), Teleports, and Transformational Satellite Communications System (TSAT). For these systems GIG-EF & SE would:

-Perform tests that physically demonstrate technical performance.
-Provide an independent, overarching review of technology and interface standards.
-Ensure technical issues are identified early and schedules synchronized to produce a jointly interoperable, timely and cost-effective architecture development.
-Prevent costly program reworks and restructuring, and more importantly, avoid delays in providing joint warfighter connectivity.

The effort also provides engineering, integration and hardware and fiber optic connectivity necessary to validate the performance for key transformational communication programs. The funding will also provide the engineering resources necessary for performing the Global Information Grid (GIG) end-to-end systems engineering oversight function. Resources will be applied to end-to-end systems engineering topics related to the successful integration of several programs that will form the GIG in areas such as information assurance (IA), quality of service (QOS), network management, interface definition and standards selection, and routing protocols. These resources will work in conjunction with systems engineers from key GIG programs such as the Joint Tactical Radio System (JTRS), Transformational Satellite Communications System (TSAT), Teleport, GIG Bandwidth Expansion (GIG-BE), Warfighters Internet-Tactical (WIN-T), Net-Centric Enterprise Services (NCES) and Automated Digital Networking System (ADNS) to identify and address technical issues resulting from engineering decisions made without the end-

to-end perspective.

B. Accomplishments/Planned Program

		FY 2005	FY 2006	FY 2007
Accomplishment/ Effort/Subtotal Cost		7.384	8.254	8.746
RDT&E Articles Quantity *(as applicable)				

FY 2005 Accomplishments: ($7.384 million)

- Developed the first increment of the GIG end to end quality of service framework
- Worked with NSA to complete the GIG IA architecture
- Developed the first increment of the end to end GIG routing architecture
- Reviewed WIN-T, ADNS, JTRS Cluster One, and GIG-BE for compliance to end to end GIG frameworks, architectures, and design guidance
- Worked with systems engineering organizations from GIG programs to identify and address cross-program issues and influence programs to implement compatible designs that maximize end to end performance
- Established GIG-EF capabilities providing interoperability and connectivity to support OC-192 (10 Gb) end-to-end testing among key GIG transport program activities and OC-48 connectivity to Service (WIN-T, FORCENET, MC2, etc.), Combatant Command (JFCOM, STRATCOM, etc.) and other GIG activities (JTRS, Teleport, etc.) to ensure programs meet GIG architectural requirements.
- Developed and maintained a testing suite capable of supporting passive and active IP monitoring and injection of GIG-like traffic and hostile attacks
- Performed end-to-end testing and experimentation in support of GIG developer requirements including but not limited to:
    - JTRS Wideband Networking Waveform early testing (Cluster 2)
    - High Assurance IP Encryption (HAIPE) 1-10 Gb Terrestrial
    - Support warfighting interoperability experimentation via the Joint Rapid Architecture Experimentation (JRAE) and US Joint Forces Command (USJFCOM) Joint Battle Management C2 (JBMC2) Activity including Quality of Service, efficient routing and scalability
    - DoD IPv6 Transition (pilot programs)
    - Joint C2, applications and platform testing activities such as JITC

FY 2006 Plans: ($8.254 million)

- Develop the second increment of the GIG end to end quality of service framework
- Work with NSA to complete the GIG IA architecture
- Develop the second increment of the end to end GIG routing architecture
- Complete the end to end GIG network management framework
- Review E-10A, JTRS Cluster Five, FAB-T, WGS, and Teleport for compliance to end to end GIG frameworks, architectures, and design guidance
- Work with systems engineering organizations from GIG programs to identify and address cross-program issues and influence programs to implement compatible designs that maximize end to end performance
- Continued support of GIG-EF capabilities and enhancements via connectivity to Allied and Coalition activities and operational networks.
- Perform end-to-end testing and experimentation in support of GIG developer requirements including but not limited to:
    - JTRS WNW (Cluster 5 and early Cluster 1)
    - HAIPE 10 Gb implementation
    - HAIPE 10 Gb Optical Encryptors early testing
    - Netcentric Core Enterprise Services early testing
    - DoD IPv6 experimentation and transition
    - Support warfighter interoperability experimentation via JRAE tests in coordination with USJFCOM JBMC2 activities
    - Joint C2, applications and platform testing activities such as JITC

FY 2007 Plans: ($8.746 million)

- Ensure the GIG end to end quality of service framework evolves in accordance with the evolution of commercial products, services, and technology
- Refine the GIG IA, routing architecture, and network management framework to be consistent with evolving commercial products, services, and technology

- Review JTRS Cluster AMF, TSAT, JC2, and NCES for compliance to end to end GIG frameworks, architectures, and design guidance
- Work with systems engineering organizations from GIG programs to identify and address cross-program issues and influence programs to implement compatible designs that maximize end to end performance
- Analyze end to end systems engineering issues by review technical documentation, working with the systems engineering organizations of each of the programs, employing modeling and simulation, and using the results of end to end systems engineering testing and influence design changes to programs to assure compatibility and to maximize end to end performance
- Continued support of GIG-BE capability. Develop initial 40 Gb connectivity among DoD testing components (GIG-BE, TSAT, Teleports) and inter-connectivity to key GIG development sites including capability to support Inter-agency end-to-end testing with DoD, Intelligence Community, Allied and Coalition activities.
- Design and test upgrade to testing suites to support 40 Gb networks
- Perform testing in support of GIG developer requirements including but not limited to:
    - IPv6 transition final testing
    - JTRS WNW end-to-end testing in support of Cluster 5 (spiral 2), AMF.
    - 40 Gbps IPv6/MPLS experimentation and testing including early HAIPE concept development
    - Support NCES spiral development
    - Continued support of end-to-end warfighter interoperability experimentation via JRAE tests in coordination with USJFCOM JBMC2 activities

  Joint C2 applications and platform testing activities such as JITC

C. Other Program Funding Summary: N/A

D. Acquisition Strategy. N/A

E. Major Performers: Naval Research Laboratory, SPAWAR Systems Center San Diego, MIT Lincoln Laboratories, NSA, DISA, and MITRE.