

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2003	
Appropriation/Budget Activity RDT&E., DW BA2				R-1 Item Nomenclature: Lincoln Laboratory 0602234D8Z				
Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	21.969	26.769	27.231	26.514	26.938	27.415	27.763	28.315

**A. Mission Description and Budget Item Justification:**

(U) The Lincoln Laboratory (LL) Line program is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). LL is operated as an FFRDC administered by the DoD, and is unique among DoD FFRDC's: the laboratory is operated (under A-21) by MIT with no fee. Thus, the Research Line is the laboratory's only dedicated source of funding for innovative research and development efforts.

(U) The LL Line funds advanced research activities that directly lead to the development of new system concepts, new technologies, and new components and materials. These activities enable the DoD to address latent technology needs that affect a broad spectrum of missions, services, and transformational operational capabilities. The Lincoln Laboratory Research Line contributed foundation technologies to two systems which received the 2002 Packard Excellence in Acquisition Award: (1) the Bio-aerosol sensing and micro-laser technologies were transferred to industry and are in production for the Joint Biological Defense Sensor (JBPDS), and (2) the Free-space optical communications technologies were used in the GeoLite optical communications satellite demonstration system. The GeoLite demonstration provides the underpinnings of the Transformation Communications Architecture. Other recent successes include a compact 3D imaging laser radar that uses unique photon-counting avalanche photodiode arrays and has demonstrated, in the DARPA Jigsaw program, high quality imagery of targets obscured by dense foliage or camouflage, and a biosensor that uses genetically engineered immune cells and has demonstrated the ability to identify major biowarfare agents in under two minutes with high sensitivity and low false alarm rate.

(U) The LL Line program currently has impact in five core research areas:

(U) Target Surveillance and Recognition, with emphasis on (1) revolutionary sensing techniques and algorithms for detecting and recognizing battlefield targets both in the clear and in difficult deployments, (2) demonstrating the technologies associated with multi-sensor fusion for target ID, and (3) advanced signal processing techniques to improve the ability of present systems to detect ground moving targets.

(U) Military Communications, with emphasis on high bandwidth, low probability of intercept, jam resistant links and machine-to-machine applications. Includes advanced antenna designs, RF technology, high-rate fiber and free-space optical communications systems, network protocols (including for mobile users with lightweight transceivers) for "socketing" sensors into the network and the interconnection of these very disparate modalities into a global defense network that can truly realize the vision of a "from sensor to decider to shooter" communications infrastructure. Developing unique intrusion detection/response techniques to protect computer networks.

(U) Combat Support Technology, including active hyper spectral sensing systems, compact biological agent detection systems, advanced 3D laser

radars (LADARs), and high-energy laser (HEL) technology. The primary objective for the active hyper spectral sensing system development is to demonstrate the feasibility and utility of combining active illumination with hyper spectral imaging for a range of military applications including Combat Identification (CID). The focus in biological agent detection is in developing technology for compact, lightweight, real-time biological-agent sensors with extremely high sensitivity and low false alarm rate. The high-energy laser technology program is focused on improving beam control for stressing atmospheric conditions (e.g., tactical HELs in near-surface engagements) and developing novel, more efficient lasers to reduce the size and weight of HEL systems.

(U) *Advanced Electronics Technology*, including revolutionary, advanced electronic/optical devices, with specific emphasis on low power and high sample rate A/D conversion for digital receivers for radar and electronic intercept, 3-D imaging and photon-counting focal-plane arrays for ISR and advanced missile seekers, mid-infrared semiconductor lasers to counter advanced heat-seeking missiles, new sensors for rapidly detecting and identifying low concentrations of bio-warfare agents, solid state low-light imagers for surveillance and targeting, and high-speed, radiation hard, ultra-low power analog and digital circuits tailored for DoD applications.

(U) *Counter Terrorism Technology*, including defense against bio-warfare, identification and tracking of individuals, surveillance and reconnaissance over wide areas, covert communications and electronic tagging, as well as exploitation of all-source data for identifying illicit behavior and facilities.

**Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>
Previous President's Budget	26.769	25.669	27.006	27.490
Current FY 04 President's Budget	26.769	27.231	26.514	26.938
Total Adjustments		1.562	-0.492	-0.552
Congressional program reductions			-0.492	-0.552
Congressional rescissions				
Congressional increases				
Reprogrammings				
SBIR/STTR Transfer				
Other		1.562	-0.492	-0.552