RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2)					February 2002				
OPERATIONAL TEST AND EVALUATION, DEFENSE (0460) BUDGET ACTIVITY SIX					LIVE FIRE TESTING (LFT) PROGRAM ELEMENT (PE) 0605131D8Z				
$'s in Millions	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	COST TO COMPLETE	TOTAL COST
PE 0605131D	17.054	12.797	10.102	10.244	10.412	10.620	10.794	Continuing	Continuing

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

This PE directly supports the Congressional statutory requirements for oversight of Live Fire Test and Evaluation (LFT&E). The primary objective of LFT&E is to assure that the vulnerability and survivability of Department of Defense (DoD) crew-carrying weapons platforms and the lethality of our conventional munitions are known and acceptable before entering full-rate production. LFT&E encompasses realistic tests involving actual U.S. and threat hardware or, if not available, acceptable surrogate threat hardware. The objective is to identify and correct design deficiencies early in the development process, and is required to be completed before weapons programs proceed beyond low-rate initial production. It also includes realistic modeling and simulation (M&S), to include pretest predictions, to assure the maximum benefit from the testing. The LFT&E program is essential, especially in view of the escalating costs of technologically sophisticated weapons systems.

The LFT PE also supports the DoD's Joint Live Fire (JLF) Program, which actually preceded the LFT&E program, begun in 1984 under an OSD charter to test fielded front-line U.S. and threat combat aircraft and armor systems for their vulnerabilities and fielded weapons, both U.S. and threat, for their lethalities against their respective targets. The Congress, seeing the vulnerability and lethality issues raised by the JLF program, decided that there must be legislation to require that this realistic testing be done on new systems before they reach the field. Hence the LFT Legislation, Title 10, Section 2366 was passed in 1987.

In the FY 1997 DoD Appropriations Act, the Congress appropriated an initial $3.0M for the Live Fire Testing and Training (LFT&T) program, formalizing an important LFT&E program relationship. The funding strengthens the natural relationship between LFT activities and the M&S being developed to support the Services' testing and training activities. The LFT&T program is directed by a Senior Advisory Group consisting of DOT&E's Deputy Director for LFT (Chair) and the four Military Service leaders for training technology located in Orlando, Florida. In FY 1998, the Congress appropriated $4.0M for continuation and expansion of the program. Again, in FY 1999, the Congress appropriated

$5.0M for further continuation and expansion of the program. Once more, in FY 2000, the Congress appropriated $7.0M for continuation and expansion of the program. For FY 2001, the Congress added $7.5M to the LFT PE to continue and expand the LFT&T program, specifying that $1.5M be dedicated to the Augmented Reality for Firefighting initiative started in FY 1997. Again in FY 2002 Congress added $3.0M to continue the LFT&T program.

The LFT PE also funds other activities used to support the functions of the LFT&E, JLF, and LFT&T programs. The other activities, outlined below, are "User Casualty Assessment," "Exploring New Technologies/Advanced Concepts and Survivability Initiatives," and "Assuring Modeling and Simulation Adequacy." Efforts in those categories underwent significant changes during FY 2000, as emphasis grew on M&S in support of LFT&E.

