Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Office of Secretary Of Defense										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602234D8Z: *Lincoln Laboratory*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	29.244	33.759	32.830	0.000	32.830	33.447	33.805	33.885	34.933	Continuing	Continuing
P534: *Lincoln Laboratory*	26.122	29.782	29.547	0.000	29.547	30.102	30.425	30.497	31.440	Continuing	Continuing
P535: *Technical Intelligence*	3.122	3.977	3.283	0.000	3.283	3.345	3.380	3.388	3.493	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Lincoln Laboratory research line program (LL Program) is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). The LL Program funds innovations that directly lead to the development of new system concepts, new technologies, and new components and materials.

(U) The LL Program currently includes seven core technologies and four technical initiatives:
(U) Advanced Electronics Technologies, with emphasis on development of materials, devices, and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors.
(U) Advanced Optical Communications, focusing on extremely efficient, free space optical communications links.
(U) Intelligence, Surveillance, and Reconnaisssance, including the development of novel active and passive RF and electro-optic sensors useful for intelligence, surveillance, and reconnaissance applications.
(U) Netcentric Operations, with an emphasis on developing and demonstrating the key technologies that will enable composable and dynamic multi-mission net centric operations on the Global Information Grid.
(U) Decision Support, with the goal of developing and demonstrating fundamental technologies and architectures supporting real time decisions across large, dynamic, heterogeneous data sets.
(U) Homeland Protection, with the objective of developing and demonstrating an architecture and the key technologies that support homeland protection.
(U) Counter Terrorism, aimed at developing technologies useful in the war on terrorism.
(U) Technical Initiatives, including biological sciences to aid the warfighter, promote public health, and develop tools for biological research; cybersecurity technologies to develop new techniques for the protection of systems against cyber attack and exploitation; robotics technologies with the objective of developing mobile, autonomous, robotic platforms that demonstrate key capabilities needed for a wide range of defense applications; and quantum information sciences to develop basic technologies that support the storage, transport, and computation of quantum information.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Office of Secretary Of Defense	DATE: February 2010
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(U) Supporting these seven core technology thrusts is a work effort titled Technical Intelligence. Technical Intelligence will support detailed understanding of technology advancement in important scientific area and other scientific disciplines such as nanotechnology, directed energy and propulsion. Some details are classified, but one effort, called Global Dialogue on Emerging Science and Technology will be jointly sponsored by DOD, Department of State, and CIA This program will give very detailed insight in such topics as Software Engineering in India, Nanotechnology in South East Asia, and European Laser development, for example. This information will in turn assist in development of U.S. capabilities.

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	31.340	34.034	0.000	0.000	0.000
Current President's Budget	29.244	33.759	32.830	0.000	32.830
Total Adjustments	-2.096	-0.275	32.830	0.000	32.830
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-0.225	0.000			
• SBIR/STTR Transfer	-0.856	0.000			
• Balance attributed to program budget review adjustments	0.000	0.000	0.000	0.000	0.000
• OMNIBUS Reprogramming	-1.015	0.000	0.000	0.000	0.000
• Undistributed Reduction	0.000	-0.275	0.000	0.000	0.000
• Other Program Adjustments	0.000	0.000	32.830	0.000	32.830

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: *Research, Development, Test & Evaluation, Defense-Wide* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602234D8Z: *Lincoln Laboratory*	PROJECT P534: *Lincoln Laboratory*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P534: *Lincoln Laboratory*	26.122	29.782	29.547	0.000	29.547	30.102	30.425	30.497	31.440	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Lincoln Laboratory program (LL Program) is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). The LL Program funds advanced research activities that directly lead to the development of new system concepts, new technologies, and new components and materials, with impact in several core technologies:

