Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E/Defense Wide BA#1				R-1 Item Nomenclature: Government/Industry/Co-Sponsorship of University Research PE 0601111D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	6.504	6.838	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

*Program transferred to become part of DARPA's Focus Research Center Program in FY 2006 and outyears.

A. Mission Description and Budget Item Justification:

(U) Program is a shared commitment between industry and Government to sponsor next generation semiconductor electronics research via the Government/Industry Co-sponsorship of University Research (GICUR) program. It capitalizes on university-based research, education and training in technologies of strategic importance to national defense and also to industry. It provides an emphasis on ground-breaking research with a long-term horizon, and education and training in selected research areas which are vital to advancement of technologies. The commitment is a jointly formed pool of funding (requiring an industry match of at least one-to-one) and a shared management structure for sponsoring this sort of long-term basic research at universities. This provides the military with leading-edge technologies as well as reduces vulnerabilities of industries involved, increases long-term technical growth in these areas, infuses new ideas and approaches, all of which are important for national security. Industry and government share responsibility for research focus area selection and overall direction. Mechanisms have been established for personnel exchange and interactions to provide for continuing education of highly qualified researchers already working in leading edge and emerging S&T. One of the areas emphasizes basic concepts for DoD needs in high frequency applications such as radars, millimeter/microwave communications and radiometry, with special attention to devices fabricated from compound semiconductors, such as gallium arsenide. The program supports both graduate and undergraduate research assistants; thereby assisting in the development of the future S&T workforce in these technical areas.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget:	6.696	0.000	0.000	0.000
Current FY2006 President's Budget Submission	6.504	6.838	0.000	0.000
Adjustments to Appropriated Value:				
Congressional Program Reductions:				
Congressional Rescissions:				
Congressional Increases:	0.000	7.000	0.000	0.000
Reprogrammings:				
SBIR/STTR Transfers:				
Other:	-0.192	-0.162	0.000	0.000

C. Other Program Funding: N/A

D. Acquisition Strategy: N/A

E. Performance Metrics:

Performance in the GICUR Program is monitored at several levels, individual level, focus center level, and overall program level. This research program is jointly funded between the industry and the Government. At the lowest level of the performer, efforts are tracked using project technical milestones that have been appropriately defined and agreed upon. In addition, published papers, conference presentations, and talks at industrial and government organizations are also used to gauge effectiveness of progress of individual efforts. Programmatic and technical milestones are also maintained at the Center level, and the interaction among the current five centers is tracked. Interactions between Centers and DoD labs and industrial organizations are also tracked. In addition, periodic technical and management reviews are conducted with the Centers to gauge progress and provide guidance. Industrial, government, and academic experts are invited to attend these reviews. At the program level, DARPA tracks major deliverables and examines the transition of technologies and ideas from the Center for development in other DARPA programs. DARPA looks at the numbers and impacts of GICUR core technologies that have moved from this program to other programs or to sponsorship by other organizations. Surveys with industry and government experts are used to understand impact and/or potential of individual technologies.

Exhibit R-2a, RDT&E Project Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E/Defense Wide BA 1			Project Name and Number: Government/Industry Co-sponsorship of University Research PE 0601111D8Z					
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
GICUR/P111	6.504	6.838	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

* Program Transferred to DARPA in FY 2006 and outyears.

A. Mission Description and Budget Item Justification:
Program is a shared commitment between industry and Government to sponsor next generation semiconductor electronics research via the Government/Industry Co-sponsorship of University Research (GICUR) program. It capitalizes on university-based research, education and training in technologies of strategic importance to national defense and also to industry. It provides an emphasis on ground-breaking research with a long-term horizon, and education and training in selected research areas which are vital to advancement of technologies.

* Program was transferred in FY 2006 and outyears to become part of DARPA's Focus Research Center Program.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
GICUR/P111	6.504	6.838	0.000	0.000

(U) FY 2004 Accomplishments: (U) The Focus Center Program has demonstrated new technologies that will provide new capabilities in the design and fabrication of semiconductor devices and integrated circuits. In the Gigascale Design Center, a design methodology for obtaining low power but high performance processors was developed using a robust checking circuit that corrects errors in a very low voltage core processor. A design roadmap was implemented to guide future technologies by enabling the accurate modeling and simulation of "what-if" experiments and scenarios on the complex semiconductor technology process. The concepts of platform-centric design were translated from the digital domain to the analog/mixed signal regime and work to formalize the approach was initiated. In the Interconnect Focus Center, the integration of optical materials with silicon were demonstrated. Optical links were developed and measurements of power consumption and bit-error rate were collected. Experiments with nanotubes were conducted, leading to the development and refinement of accurate models of transient performance, including parasitic reactances. In the Center for Circuits Solutions, robust design methodologies for enabling computation with unreliable or faulty components were investigated and interfaces were defined. In addition, applications of fin field effect transistors (finFETs) were investigated, including dynamic and dc properties. Under the Materials, Structures, and Devices Center, experiments with carbon nanotubes and the integration of nanotubes with silicon circuits were conducted. Measurements of mobility were performed and methods to form good contacts using metallics were developed. In addition, experiments were conducted to quantify how film strains and new materials will provide carrier mobility enhancements for very short channel transistors. In the Functional Electronic Nano-Architectures Center, advances in understanding the chemistry of certain polymeric materials enabled development of a process for creating a novel polymeric memory cell that would have significant low power and low fabrication cost and could be scaled to nano-scale dimensions.

(U) FY 2005 Accomplishment: (U) The Focus Center Program has demonstrated new technologies that will provide new capabilities in the design and fabrication of semiconductor devices and integrated circuits. In the Gigascale Design Center, a design methodology for obtaining low power but high performance processors was developed using a robust checking circuit that corrects errors in a very low voltage core processor. A design roadmap was implemented to guide future technologies by enabling the accurate modeling and simulation of "what-if" experiments and scenarios on the complex semiconductor technology process. The concepts of platform-centric design were translated from the digital domain to the analog/mixed signal regime and work to formalize the approach was initiated. In the Interconnect Focus Center, the integration of optical materials with silicon were demonstrated. Optical links were developed and measurements of power consumption and bit-error rate were collected. Experiments with nanotubes were conducted, leading to the development and refinement of accurate models of transient performance, including parasitic reactances. In the Center for Circuits Solutions, robust design methodologies for enabling computation with unreliable or faulty components were investigated and interfaces were defined. In addition, applications of fin field effect transistors (finFETs) were investigated, including dynamic and dc properties. Under the Materials, Structures, and Devices Center, experiments with carbon nanotubes and the integration of nanotubes with silicon circuits were conducted. Measurements of mobility were performed and methods to form good contacts using metallics were developed. In addition, experiments were conducted to quantify how film strains and new materials will provide carrier mobility enhancements for very short channel transistors. In the Functional Electronic Nano-Architectures Center, advances in understanding the chemistry of certain polymeric materials enabled development of a process for creating a novel polymeric memory cell that would have significant low power and low fabrication cost and could be scaled to nano-scale dimensions.

Program ends in FY 2005. The program has been transferred to become part of DARPA's Focus Research Center Program.

C. **Other Program Funding**: N/A

D. **Acquisition Strategy**: N/A

E. **Major Performers**

Georgia Institute of Technology, Interconnect Focus Center, Atlanta, GA
Massachusetts Institute of Technology, Materials/Structures/Devices Center, Boston, MA
University of CA at LA, Functional Engineering Nano-Architectonics Center, Los Angeles, CA
University of CA at Berkeley, Gigascale Design Center, Berkeley, CA
Carnegie Mellon University in Pittsburgh, PA N/A