This Research Category 6.5 PE supports LFT&E management activities for the oversight of RDT&E of new systems, as well as RDT&E of fielded systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2001 Accomplishments:
Review and Monitor Major Test and Evaluation (T&E) Programs: Completed LFT&E technical assessments for those systems approaching due dates for LFT&E reporting to Congress. Oversight of continuing vulnerability efforts in the category of armored vehicles included: the Advanced Amphibious Assault Vehicle, the M2/M3 Bradley FVS upgrade, the Crusader field artillery system, the family of Interim Armored Vehicles (IAV), and the M1A2 Abrams Tank. Under the category of ships and submarines, efforts continued on the Advanced SEAL Delivery System (ASDS), the CVN(X) next generation aircraft carrier, the DDG-51 guided missile destroyer, the DD 21 Land Attack Destroyer, the T-AKE Lewis and Clark Dry Cargo/Ammunition Ship, the replacement amphibious assault ship LHA(R), the LPD-17 San Antonio Amphibious Transport ship, the Seawolf (SSN-21) submarine, and the Virginia Class (SSN-774) attack submarine. Under aircraft, vulnerability oversight continued on the Airborne Laser (ABL) system, the B-1B Lancer Conventional Mission Upgrade Program (CMUP), the B-2 Spirit, the UH-60M Blackhawk, the C-130J Hercules, the CH-47F Chinook, the RAH-66 Comanche, the F-22 Raptor, the F-35 Joint Strike Fighter, the F/A-18E/F Super Hornet AESA Upgrade the KC-130J, the OH-58D Kiowa Warrior, the MH-60R Multi-mission Helicopter, the MH-60S Cargo Helicopter, C-130 AMP, the AH-1Z Helicopter Upgrade, the UH-1Y Helicopter Upgrade, and the V-22 Osprey. Oversight of lethality efforts in the category of surface attack weapons included the Airborne Mine Neutralization System (AMNS), the ATACMS Block II (Base BAT and P^{3}I BAT), the EX-171 Extended Range Guided Munition, the AGM-158A Joint Air to Surface Stand-off Missile (JASSM), the Javelin Alternate Main Charge Warhead (AMCW) and Javelin Enhanced Tandem Integration (JETI) systems, the AGM-154B and AGM-154C Joint Standoff Weapons (JSOW), the Line-of-Sight Antitank Weapon, the M829E3 120mm APFSDS-T cartridge, the Objective Crew Served Weapon (OCSW), the Objective Individual Combat Weapon (OICW), the Rapid Airborne Mine Clearance System, the Sense and Destroy Armor Munition (SADARM), the Sensor Fuzed Weapon (SFW), the Tactical Tomahawk, the Multiple Launch Rocket System (MLRS) (Guided), the TOW Fire and Forget, the Wide Area Munition (WAM) PI, and the XM982 Excalibur extended range artillery projectile. Oversight of lethality of air and missile defense systems

included the AIM-9X Sidewinder missile upgrade, the Advanced Medium Air-to-Air Missile (AMRAAM), the Evolved Sea Sparrow Missile (ESSM), the Medium Extended Air Defense System (MEADS), the MLRS Guided Rocket, the Navy Area Tactical Ballistic Missile Defense System, the National Missile Defense (NMD) System, Navy Theater Wide missile defense, the Patriot Advanced Capability (PAC-3), the Rolling Airframe Missile (RAM) HAS, and Theater High Altitude Area Defense (THAAD).

Manage JLF Programs: Conducted tests of fielded systems not previously tested under Air, Land, or Sea JLF programs. JLF began to plan and execute a lethality test of a helicopter-launched Hellfire missile against a small-ship target. Lethality testing of U.S. weapons against a SCUD missile began. We started lethality tests against an additional foreign target vehicle, continued testing of a second vehicle, and completed testing of the third classified vehicle started in FY 1999. Phase II of the fuel filler (metal mesh) testing and a C-130 mission abort study was completed. Vulnerability testing of F-14 and F-16 aircraft continued to address different subsystems, issues, and possibly threat munitions. The final JLF tests of the CH-47D rotor blades were started by firing at dynamic, loaded rotor blades on an operating helicopter. Advanced planning and feasibility studies were completed for potential future projects, such as EA-6B composite wing, fire suppression for the C-130 wing leading edge, AH-1 tail rotor blade static, anti-helicopter mine threat, engine vulnerability, and damage digitization equipment development. The analysis of the C-130 wing hydrodynamic ram test data was completed.

User Casualty Assessment: Initiated an effort oriented towards investigating the training and operational factors which affect the incidence of gravitational loss of consciousness (G-LOC) in aircrew. The work was subdivided into six areas: (1) an analysis of gravity tolerance as a function of flight hours flown; (2) an assessment of the causal factors for differences in G-LOC rates between the Air Force and Navy, and factor(s) accounting for the significant decrease in the Navy G-LOC rate in 1991; (3) a determination of whether mishaps designated as "controlled flight into terrain" were actually G-LOC related mishaps; (4) an examination of why a poor anti-G straining maneuver continues to be the primary causal factor for G-LOC incidents; (5) a review of why the rate of G-LOC incidents has increased steadily in the Air Force since 1990; and (6) an evaluation of the causal factors for high G-LOC rates in the Air Force T-37 aircraft. Conducted a ground collision avoidance system (GCAS) G-LOC flight demonstration consisting of two sorties replicating actual factual G-LOC instances utilizing an automatic GCAS incorporated within an F-16 aircraft.

