



The Joint Service
Small Arms Program
(JSSAP)

DATA-GAP
Colloquium,
Dec. '98

Light Fighter Lethality

After next

Stephen C. Small, Ph.D.

(973) 724-7043

ssmall@pica.army.mil





Light Fighter Lethality After Next



- **Outline of Presentation**
- **Purpose and Objectives**
 - Methodology
 - Working Groups
 - Concepts & Data Gaps
 - Summary/Plans





Light Fighter Lethality After Next



- Purpose and Objectives of the colloquium
 - To conceptualize and quantify the potential of a lethality system for the individual warrior of the Army After Next





Light Fighter Lethality After Next



- Purpose and Objectives of the colloquium
(Continued)

- To Identify and Describe LFL Data Gaps for Seeker Projectiles and Ancillary Equipment
- To Formalize “Known Unknowns”
- To Build Upon Our Previous Conferences





Light Fighter Lethality After Next



• Participants:

- **User Reps: All Services**
- **US R&D Community**
 - **US Army: ARDEC, CECOM, AMCOM, MICOM, NRDEC, ARL and ARO**
 - **US Navy: NSWC Crane**
 - **National Laboratories: ORNL and LANL**
 - **Industry: Primex, Aerojet, Motorola, AlliantTechSystems, Nekton, Boeing and Battelle**
 - **Academe: Univ. of NM and Duke Univ**



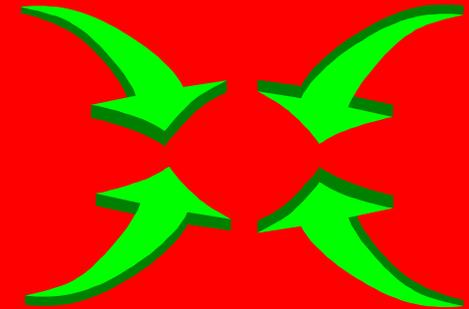


Light Fighter Lethality After Next



- **Methodology:**

- **Day1/Phase I: Orientation**
- **Phase II: Group Discussions & Subgroup Meetings**
- **Plenary Session**
- **Leader's Meeting**

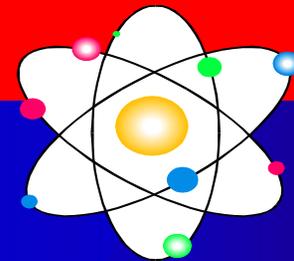
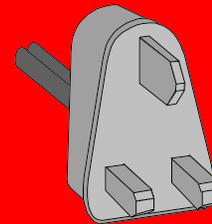




Light Fighter Lethality After Next



- Methodology (Continued):
 - **Day2/Phase III: Final Revisions**
 - Concluding Subgroup Meetings
 - Presentations by Each Subgroup Leader
 - **Hotwash/Offline**





Light Fighter Lethality After Next



- Orientation Briefings
- JSSAP Program Overview
- Light Fighter Lethality (LFL)
- LFL Data Gathering Meetings
- Future Warrior Architecture Overview
- Threat to the Army Past 2010





Light Fighter Lethality After Next



• Working Groups:

- Systems Engineering
- Munitions Sensors and Guidance/Control
- Projectile and Warhead
- Fire Control