(U) Advanced Electronics Technologies, with emphasis on development of materials, devices, and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors.
(U) Advanced Optical Communications, focusing on extremely efficient, free space optical communications links.
(U) Intelligence, Surveillance, and Reconnaissance, including the development of novel active and passive RF and electro-optic sensors useful for intelligence, surveillance, and reconnaissance applications.
(U) Netcentric Operations, with an emphasis on developing and demonstrating the key technologies that will enable composable and dynamic multi-mission net centric operations on the Global Information Grid.
(U) Decision Support, with the goal of developing and demonstrating fundamental technologies and architectures supporting real time decisions across large, dynamic, heterogeneous data sets.
(U) Homeland Protection, with the objective of developing and demonstrating an architecture and the key technologies that support homeland protection.
(U) Counter Terrorism, aimed at developing technologies useful in the war on terrorism.
(U) Technical Initiatives, including biological sciences to aid the warfighter, promote public health, and develop tools for biological research; cybersecurity technologies to develop new techniques for the protection of systems against cyber attack and exploitation; robotics technologies with the objective of developing mobile, autonomous, robotic platforms that demonstrate key capabilities needed for a wide range of defense applications; and quantum information sciences to develop basic technologies that support the storage, transport, and computation of quantum information.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Advanced Electronics Technology	7.011	6.447	6.839	0.000	6.839

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: (U) Advances were made in the techniques for detecting explosive residues on people and objects. Improvements in low noise, visible CCD imagers were made along with novel imager architectures that facilitate imaging through turbulence and target tracking. *FY 2010 Plans:* (U) Develop technologies for imaging focal planes that enable new approaches to electro-optical sensors. Develop unique integrated circuit designs and processes for ultra-low power electronics, high data collection rates, or operation in stressing environments. *FY 2011 Base Plans:* (U) Continue technology development for imaging focal planes through the use of an advanced set of design and fabrication tools.					
Advanced Optical Communications *FY 2009 Accomplishments:* (U) Developed arrays of superconducting, single photon counting detectors with world record detection sensitivity for advanced optical communication systems. Demonstrated a new world record in quantum key distribution rate. *FY 2010 Plans:* (U) Develop technologies to increase the data rate of ultra sensitive communications links. Develop advanced channel equalization techniques to allow wide-band optical data transmission through scattering media. *FY 2011 Base Plans:* (U) Evaluate novel optical communication schemes to further increase the operational utility of optical communications.	3.116	2.660	2.600	0.000	2.600

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Intelligence, Surveillance, and Reconnaisssance *FY 2009 Accomplishments:* (U) Designed, built, and field-tested a novel multiple input-multiple output (MIMO) radar architecture. Demonstrated an ultrawide-band laser radar. Continued to develop and demonstrate advanced, infrared digital focal plane array (DFPA) readout circuitry. *FY 2010 Plans:* (U) Continue to improve sensitivity and data throughput rate of infrared digital focal plane array surveillance camera. Continue to investigate MIMO radar architectures. Develop technologies for highly integrated RF front ends, including silicon-based transceivers for use in low cost and reconfigurable RF systems. Develop novel computer architectures designed specifically for rapidly processing graph data relevant to military operations. *FY 2011 Base Plans:* (U) Investigate novel radar and electro-optic sensors to improve Department of Defense ISR capabilities.	6.736	5.260	5.260	0.000	5.260
Net-centric Operations *FY 2009 Accomplishments:* (U) Automated net-centric operations (NCO) processes, including service composition. Worked on data integration techniques. Demonstrated NCO in a large scale field experiment. *FY 2010 Plans:* (U) Continue with the development of advanced, automated services and architectural features for net-centric operations. Demonstrate a second large scale field experiment incorporating additional NCO services.	1.386	1.960	1.960	0.000	1.960

Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: (U) Continue to add advanced architectural features and services useful for NCO.					
Counter Terrorism Technologies *FY 2009 Accomplishments:* (U) Developed advanced social network graph building tools to aid in discovering terrorist networks. Developed advanced, low power, RF receivers. *FY 2010 Plans:* (U) Continue development of novel UAV sensing and wide-band communications systems. Demonstrate a system that employs a family of low cost, miniature, ground-based sensors. Evaluate automated software tools for terrorist threat network analysis and tracking. *FY 2011 Base Plans:* (U) Demonstrate sensors for miniature UAVs and increasingly sophisticated social network graph building tools.	2.266	2.660	2.660	0.000	2.660
Decision Support *FY 2009 Accomplishments:* (U) Used Intelligence, surveillance, and reconnaissance-data from a computer-generated tactical scenario and conducted an integrated laboratory decision-support experiment. *FY 2010 Plans:* (U) Demonstrate an integrated multi-source information and knowledge management architecture to provide decision support for military applications. Explore conceptual architectures for the human-machine interface.	2.871	3.380	3.380	0.000	3.380

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: (U) Continue to develop and test knowledge building tools to facilitate decision support for the military.					
Homeland Protection *FY 2009 Accomplishments:* (U) Developed a sensing, communications, and control architecture that will revolutionize the response to homeland disasters. Evaluated video processing technologies to support semi-automated surveillance. *FY 2010 Plans:* (U) Complete a communications and sensor network that supports national response to homeland disasters. Develop and test advanced video technologies to provide critical infrastructure surveillance. *FY 2011 Base Plans:* (U) Expand the critical infrastructure protection effort to include multi-camera tracking and forensics.	2.736	2.365	2.365	0.000	2.365
Technical Initiatives *FY 2010 Plans:* (U) Work in biological sciences will focus on developing field diagnostics, gene synthesis, and biomarkers for depression. Efforts in cyber security technologies will concentrate on building a next-generation cyber warfare test range, developing the concept of an open architecture anti-tamper system, and creating an automated cyber mission risk assessment tool. The robotic technologies objectives include demonstrating cooperative interior mapping using two autonomous robots and initiating development of a mobile ground robot capable of acting as a convoy lead. The quantum information science goals include demonstrating long range quantum information transmission and initial development of improved quantum information storage mechanisms.	0.000	5.050	4.483	0.000	4.483

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: (U) Evaluate performance of multi-analyte, field diagnostic platforms and describe the instrumentation needed to characterize whole body trauma effects on brain injury. Demonstrate advanced cyber warfare test range and cyber mission risk assessment tools. Demonstrate utility of an open architecture anti-tamper hardware. Demonstrate robot convoy leader functions and begin development of cognitive robot architecture and algorithms. Develop several quantum information science technologies with improved qubit coherence time for quantum information storage and computation.					
Accomplishments/Planned Programs Subtotals	26.122	29.782	29.547	0.000	29.547

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P535: *Technical Intelligence*	3.122	3.977	3.283	0.000	3.283	3.345	3.380	3.388	3.493	Continuing	Continuing

A. Mission Description and Budget Item Justification

Technical Intelligence supports five core technology thrusts that combine efforts in two areas: 1) from the university community through the JASONs (this is not an acronym) program and 2) through information on maturation and development of technology throughout the rest of the world.

(U) JASONs is a group of approximately 65 appropriately cleared experts who provide detailed independent technical assessment of the most difficult technological problems. JASON members are mostly fully tenured professors in physics, mathematics, biosciences, and engineering, and hold active SCI-level clearances. Output from JASON studies are provided across the leadership and program manager levels and their studies shape programmatic and technical decisions involving millions of dollars. JASONs were previously funded through university research programs, but their level of technology maturity is appropriate for incorporation into Applied Research.

