RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE June 2001	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**			
COST *(In Millions)*	FY 2000	FY 2001	FY 2002						Cost to Complete	Total Cost
Total Program Element (PE) Cost	1.986	2.025	2.086						Continuing	Continuing
Risk Assessment and Biamedical Applications/P506	1.986	2.025	2.086						Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U)This program supports efforts in advanced technology development to provide biomedical strategies for preventing, treating, assessing and predicting casualties from ionizing radiation, either alone or in combination with biological warfare (BW)/chemical warfare (CW) agents. It is directed at the need for the Department of Defense (DoD) to be prepared to execute military missions within radiation environments, to manage radiation crises associated with terrorist activities, and for consequence management in the event of nuclear weapons detonation. The DoD is ethically committed to protection of Service members from the adverse health effects of ionizing radiation to the fullest extent consistent with operational requirements. The program incorporates findings from basic and applied research into highly integrated and focused advanced technology development studies to produce: (1) protective and therapeutic strategies, (2) tools to measure radiation and depleted uranium (DU) exposure to military personnel, and (3) accurate models to predict casualties, particularly in combined nuclear-biological-chemical (NBC) environments. The Armed Forces Radiobiology Research Institute (AFRRI), because of its multidisciplinary staff and exceptional laboratory and radiation facilities, is uniquely qualified to executes the program prescribed by its mission. Because national laboratories operated by the Department of Energy no longer support advanced research relevant to military medical radiobiology, AFRRI is currently the sole laboratory in existence with the combined capabilities needed to conduct this research.

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(U) Project Number and Title: P506 Risk Assessment and Biamedical Applications

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2000 Accomplishments:

(U) Demonstrated efficacy of combined cytokine (IL-11 and G-CSF) treatment for chronic radiation exposure of the hematopoietic system.($ 0.165 million)

(U) Distributed pre-beta version of the biodosimetry assessment tool (BAT) software program to selected laboratories and clinical colleagues for initial review and comments.($ 0.100 million)

(U) Demonstrated safety of 5-androstenediol in preclinical trial using the canine animal model. Initiated pharmacokinetic studies of 5-androstenediol in canine animal model.($ 0.300 million)

(U) Determined correlation between pharmacokinetic response and radioprotection of a second-generation aminothiol radioprotectant using a slow-release implant delivery system and measuring tissue injury, survival, and animal performance metrics. Completed study on toxicity (nausea) reduction to aminothiol prophylaxis by supplemental treatment with anti-emetics.($ 0.147 million)

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(U) Continued in vivo studies validating cytogenetic-based (interphase-cell chromosome-aberration) biodosimetry system over a broad dose range and partial-body exposure situation. Tested improved cytological analysis platforms using simple and easy-to-perform sample preparation protocols. ($ 0.800 million)

(U) Demonstrated elevation of gene-expression at the messenger-RNA and protein levels using an in vivo irradiated mouse model system. Completed initial-phase optimization of PCR-based assays for measuring gene expression of a single target molecular biomarker using an existing field deployable analytical platform. ($ 0.174 million)

(U) Coordinated assembly of experimental data from B. anthracis/radiation animal studies and delivered to the Defense Threat Reduction Agency`s Human Response Program for incorporation into the Consequences Assessment Tool Set (CATS) program to model casualty predictions. ($ 0.100 million)

(U) Completed development of a method to measure uranium in urine of military personnel; generated protocol to application centers for assessment as a fieldable methodology. Completed development of protocols for a rapid, simple method to identify DU fragments and initiated patent application. ($ 0.200 million)

(U) FY 2001 Plans:

(U) Complete preclinical safety assessment of 5-androstenediol using a canine animal model. Initiate safety assessment of an injectable vitamin E-based radioprotectant in the canine model. ($ 0.509 million)

(U) Initiate preclinical safety and efficacy studies of the therapeutic cytokine combination, IL-11 plus G-CS F, in the canine animal model. ($ 0.082 million)

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(U) Complete 1st phase in vivo test and evaluation of the cytogenetic-based biodosimetry system encompassing dose-range and partial body exposure studies in radiation therapy patients. Collect exposure data to validate performance charactristics involving prior radiation exposures.($ 0.888 million)

(U) Continue optimization studies using a single analytical platform for a field-based biodosimetry system including the development of sample preparation protocols and the development of protocols to allow measurement of multiple radiation-responsive gene-expression biomarkers. ($ 0.099 million)

(U) Provide initial assessment of aberrations in B. anthracis vaccine efficacy as a consequence of exposure to ionizing radiation. Initiate efforts to incorporate performance-degrading consequences from combined radiation/BW agent exposures into the CATS casualty prediction models. ($ 0.248 million)

(U) Initiate in vivo cancer studies with embedded DU. Complete patent application for rapid, simple analysis method to identify DU fragments. Generate protocol available to application centers for assessment as a potential fieldable methodology. Use DU research results to continue contributions to assess fragment removal policies. ($ 0.199 million)

(U) FY 2002 Plans:

(U) Complete preclinical safety and efficacy study of 5-androstenediol in the canine. Initiate efficacy studies of the injectable vitamin E-based radioprotectant in the canine. Initiate safety assessment of a slow-release aminothiol-based radioprotectant in the canine.($ 0.502 million)

(U) Continue safety and efficacy studies of the combined cytokine treatment, IL-11 and G-CSF, in the canine.($ 0.102 million)

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(U) Continue test and evaluation of the cytogenetic-based biodosimetry system using samples from radiotherapy patients and by defining performance specifications for low-dose rate gamma and fission neutron radiation using the previously developed automated imaging platform.($ 0.702 million)

(U) Continue validation of a field-based biodosimetry system using multiple biomarkers for dose assessment.($ 0.102 million)

(U) Provide completed data set demonstrating the effect on mortality and morbidity of combied radiation/B. anthracis exposure as a function of vaccine efficacy to the CATS model. Provide data demonstrating the effect on mortality and morbidity of combined exposure to radiation and VEE as a function of vaccine efficacy to the CATS model.($ 0.376 million)

(U)Continue in vivo cancer studies for embedded DU.($ 0.302 million)

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(U) B. Program Change Summary	**FY 2000**	**FY 2001**	**FY 2002**	**Total Cost**
Previous President's Budget Submit	2.007	2.043	2.075	Continuing
Appropriated Value	0.000	2.043	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.018	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.011	
c. Other	-0.021	0.000	0.000	
President's Budget Submission	1.986	2.025	2.086	Continuing

Change Summary Explanation

(U) **Funding**: FY 2000 adjustments were the result of a below threshold reprogramming. FY 2001 reductions reflect Section 8086 adjustments.

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

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

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

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A