RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2							R-1 ITEM NOMENCLATURE Lincoln Laboratory **PE 0602234D8Z**			
COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing
Lincoln Laboratory/P534		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing

(U) Project Number and Title: P534 Lincoln Laboratory

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) The Lincoln Laboratory (LL) program is a high technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). LL is operated as a FFRDC administered by the DoD, and is unique among DoD FFRDCs. It has no funding sources other than this Research Line for its innovative research and development efforts. This is due to the fact that LL is operated by MIT at no fee and may not charge for IR&D (under A-21). Other DoD FFRDCs do charge a fee with which they may support research efforts.

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(U) The LL Line funds research activities that directly lead to the development of new system concepts, new technologies, and new components and materials. Historically, the Line funding supported many development and demonstration programs which have led to such significant DoD systems as Joint Surveillance Target Attack Radar System (JSTARS), Military Strategic Tactical and Relay (MILSTAR), Ground-Based Electro-Optical Deep Space Surveillance (GEODSS), as well as to solid-state devices and processes of major importance to the military industrial base. Technology developed under the Line research is being used to upgrade existing military systems, e.g., the Navy's Hawkeye, and Aegis radars, and the Air Force's space surveillance and communication systems. The Line also supports ongoing Laboratory programs with state-of-the-art technology developments. The Line program currently has the following 4 research elements:

- 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, (3) fundamental target-recognition bounds and their implications for sensor and algorithm design, and (4) revolutionary new approaches for automated passive sonar target classification of submarine targets and discrimination of submarines from surface ship clutter.
- High-connectivity, low-cost military global defense network and communications systems, with emphasis on new antennas, RF technology, network protocols (including for mobile users with lightweight transceivers), high-rate fiber and free-space optical communications systems, and the interconnection of these very disparate modalities into a global defense network that can truly realize the vision of a "from sensor to shooter" communications infrastructure which will greatly enhance force effectiveness by providing the right information at the right time anywhere in the world. Developing unique intrusion detection techniques to protect computer networks.
- Advanced combat support technologies including advanced 3D laser radars, active hyperspectral sensing systems, and compact biological agent detection systems. The primary objective for the active hyperspectral sensing system development is to demonstrate the feasibility and utility of combining active illumination with hyperspectral 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 (< 1 agent containing particle per liter of air) and with strong background clutter rejection for extremely low false-alarm rate (< 1 per week). Continue the development of totally new sensors using Avalanche Photodiode Detector (avalanche photodiode) arrays with new compact, efficient lasers.

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• Revolutionary, advanced electronic/optical technology, with specific emphasis on optical sampling for direct analog-to-digital conversion on the microwave carrier in digital receivers for radar and electronic intercept, 3-D imaging and high sensitivity IR focal-plane arrays for advanced missile seekers, mid-infrared semiconductor lasers to counter advanced heat-seeking missiles, new miniature fluorescent and microfluidic sensors for rapidly detecting and identifying low concentrations of biowarfare agents, solid state low-light imagers for improved night vision under starlight illumination, and high-speed, radiation hard, ultra-low power analog and digital circuits for ubiquitous DoD applications.

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COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing
Lincoln Laboratory/P534		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing

(U) FY 2001 Accomplishments:

(U) Target Surveillance and Recognition: ($4.893 million)

(U) *Surface Surveillance*: Continued to investigate the absolute (vs. relative, between two sensor designs) fundamental ATR performance bounds. Applied multi-sensor ATR concepts to develop of practical multi-sensor ATR architectures for high-performance, resource-efficient, wide-area battlefield target recognition. Designed field experiments to demonstrate such architectures. In addition to being directly applicable to ongoing R&D efforts such as DARPA`s Moving Target Exploitation (MTE) and Moving and Stationary Target Acquisition and Recognition) MSTAR programs, these activities have considerable significance for organizations, such as National Intelligence Mapping Agency (NIMA), NRO and the Services, who are planning and developing next-generation sensing and exploitation systems. Demonstrated multi-sensor data fusion and target recognition system at operational data site.