Exploring New Technologies/Advanced Concepts and Survivability Initiative: Continued to sponsor testing of contractor-supplied passive ullage protective systems. Test results will be reported and supplied to participating contractors as well as the services and major airframe manufacturers.

Physics Based Evaluations: Continued strong emphasis on understanding the application of physics-based M&S to test programs and the evaluation of their adequacy. Generated resources for continuing Safety and Survivability of Aircraft Initiative (SSAI) and provided funding for other efforts stemming from the LFT&E physics-based modeling workshops. Assured that programmatic focus is maintained in the development and application of M&S tools and that training capabilities are continuously improved to reflect more credible models. Pushing for a more consistent infrastructure for managing the M&S that supports T&E specifically and the acquisition process in general. In an environment of shrinking resources it is

essential to understand the marginal return on M&S investment. Completed an update to and release of the Target Interaction, Lethality, and Vulnerability (TILV) Master Plan to support Directed Energy Weapons.

LFT&T: Continued projects started in prior years and start new projects to the extent funding allows. Began dedicated project in Augmented Reality based firefighting.

Radio Frequency (RF) Weapons Vulnerability Assessment: Performed an outdoor, live fire, open-air test with the F-16B, Block 15 as the test asset. Two different RF devices were employed, each varying in waveform characteristics, rise time, pulse repetition frequency, burst length, and power level, in the testing. Conducted a demo of two RF sources against business and medical electronic equipment at a DoD test facility. Completed calculations to relate transient electric fields inside a building to those incident on an exterior wall. Prepared plans for work to deal with identifying the possible biological effects on the military crew or members of the crew subsequent to exposure to a high power microwave threat.

Official Travel: Performed official travel to carry out oversight of LFT&E programs.

FY 2002 Plans:

Review and Monitor Major T&E Programs: Complete LFT&E technical assessments for those systems approaching due dates for reporting to Congress. Oversight of continuing vulnerability efforts in the category of armored vehicles will include: the Advanced Amphibious Assault Vehicle, the M2/M3 Bradley FVS upgrade, the Crusader field artillery system, the family of Interim Armored Vehicles (IAV), and the M1A2 Abrams Tank. Under the category of ships and submarines, efforts continued on the Advanced SEAL Delivery System (ASDS), the CVN(X) next generation aircraft carrier, the DDG-51 guided missile destroyer, the DD (X) Future Surface Combatant, the T-AKE Lewis and Clark Dry Cargo/Ammunition Ship, the replacement amphibious assault ship LHA(R), the LPD-17 San Antonio Amphibious Transport ship, the SSGN Land Attack/Special Ops/Arsenal Submarine, the Seawolf (SSN-21) submarine, and the Virginia Class (SSN-774) attack submarine. Under aircraft, vulnerability oversight will continue on the Airborne Laser (ABL) system, the B-1B Lancer Conventional Mission Upgrade Program (CMUP), the B-2 Spirit, the UH-60M Blackhawk, the C-130J Hercules, the CH-47F Chinook, the RAH-66 Comanche, the F-22 Raptor, the F-35 Joint Strike Fighter, the F/A-18E/F Super Hornet AESA Upgrade the KC-130J, the OH-58D Kiowa Warrior, the MH-60R Multi-mission Helicopter, the MH-60S Cargo Helicopter, C-130 AMP, the AH-1Z Helicopter Upgrade, the UH-1Y Helicopter Upgrade, and the V-22 Osprey. Oversight of lethality efforts in the category of surface attack weapons will include the Airborne Mine Neutralization System (AMNS), the ATACMS Block II (Base BAT and P^3I BAT), the EX-171 Extended Range Guided Munition, the AGM-158A Joint Air to Surface Stand-off Missile (JASSM), the Javelin Alternate Main Charge Warhead (AMCW) and Javelin Enhanced Tandem Integration (JETI) systems, the AGM-154B and AGM-154C Joint Standoff Weapons (JSOW), the Line-of-Sight Antitank Weapon, the M829E3 120mm APFSDS-T cartridge, the Objective Crew Served Weapon (OCSW), the Objective Individual Combat Weapon (OICW), the Rapid Airborne Mine Clearance System, the Sense and Destroy Armor Munition (SADARM), the Sensor Fuzed Weapon (SFW), the Tactical Tomahawk, the Multiple Launch Rocket System (MLRS) (Guided), the TOW Fire and Forget, the Wide Area Munition (WAM) PI, and the XM982 Excalibur extended range artillery projectile. Oversight of lethality of

