RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 1999	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2							R-1 ITEM NOMENCLATURE Medical Free Electron Laser PE 0602227D8Z			
COST*(In Millions)*	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total Program Element (PE) Cost	19.137	14.496	9.719	9.698	4.670	4.651	4.749	4.848	Continuing	Continuing
MFEL/P483	19.137	14.496	9.719	9.698	4.670	4.651	4.749	4.848	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) The MFEL program seeks to develop advanced, laser-based applications for military medicine and electronic materials research. Free electron lasers (FELs) provide unique pulse features and tunable wavelength characteristics that are unavailable in other laser devices. Thus, FELs broaden the experimental options for the development of new laser-based applications.

(U) The majority of this program (80%) is focused on developing advanced procedures for the rapid diagnosis and treatment of battlefield - related casualties. Specific applications under investigation include soft tissue repair, hard tissue surgery, therapies for thermal burns and chemical burns, and enhanced medical imaging. Laser applications will be clinically tested in unique MFEL medical centers, leading to Food and Drug Administration (FDA) approval. There is high potential dual use for civilian medicine. Thus far, more than 20 clinical procedures have been developed in several medical specialties, including ophthalmology, orthopedics, thermal and chemical burn repair, and neurosurgery.

(U) A much smaller part of this program (20%) is focused on electronic materials research. In these studies, the high energy FEL beam is being exploited for improved processing applications including more effective dopants, surface cleaning and modification of transport properties of microelectronic substrates

(U) The program is executed extramurally. Performers include 5 major medical centers and approximately 20 applications groups. Awards are made competitively, following solicitation and peer review, for performance periods of 2 to 3 years. The program emphasizes the use of interdisciplinary teams of physicians, physicists, biologists, and engineers and collaborative interactions among the major MFEL centers.

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(U) Project Number and Title: P483 MFEL

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY1998 Accomplishments:

(U) Research on surgery of the eye and the brain, on monochromatic X -ray imaging, and on improved electronic materials continued at Vanderbilt University. The mid-infrared FEL was compared with a new prototype optical parametric mid-infrared laser for incision quality. ($ 2.221 Million)

(U) Research on surgery of the eye, the brain, the skin, nerves and bone continued at Duke University. Performance of the vacuum ultraviolet (UV) laser was enhanced and the preclinical research facilities was completed. ($ 2.882 Million)

(U) Research on surgical applications of lasers in wound repair, neurosurgery and burn treatment continued at Mass General Hospital. Collaborations were conducted with the Army Institute of Chemical Defense on chemical burn treatment. ($ 3.751 Million)

(U) Research on wound sterilization and bone surgery continued at the Beckman Laser Institute. Development of a new Doppler-imaging device for guiding laser usage by burn surgeons continued. ($ 0.993 Million)

(U) Research on biomolecular and tissue absorption characteristics of FEL radiation continued at Stanford University, as was research into the effects of FEL radiation on microelectronic and energetic materials. ($ 2.155 Million)

(U) Research to develop compact FELs, optical fibers and wave-guides for use in hospitals and battlefield settings continued. ($ 3.283 Million)

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(U) Studies on the interactions of photons with biomolecules, cells, tissues, and materials continued.($ 3.852 Million)

(U) FY1999 Plans:

(U) A competition for medical center awards will be conducted during 1999 for awards beginning in FY2000. It is anticipated that the number of centers supported by the program will be reduced in number from five to three. Increased emphasis will be placed upon transition of research products for combat casualty care and military trauma centers by establishing collaborative projects between military medical sites and research centers funded under the program. ($ 14.496 Million)

(U) FY2000 Plans:

(U) Reduce number of centers funded in the Program from five to three and provide interim funding for close out and transition of promising technologies to industry. Phase out all electronics research and refocus continuing research efforts to address identifiable transition targets relevant to treatment and diagnosis of medical conditions of specific interest in military medicine. Selection of centers and specific projects will depend upon competition held during FY1999. ($ 9.719 Million)

(U) FY2001 Plans:

(U) Begin phase-out of two of the three academic research centers by transition of research efforts to either military medical institutions or industry. Continue development of new procedures for treatment and diagnosis of medical conditions of particular pertinence to military medicine. ($ 9.698 Million)

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(U) B. Program Change Summary	FY1998	FY1999	FY2000	FY2001	Total Cost
Previous Presidents Budget	20.103	9.706	4.800	4.782	Continuing
Appropriated Value	20.841	14.706	0	0	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed Undistributed Reduction	-1.704	-0.210			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0	0	-0.081	-0.084	
c. Other	0	0	5.000	5.000	
Current Presidents Budget	19.137	14.496	9.719	9.698	Continuing

Change Summary Explanation: Funding changes are due to congressional undistributed reductions and inflation adjustments.

(U) Funding: The budget reflects an increase of $5M in FY00 and FY01 to maintain three medical centers.

(U) Schedule: N/A

(U) Technical: Changes are due to Congressional adjustments in FY 1998 and FY 1999. Outyear programs continue support for three medical centers.

(U) C. OTHER PROGRAM FUNDING SUMMARY COST: N/A

(U) D. ACQUISITION STRATEGY: N/A

(U) E. SCHEDULE PROFILE: N/A