(U) *Sonar Target Classification*: Expanding application of Interactive Passive Acoustic Classifier (IPAC) began deployment of a classification approach beyond submarine towed array sonars to the fixed (SOSUS) and mobile (SURTASS) surveillance problems. Developed techniques for operator in-situ training and test with field data. Developing dynamic databases to permit sonar to exploit knowledge of environment, intelligence information, external sensor data on surface ship clutter. Testing advanced sonar techniques in submarines in operational environments. Several algorithms have become operational.

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(U) *Underground Structures*: Refined techniques for sparse-array active seismic imaging and demonstrate an existing underground facility. Developed algorithms that allowed detection of underground structures down to about 100m.

(U) Military Communications: ($4.504 million)

(U) Continued to develop technology for global high-rate military communications and networking, including optical communications in space and fiber. Continued demonstration and extension of networking techniques and protocols for interworking among disparate networks including Milsatcom. Demonstrated ultra-fast optical testbed with 100 Gbps transmissions between Lincoln Laboratory and Washington, DC (application to surveillance data processing) using this test bed for distributed radar experiment. Investigated novel application areas for optical technology such as ultra-fast data encryption and processing. Began developing antenna and processing techniques to allow high quality comm.-on-the-move.

(U) *Defensive Information Warfare*: Development and evaluation of advanced techniques for network intrusion detection continued. Focus shifted towards detection of insider attacks (i.e. attacks from users who have authorized access to the system). Built systems that process complementary data from an ensemble of cooperating intrusion detection systems, for improved aggregate performance. Developing technologies that will improve the security of wireless networks. Continue to test Air Force base computer traffic to assess and improve performance.

(U) *Combat Support Technology*: ($4.425 million)

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(U) *Active Hyperspectral Sensing System*: Continued to develop a full-spectral active Hyperspectral Imaging (HIS) system for target recognition, using select, discrete-frequency laser wavelengths throughout the visible through mid-wave infrared (IR) spectral regions, broadband illumination in discreet segments of those regions, and passive long-wave IR imaging. The system will be adaptable, where both the sensing wavebands and target-recognition algorithms will be specified by the applications. Developed algorithms to find mines (metal and plastic) with high detection probability using particular wavelength combinations. For some applications, visible avalanche photodiode (avalanche photodiode) arrays are being incorporated that permit range-resolved imaging as well as the standard spatial and spectral imaging that the active hyperspectral (HIS) system affords. The potential is for 4 dimensional sensor systems that could greatly enhance target detection and identification.

(U) *3D Laser Radar*: Continued to improve the performance of 3-D laser radar systems. Developed techniques for scaling avalanche photodiode array sizes to greater than 32 x 32 pixels. These larger arrays have applications for advanced ballistic missile defense (BMD) and tactical seekers and ground mapping and foliage penetration. Continued the development of 1 micron and 1.5-micron-sensitive avalanche photodiode arrays. These devices will enable the single-photon-sensitive 3-D laser radar technologies to be used in the eyesafe regime for applications such as combat identification and tactical seeker homing in urban environments. Initiated the development of multi-function laser transmitters, which are capable of 3-D imaging and laser-vibration sensing, for applications of combat identification and underground-structure sensing. Started building an airborne demonstration system to test ground mapping and target identification. System to be demonstrated in FY2002.

(U) *Bio Agent Detection Systems*: Transitioned the bio agent trigger system Biological Agent Warning Sensor (BAWS), to the Joint Biological Point Detection System (JBPDS). After successful tests, BAWS was transferred to a contractor for fabrication of about 1000 JBPDS systems. Continued to investigate techniques and technologies to make the warning sensor more sensitive and smaller. Improved the performance of the mammalian B-cell bio ID sensor. Developed B-cell lines tuned to a number of bio agents (e.g., plague, foot-and-mouth, tularemia, etc.) Began to explore methods to combine the B-cell-based sensor with a BAWS type trigger sensor. This technology development is directed toward developing integrated, miniature, low-power bio-sensors. Developed techniques to collect and preserve clear samples for diagnosis and threat characterization. Started to develop and test concepts for military base protection and urban defense. Both of these areas require different sensor and warning concepts and close connections with health care institutions.