air and missile defense systems will include the AIM-9X Sidewinder missile upgrade, the Advanced Medium Air-to-Air Missile (AMRAAM), the Evolved Sea Sparrow Missile (ESSM), the Medium Extended Air Defense System (MEADS), the MLRS Guided Rocket, the Navy Area Tactical Ballistic Missile Defense System, the National Missile Defense (NMD) System, Navy Theater Wide missile defense, the Patriot Advanced Capability (PAC-3), the Rolling Airframe Missile (RAM) HAS, and Theater High Altitude Area Defense (THAAD).

Manage JLF Programs: Conduct tests of fielded systems not previously tested under Air, Land, or Sea JLF programs. Tests of foreign ground systems acquired for exploitation will continue. Additional U.S. munitions will be tested against the SCUD launcher. Testing of U.S. munitions against the remaining two classified targets should be completed. Plans for JLF tests to investigate the lethality of U.S. munitions against foreign air defense systems will be also finalized. JLF testing of the CH-47D rotor blades and drive train will be completed and lethality testing of U.S. weapons against the MiG-29, Hind, and additional air defense systems will be performed. An analysis of the C-130J mission abort parameters will be performed. Testing of MANPADS against aircraft will be performed, particularly on the C-130, as well as testing of the C-130 engine nacelle fire extinguishing system. Vulnerability testing of the H-60, specifically the tail rotor subsystem and engine nacelle fire suppression, will be performed. The effort to plan and execute a lethality test of a helicopter-launched Hellfire missile against a small-ship target will continue.

User Casualty Assessment: Complete the effort oriented towards investigating the training and operational factors which affect the incidence of G-LOC in aircrew.

Exploring New Technologies/Advanced Concepts and Survivability Initiative: Continue to promote and evaluate new technologies in support of safety and survivability of aircraft, focusing on fire and explosion effects and mitigation.

Physics Based Evaluations: Emphasis will continue in the area of physics based M&S and its close connection to realistic assessment and training. Continue development of consistent approaches to risk evaluation and T&E prioritization based on modeling.

LFT&T: Continue projects started in prior years and start new projects to the extent funding allows.

Radio Frequency (RF) Weapons Vulnerability Assessment: Conduct three RF vulnerability tests. Three foreign devices will be tested against both military systems and commercial infrastructure items under operationally relevant conditions. Complete and test a new prototype ultrawideband device built from readily available components.

Official Travel: Perform official travel to carry out oversight of LFT&E programs.

FY 2003 Plans:

Review and Monitor Major T&E Programs: Complete LFT&E technical assessments for those systems approaching due dates for reporting to Congress. Oversight of continuing vulnerability efforts in the category of armored vehicles will include: the Advanced Amphibious Assault Vehicle, the M2/M3 Bradley FVS upgrade, the Crusader field artillery system, the family of Interim Armored Vehicles (IAV), and the M1A2 Abrams Tank. Under the category of ships and submarines, efforts willcontinue on the Advanced SEAL Delivery System (ASDS), the CVN(X) next generation aircraft carrier, the DDG-51 guided missile destroyer, the DD (X) Future Surface Combatant, the T-AKE Lewis and Clark Dry Cargo/Ammunition Ship, the replacement amphibious assault ship LHA(R), the LPD-17 San Antonio Amphibious Transport ship, the SSGN Land Attack/Special Ops/Arsenal Submarine, the Seawolf (SSN-21) submarine, and the Virginia Class (SSN-774) attack submarine. Under aircraft, vulnerability oversight will continue on the Airborne Laser (ABL) system, the B-1B Lancer Conventional Mission Upgrade Program (CMUP), the B-2 Spirit, the UH-60M Blackhawk, the C-130J Hercules, the CH-47F Chinook, the RAH-66 Comanche, the F-22 Raptor, the F-35 Joint Strike Fighter, the F/A-18E/F Super Hornet AESA Upgrade the KC-130J, the OH-58D Kiowa Warrior, the MH-60R Multi-mission Helicopter, the MH-60S Cargo Helicopter, the C-130 AMP, the AH-1Z Helicopter Upgrade, the UH-1Y Helicopter Upgrade, and the V-22 Osprey. Oversight of lethality efforts in the category of surface attack weapons will include the Airborne Mine Neutralization System (AMNS), the ATACMS Block II (Base BAT and P^3I BAT), the EX-171 Extended Range Guided Munition, the AGM-158A Joint Air to Surface Stand-off Missile (JASSM), the Javelin Alternate Main Charge Warhead (AMCW) and Javelin Enhanced Tandem Integration (JETI) systems, the AGM-154B and AGM-154C Joint Standoff Weapons (JSOW), the Line-of-Sight Antitank Weapon, the M829E3 120mm APFSDS-T cartridge, the Objective Crew Served Weapon (OCSW), the Objective Individual Combat Weapon (OICW), the Rapid Airborne Mine Clearance System, the Sense and Destroy Armor Munition (SADARM), the Sensor Fuzed Weapon (SFW), the Tactical Tomahawk, the Multiple Launch Rocket System (MLRS) (Guided), the TOW Fire and Forget, the Wide Area Munition (WAM) PI, and the XM982 Excalibur extended range artillery projectile. Oversight of lethality of air and missile defense systems will include the AIM-9X Sidewinder missile upgrade, the Advanced Medium Air-to-Air Missile (AMRAAM), the Evolved Sea Sparrow Missile (ESSM), the Medium Extended Air Defense System (MEADS), the MLRS Guided Rocket, the Navy Area Tactical Ballistic Missile Defense System, the National Missile Defense (NMD) System, Navy Theater Wide missile defense, the Patriot Advanced Capability (PAC-3), the Rolling Airframe Missile (RAM) HAS, and Theater High Altitude Area Defense (THAAD).

Manage JLF Programs: Conduct tests of fielded systems not previously tested under Air, Land, or Sea Joint Live Fire programs. Tests of foreign systems acquired for exploitation will continue. Additional U.S. munitions will be tested against the SCUD launcher. Testing of U.S. munitions against the remaining two classified targets should be completed and reports prepared. JLF tests to investigate the lethality of U.S. munitions against foreign air defense systems will be performed. JLF lethality testing of U.S. weapons against the MiG-29, Hind, and additional air defense systems will be performed. Additional aircraft vulnerability tests of the AH-64, F-117, AH-1S, CH-53E, and OH-58C/D are being planned. JLF will continue to acquire foreign targets and munitions, invest in development of technologies that increase test realism, and improve data base management tools.

User Casualty Assessment: Continue to promote and evaluate user casualty technologies and initiatives to the extent that funding allows.

Emphasis will be on user/crew performance and survivability.

Exploring New Technologies/Advanced Concepts and Survivability Initiative: Continue to promote and evaluate new technologies in support of safety and survivability of aircraft, focusing on fire and explosion effects and mitigation.

Physics Based Evaluations: Emphasis will continue in the area of physics based M&S and its close connection to realistic assessment and training. Continue development of consistent approaches to risk evaluation and T&E prioritization based on modeling.

LFT&T: Continue projects started in prior years and start new projects to the extent funding allows.

Directed Energy Weapons: Initiate activities to identify methodologies, instrumentation, and analytical requirements to evaluate lethality of directed energy weapons (DEWs), including vulnerabilities of conventional weapon systems to threat DEW systems to the extent funding allows.

Hypersonic Testing Capability: Investigate technologies, methodologies, and instrumentation needed to develop a hypersonic testing capability of missile defense systems as funding permits.

Official Travel: Perform official travel to carry out oversight of LFT&E programs.

B. (U) PROGRAM CHANGE SUMMARY

($ in Millions)	FY 2001 Appropriation	FY 2002 Amended President's Budget Request	FY 2003 Clinton Budget
FY 2002 President's Budget	17.054	9.887	10.032
Live Fire Testing & Training Initiative		3.000	
Appropriated Value	17.054	12.887	
Adjustments to Program Value			
Congressional Reduction		(0.090)	
Inflation Adjustment			(0.080)
Program Adjustment			150
Current Budget Submit	17.054	12.797	10.102

C. (U) OTHER PROGRAM FUNDING NA