(U) The technical intelligence program will support collaborative work with the U.S. federal intelligence community on emerging and disruptive technologies, primarily through further development of the Science and Technology Net Assessment studies, which assess a select set of technologies from both a domestic and foreign development perspective. The program will also support focused technology and regional trend studies and collaborative work with international partner nations on assessments of emerging and disruptive technology and its application. The technical intelligence program will also support development of information technology based tools that enable collaborative analysis of emerging and disruptive technologies.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Technical Intelligence	3.122	3.977	3.283	0.000	3.283
FY 2009 Accomplishments: (U) Continue to focus the JASON studies and Technical Intelligence in areas critical to national security. JASON studies will be focused depending on the area most important in the security environment at the time. For the Technical Intelligence portion; additional country specific S&T sector reports will be commissioned in by the Library of Congress Federal Research Division and					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
finalized. In support of continued efforts to characterize technology trends and forecast the map of the future science and technology landscape, this program will continue the National Academies project to forecast future disruptive technology and will sponsor several conferences in countries and technologies of interest. This program will participate in a tri-lateral arrangement with the United Kingdom and Australia to assess emerging and disruptive technology and will contribute to generation of tri-lateral research products on technology implications. The program will continue the efforts of two National Academy of Sciences projects under the National Research Council, one called Forecasting Future Disruptive Technology to identify national security impacts of forecasted technologies, and the Board on Global Science and Technology to increase understanding of international perspectives on emerging S&T. In coordination with the National Intelligence Committee effort to Strengthen Science and Technology Analysis, this program will coordinate, and develop processes and mechanisms to integrate and coherently track defense S&T intelligence requirements and will conduct S&T net technical assessments in several areas such as energetic materials, micro-electronics, information assurance and neuroscience.					
FY 2010 Plans: (U) Continue to focus the JASON studies and Technical Intelligence in areas critical to national security. JASON studies will be focused depending on the area most important in the security environment at the time. For the Technical Intelligence portion some details are classified. The program will conduct S&T net technical assessments on global technology advancement in collaboration with the National S&T Intelligence Committee in the areas such as electronic warfare, hypersonic aeronautics and others as identified by the S&T net assessment program in FY 2009. This program will continue tri-lateral collaboration with the United Kingdom and Australia to continue assessments on emerging and disruptive technology and will contribute to an international conference. The program will continue the effort of a National Academy of Sciences project under the National Research Council called Forecasting Future Disruptive Technology to identify national security impacts of forecasted technologies, will sponsor several conferences in countries and technologies of interest, and will conducted a future technology war-game at the National Defense University, focused on the					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
potential disruptive impact of commercially available technologies. In coordination with the National Intelligence Committee and the Defense Intelligence Community effort to Strengthen Science and Technology Analysis, this program will initiate the implementation of a structured enterprise approach to determine, prioritize, track, distribute and evaluate S&T intelligence requirement and will generate a report on the health of Defense S&T Intelligence to support the defense S&T program. Country specific reports by the Library of Congress Federal Research Division commissioned in FY 2009 will be finalized, additional reports will be commissioned and the program will initiate development of Web 2.0 based information technology solutions geared to increase global technology awareness. *FY 2011 Base Plans:* (U) Continue to focus the JASON studies and Technical Intelligence in areas critical to national security. JASON studies will be focused depending on the area most important in the security environment at the time. For the Technical Intelligence portion some details are classified. The program will conduct S&T net technical assessments on global technology advancement in collaboration with the National S&T Intelligence Committee in the areas such as electronic warfare, hypersonic aeronautics and others as identified by the S&T net assessment program in FY 2009. This program will continue tri-lateral collaboration with the United Kingdom and Australia to continue assessments on emerging and disruptive technology and will contribute to an international conference. The program will continue the effort of a National Academy of Sciences project under the National Research Council called Forecasting Future Disruptive Technology to identify national security impacts of forecasted technologies, will sponsor several conferences in countries and technologies of interest, and will conducted a future technology war-game at the National Defense University, focused on the potential disruptive impact of commercially available technologies. In coordination with the National Intelligence Committee and the Defense Intelligence Community effort to Strengthen Science and Technology Analysis, this program will initiate the implementation of a structured enterprise approach to determine, prioritize, track, distribute and evaluate S&T intelligence requirement and will generate a report on the health of Defense S&T Intelligence to support the defense S&T program. Country specific reports by the Library of Congress Federal Research Division commissioned in FY 2009 will					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
be finalized, additional reports will be commissioned and the program will initiate development of Web 2.0 based information technology solutions geared to increase global technology awareness.					
Accomplishments/Planned Programs Subtotals	3.122	3.977	3.283	0.000	3.283

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A