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(U) Advanced Electronics Technology: ($6.095 million)

(U) Investigated highly scaled Complementary Metal Oxide Silicon/Silicon On Insulator (CMOS/SOI) digital circuits using mixed electron-beam and optical lithography at 25-nm feature sizes for ultra-dense circuits. Explored integration of integrated circuits (ICs) in the third dimension as a means to significantly improve functional density. Demonstrated an optically sampled A/D with multi-GHz bandwidth for radar and electronic intelligence use. Extended highly integrated Charge-coupled Device/Complementary Metal Oxide Silicon (CCD/CMOS) imager to include noiseless jitter compensation of platform motion. Continued development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for "smart" multimode sensors. Transferred advanced mid-IR semiconductor laser technology to industry for dual-wavelength infrared countermeasure (IRCM). Continued development of combined biochemical, micromechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Developed functional 32 x 32 Avalanche Photo Diode array for use in a laser radar demonstration.

(U) FY 2002 Plans:

(U) Target Surveillance and Recognition ($5.017 million)

(U) *Surface Surveillance*: Extend integrated capability to automatic detection and identification of high value targets like Surface-to-Air Missiles. This capability will build upon the trainable search agents and use terrain features as contextual information to help the target recognition process. Focus will center on the automatic target recognition of SA-6s from overhead data and reducing the processing latencies associated with these time-critical targets. Technology will continue to be tested using operational data. Use data from airborne sensors to support development of advanced operational concepts, electronic countermeasures (ECCM), and auto target recognition (ATR) algorithms. Start the transition of this technology to a multi-mode test airborne platform being developed to test a forward C^2 platform for the Air Force.

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(U) *Underground Structures*: Continue to tune sparse arrays for actively imaging underground facilities. Consider sensors, processing, calibration and communications requirements. Use relevant measurement data to understand the phenomenology to tune and validate imaging algorithms. The objective of this work is to identify features of underground structures.

(U) *Sonar Target Classification*: Develop dynamic database concepts to permit sonar to better exploit knowledge of environment, intelligence information, and external sensor data on surface ship clutter. Extend Interactive Passive Acoustic Classifier (IPAC) methodology to sonar classification with multiple sensors, using the hull, sphere, and towed arrays of a typical submarine as an example. Continue Operator-Machine Interface (OMI) development. Explore the benefit of distributed sensor systems to classification. Continue to transfer algorithms to the operational fleet.

(U) *Open Systems Technology and Prototyping Testbed*: Develop concepts and technology using commercial components, tailored high speed very large scale integration (VLSI) designs, and new software architectures and protocols to allow flexible and upgradeable electronics/software for future military sensor and communication systems. This should allow shorter development times, open competition, and the upgrade of military systems much more easily and cheaply. Also developing a modular testbed for ground and airborne measurement systems to allow rapid prototyping of new processing hardware and algorithm concepts.

(U) Military Communications: ($4.489 million)

(U) *Global Networks*: Continue to develop technology for global high-rate (10's to 100's Gbps) military communications and networking, including optical communications in space and fiber. Continue demonstration and extension of networking techniques and protocols for interworking among disparate networks including Milsatcom. Demonstrate networked applications over MILSTAR II to facilitate ability to transfer C4ISR data in the tactical theater. Utilize high-speed fiber network between Lincoln Laboratory and Washington, DC to demonstrate movement of radar data from sensor to remote processing site for fusion with other radar data. Investigate novel application areas for optical technology such as ultra-fast data encryption and processing.

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(U) *Defensive Information Warfare*: Research, development and evaluation of systems that can determine an attackers intent will be carried out. Research on combined detection and reaction will be extended to mobile, wireless networks. Technology transfer of detection and reaction systems to military users will continue. Methodology for evaluation of intrusion detection and reaction systems will be transferred to other government organizations. Starting to evaluate the security issues associated with net centric warfare.

