RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	**R-1 ITEM NOMENCLATURE** Medical Free Electron Laser **PE 0602227D8Z**

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		19.845	19.660	0	0	0	0	0		
MFEL/P483		19.845	19.660	0	0	0	0	0		

(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 medical technologies.
(U) The majority of this program is focused on developing advanced procedures for rapid diagnosis and treatment of battlefield-related medical problems. Specific applications under investigation include soft tissue repair, hard tissue surgery, therapies for thermal and chemical burns, warfighter vision correction, and enhanced medical imaging. Laser applications will be clinically tested in unique program medical centers, leading to Food and Drug Administration (FDA) approval. There is high potential dual use for civilian medicine. Thus far, more than 30 clinical procedures have been developed in several medical specialties, including ophthalmology, orthopedics, thermal and chemical burn repair, and neurosurgery. Responsibility for the management and funding of this program is planned for transfer to the National Institutes of Health (NIH) beginning in FY 2003.
(U) A small part of this program is focused on electronic materials research. In this research, the high energy FEL beam is exploited for improved processing applications including more effective microstructure, surface cleaning and modification of transport properties of microelectronic substrates.

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(U) The program is executed primarily extramurally, but a small amount of funding has been awarded to DOD medical centers to facilitate technology transfer. Performers include 5 major university medical centers, the Army Institute for Surgical Research, and approximately 6 applications groups. Awards are made competitively, following solicitation and peer review, for performance periods of up 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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Total Program Element (PE) Cost		19.845	19.660	0	0	0	0	0		
MFEL/P483		19.845	19.660	0	0	0	0	0		

(U) Project Number and Title: P483 MFEL

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Program management was transferred to the Air Force Office of Scientific Research, and the five major university-based medical center awardees completed their first full year of funding. In FY 2001, this program supported essential military missions through the following technical accomplishments: Emphasis continued to be on military-relevant laser medicine with increasing activity in external and endoscopic imaging for rapid battlefield injury diagnostics and treatment. Advances have been made in understanding problems associated with laser vision correction for military personnel, including diseminating knowledge of an important animal model, and demonstrations of laser activated bonding of surgical eye flaps. Major advances have been made in photochemical treatment of infected wounds. Optical Coherence Tomography has demonstrated important capability in burn assessment, and compact, portable units are being designed. A monochromatic x-ray source, based on laser scattering, has performed close to design specifications, with great promise for improved diagnosis and treatment and with greatly reduced dosage to the patient. Promising techniques for enhancing drug delivery and for making bio-polymers have been devised and demonstrated. ($ 19.845 million)

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(U) FY 2002 Plans:

(U) Major medical center programs will enter their second year, with continued emphasis on combat casualty care and other militarily relevant medicine. In FY 2002, this program will continue to support essential military missions through the following activities: Laser based imaging procedures, previously demonstrated, will be developed in portable form, with appropriate software, for field use, in conjunction with DOD medical centers. Other field diagnostic imaging applications of Optical Coherence Tomography, and newly invented endoscopic confocal microscopic imaging, will be developed. Animal studies of diagnostics and treatment using the newly developed monochromatic x-ray source will begin. Collaborative studies, between university centers and DOD medical centers involved with military laser vision correction issues, will intensify. Militarily relevant medical procedures introduced under this program will continue to be evaluated by, and transferred to, military medical centers, and the special capabilities and facilities available at such centers will be used extensively. ($ 14.660 million)

(U) FY 2003 Plans:

(U) Transferred to National Institutes of Health (NIH).

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(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
President's FY2001 Budget Submit	15.029	4.634	4.358	
Delta	4.816	10.026	-4.358	
FY 2002 Amended President's Budget Submit	19.845	14.660	0.000	
Appropriated Value	20.029	19.660	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.184	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current President's Budget	19.845	19.660	0.000	

Change Summary Explanation:.

(U) Funding: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 increase to fund new technologies in combat casualty care.

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(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