(U) Combat Support Technology: ($6.170 million)

(U) *Active Hyperspectral Sensing System*: Complete the development of a measurement system consisting of passive hyperspectral and multi-spectral imaging sensors with select, discrete-frequency laser wavelengths. The system will be adaptable, where both the sensing wavebands and target-recognition algorithms will be specified by the applications. In addition to combat ID, these systems will be investigated for detecting bio agents remotely (~100m to 1km). Start integrating hyperspectral techniques with laser radars to obtain true 4 dimensional sensors.

(U) Forward Airborne C^2 Platform: Begin development and testing of an airborne C^2 aircraft for test and evaluation of a forward based C^2 node. The test platform will have all appropriate communication, command and control gear to test gathering, assessing and targeting enemy ground targets.

(U) *Biological Agent Detection Systems*: Field testing of the integrated BAWS/B-cell sensor will be conducted and non-living analogs to the B-cells investigated to enhance sensor operability. Network architectures of warning/ID sensors will be tested in combined modeling and validation measurements. Transition of the bio sensor technologies to aqueous and plant environments will be investigated. Sensor architectures will be considered that fuse biological with chemical sensors and appropriate response strategies. Applications for the cartridge-based nucleic-acid testing will be expanded to include real-time, in-the-field DNA analysis, and confirmation sensing. Working with USAMRIID to transfer these techniques to them. Working with the Joint Biological Program Office to develop follow-on concepts for JBPDS. Continue to work the military base and urban bio defense problem. Measurements have been made in buildings and large public gatherings, to assess backgrounds and sensor system concepts that would work in these environments.

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(U) *3D Laser Radar*: Continue the development of laser radar technologies for applications to advanced ballistic and tactical seekers and combat identification. This includes the development of visible and near-infrared-sensitive Geiger-mode avalanche photodiode arrays with bonded timing circuitry for 3-D laser radars. Upgrade the 3-D imaging brassboard system to operate at the 1.0-micron wavelength. This will allow the functional test and demonstration of the InGaAs avalanche photodiode arrays. Examine the issues related to integrating these systems into lightweight, low power, packages consistent with advanced seeker applications, which will provide single-photon-sensitivity and high-precision range resolution for generating detailed 3-D imagery of targets. Continue the development of multi-function laser-radar systems, which combine 3-D imaging and range-Doppler/vibration sensing for applications to BMD interceptors, combat identification and foliage penetration. These systems will use the same laser transmitter for incoherent 3-D laser radar, utilizing the avalanche photodiode arrays, and coherent laser radar for target-vibration sensing. This development will involve the integration of a multi-function laser radar testbed, which will enable the collection of 3-D and range-Doppler image data on a variety of relevant targets. Continue the integration and testing of laser radar concepts on test ranges and air platforms.

(U) Advanced Electronics Technology: ($6.293 million)

(U) Address improvement of CMOS/SOI yield and radiation hardness. Explore limits of optical lithography using phase-shift masking at 157-nm wavelength. Complete the 3-D stacked megapixel imager with on-chip digital image processing. Demonstrate optically sampled A/D at 1-GHz bandwidth in field radar site. Continue development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for “smart“ multimode sensors. Demonstrate near-IR/electronically shuttered 4-megapixel CCD imager for airborne reconnaissance. Build beam-combined high-brightness IRCM demonstration package. Develop high-power laser systems using beam-combined fiber sources and/or cooled ytterbium:yttrium aluminum garnet (Yb:YAG). Develop optimized super-wideband compressive receiver for airborne electronic intelligence (ELINT). Continue development of combined bio-chemical, micro-mechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Begin investigation of the combination of biology and electronics to develop totally new capabilities (e.g., bio batteries, artificial membranes and cell components for detection and control functions, high density storage, etc.)

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(U) FY 2003 Plans:

(U) Target Surveillance and Recognition: ($5.503 million)

(U) *Surface Surveillance*: Incorporate tactical sensor data into the fusion process and complete development of a robust time critical strike architecture. Use the Air Force airborne command and control test aircraft (MC2A) to develop and test advanced concepts for surface surveillance. The architecture will use the components developed in previous programs using data from the MC2A. The algorithms will be designed to find, identify, and target ground forces. Connection to the MC2A platform will allow evaluation of the algorithms in integrated Air Forces exercises. Particular focus will be on difficult targets; moving, in foliage, and urban targets. A number of foliage penetration and "through the wall" sensor technologies will be investigated. In addition to being directly applicable to ongoing R&D efforts such as DARPA's MTE and MSTAR programs, these activities will have considerable significance for organizations, such as NIMA, NRO and the Services that are planning and developing next-generation sensing and exploitation systems.

(U) *Sonar Target Classification*: (U) Continue to develop automation approaches. Consider benefit of new automation and classification concepts to active sonar concepts using off-board sources and distributed receivers. This allows multiple detection geometries and phenomenologies. Test these techniques on submarines to allow transition to full fleet operation.
(U) *New Open Systems Technology* : Further develop VLSI Application-Specific Integrated Circuit (ASIC) design process and show full integration with commercial Internet Protocol (IP) core kernels and structured software leading to full "system on a chip" capability. Initial focus will be a "radar on a chip". This technology (1) enables rapid design cycles, (2) significantly eases hardware and software upgradeability, (3) minimizes hardware and software changes as new computing systems are used, and (4) allows real time flexibility in sensor features and algorithms. These capabilities will be demonstrated in a modular testbed connected to ground and airborne sensor systems.

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(U) Military Communications: ($4.458 million)

(U) *Global Networks*: Continue to develop architecture and technology for global high-rate military communications and networking, including optical communications in space and fiber, future Milsatcom, and tactical theater communications particularly to forces on the move and to support time critical strike. Continue laboratory demonstrations of technology for DoD-specific applications, refine networking architecture and protocols, and aid DoD in defining its development and procurement strategy for the future global defense network that will provide C3 and ISR with tactical timeline product transport with tactical timelines. Application is to the emerging integration of DoD command elements, information centers, and execution forces into a unified Global Information Grid. Specific technologies include very high speed (~100GBps) optical systems, multi-frequency RF systems using MEMs techniques, (uses x-y addressable micro-switches to change the metal shape thereby tuning the RF components over very wide bandwidths) and protocols for high speed wireless networks, antenna designs and architectures for "comm-on-the-move" systems. Expect to have the design of a comm.-on-the-move distributed antenna system for Army vehicles.

(U) *Airborne C^2 Node*: Use the Air Force airborne C^2 testbed to test new communication, command, and control concepts for ISR and weapon targeting.

(U) *Defensive Information Warfare*: Research and development of information assurance for wireless networks will continue, focusing on the problems of node mobility, frequent node unavailability, low-bandwidth communication, and node overrun. Evaluation of next-generation sensors and correlators will continue along with testbeds to evaluate new concepts. Work the wired and wireless security issues facing net centric warfare. Near term focus will be on global ISR problems and use the C^2 testbed described above.

(U) Combat Support Technology: ($7.771 million)

(U) *Active Hyperspectral Sensing Systems*: Operational concepts will continue to be incorporated during this phase for surface surveillance and reconnaissance to be operated on various platforms such as ground vehicles (including unattended ground sensors), UAVs and aircraft. The effort will focus on selected specific applications which will lead to the prototype of compact and/or miniaturized sensing systems, adaptive and automated real-time (or near real-time) processing algorithms, as well as protocols for

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communication and product dissemination. Continue the development of active multi-and hyper-spectral sensors for remote detection of bio agents and reactants.

(U) *Biological Agent Detection Systems*: Sensor designs developed in FY2003 will be transitioned to prototype fabrication and testing, especially in applications of advanced JBPDS units and small (hand-held) units for both air and water-quality monitoring. Expect to transition some of these designs to the Joint Program Office for Bio systems. Emphasis will be on integration of sensing systems, communications, and information management for large-scale applications such as military base and urban defense (building, crowd, and port of entry defense). Forensics applications and diagnostic techniques will continue to seek to meet the military and civilian communities needs for ever smaller, faster, and cheaper sensing modalities. Will continue to work with Joint Program Office for bio defense, USAMRIID, and other government agencies and industry to transfer concepts to the field. A test bed will be used in conjunction with the Boston Emergency Management Agency and National Guard to test new homeland bio defense concepts and to better understand urban defense issues.

(U) *3D Laser Radar*: Continue the development of laser-radar technologies for applications of advanced ballistic and tactical seekers, surface surveillance, and combat identification. This includes the development of visible and near-infrared-sensitive Geiger-mode avalanche photodiode arrays with bonded timing circuitry for 3-D laser radars. Integrate these systems into small (~150cm^3) lightweight (~1kg), low power, packages consistent with advanced seeker applications, which will provide single-photon-sensitivity and high-precision range resolution for generating detailed 3-D imagery of targets. Continue the development of multi-function laser-radar systems, which combine 3-D imaging and range-Doppler sensing for applications to BMD interceptors, combat identification and foliage penetration. Use unique autodyne techniques for range Doppler imaging. These systems will use the same laser transmitter for incoherent 3-D laser radar, utilizing the avalanche photodiode arrays, and coherent laser radar for range-Doppler imaging. Collect simultaneous Range-Doppler and 3-D images of various targets in order to demonstrate the target-recognition and discrimination capability of the combined measurement modalities using ground and airborne platforms. Combine laser radar with hyperspectral techniques to achieve 4D systems. Test these systems on ground and air platforms.

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(U) Counter Terrorism Technology: ($2.500 million)

(U) The objective of this effort is to develop concepts and technologies relevant to countering terrorism. New sensing approaches to detect and identify terror weapons (e.g. chemical weapons, bio agents, high explosives) remotely will be investigated. For example, methods will be studied and developed to "tag" source materials to: (1) help locate fabrication facilities, couriers, weapons, (2) support first responders and cleanup, and (3) ease attribution. Effluent monitoring techniques using new multi- spectral and laser technologies will also be investigated. Detection of minute traces of DNA in the environment (vehicles, clothing, buildings) will be considered for terrorist tracking and source attribution.

(U) Counter terrorism requires "defense in depth" which often depends on gathering, communicating and combining, and intelligently sorting information from many disparate sources. Data fusion and decision making techniques focused on this problem will be examined and developed.

(U) Advanced Electronics Technology: ($7.500 million)

(U) Explore low-voltage CMOS/SOI analog and digital circuits for cryo-cooled focal-plane and special-purpose processing applications, including combinations with superconductive and optical devices. Apply 3-D stacking to build high-bandwidth low-power digital processors and fabricate 3-D circuit prototypes as a research foundry for the DoD design community. Demonstrate highly integrated imager with digital output in optimized low-power-consumption configuration suitable for micro-sensor use. Continue development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for "smart" multimode sensors. Demonstrate near-IR/electronic-shuttered 25-megapixel CCD imager for airborne reconnaissance. Demonstrate optimized super-wideband ELINT compressive receiver in airborne field test. Develop ultra-low power charge-to-digital converters for RF receivers at 250 Msps and 14 bits. Demonstrate compact and power efficient version of optically sampled A/D with 3-GHz bandwidth for radar and electronic intelligence use. Extend MEMs reconfigurable microwave circuits to high power for transmitter applications. Continue development of combined biochemical, micromechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Continue the investigation of revolutionary bio-electronic devices. Continue collaborations with industry to transition/insert technologies and subsystems into advanced DoD systems.

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(U) B. Program Change Summary	**FY 2001**	**FY 2002**	**FY 2003**	**Total Cost**
Previous President's Budget	18.602	18.845	19.934	
Delta	1.315	3.124	1.155	
FY02 Amended President's Budget Submit	19.917	21.969	21.089	Continuing
Appropriated Value	20.102	21.969	NA	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.185	0.000	0.000	
c. Other	0.000	0.000	6.643	
Current FY 2003 Budget Submission	19.917	21.969	27.732	Continuing

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Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 and FY 2003 increases reflect programmatic adjustment to continue emphasis efforts in the areas of Bio Agent Detection Systems and Counter Terrorism Technology.

(U) **Schedule**: N/A

(U) **Technical: N/A**

(U) **C.** **Other Program Funding Summary Cost**: N/A

(U) **D.** **Acquisition Strategy**: N/A

(U) **E.** **Schedule Profile**: N/A