Light Fighter Lethality After Next

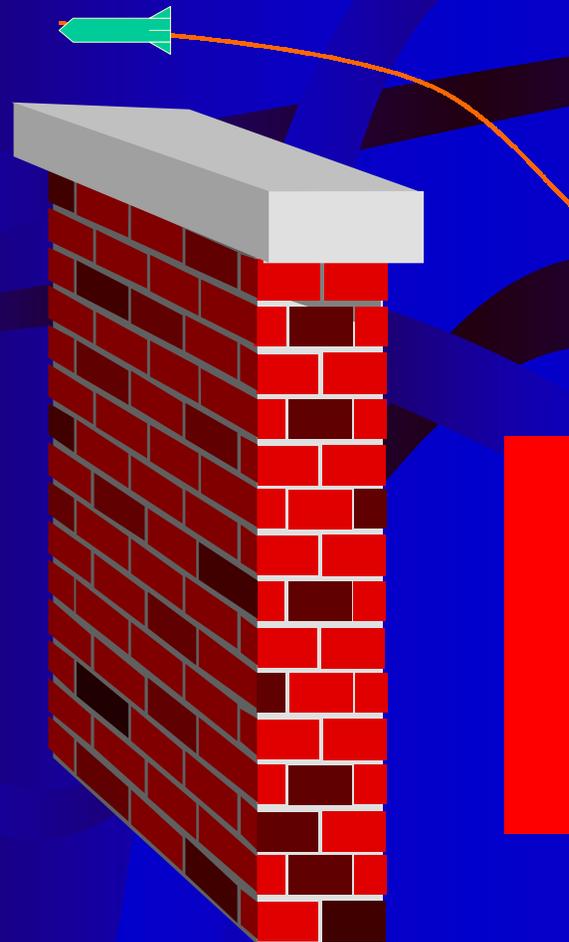


- **Notional LFL Concept Presented:**
 - **Soldier -Based System, with Low Weight and Low Recoil**
 - **Seeker Projectiles for High Probability of Kill at extended Ranges**
 - **Dual Lethality for Point, Area and Defilade Targets**





Seeker Projectile Concept for Light Fighter Lethality After Next





Standoff Combat

- Extended Open Areas





Close Quarter Combat



- Densely Wooded Terrain
- Urban Terrain

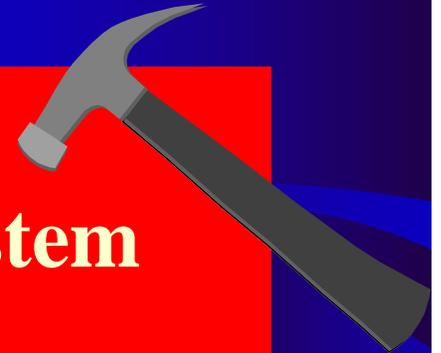




Light Fighter Lethality After Next



- **Related LFL Notional Features:**
- **Oneness-of-user-with-weapon-system**
- **“Transparency”**
 - **Unobtrusiveness-of-size/weight**
 - **Naturalness-of-fire-with-configuration**
 - **Uncover-the-target**
 - **Comportment-of-user-in-the-field**





Light Fighter Lethality After Next



- **Related LFL Notional Features (Continued):**
- **Combatant Additional Role as Target Designator**
- **Soft-Failure & Graceful Degradation With Backup Operating Modes**





Light Fighter Lethality After Next



- **Preliminary Integration of Data Gaps:**

- **Advanced Materials Capabilities and Potentials**
- **In-flight Propulsion, Steerage & Power Options**
- **Advanced Man-machine Interface Methods**
- **Warhead Options and Target Characteristics**





Light Fighter Lethality After Next



- **General Comments:**

- **Development Risk/Payoff should be Studied**
- **Mental/Physical Strain Placed on User Must be Studied**
- **Future Threat Vulnerabilities Warrant Examination**
- **A Close-In Assault Weapon May Need to Augment a Seeker Projectile Approach**



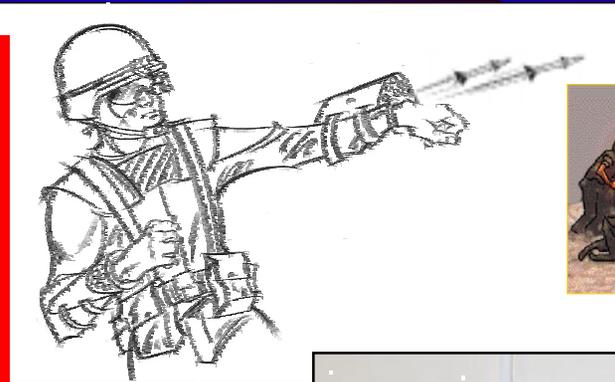


ARD-04, Light Fighter Lethality After Next



Provide the individual AAN warfighter with an ultra-light/versatile lethality system that yields: dramatically reduced system weight; overwhelming lethality; and maximum operational utility and survivability.

- Dual munition pod system weighing less than 10 lbs (T), 5 lbs. (G)
- Course correcting, seeker projectiles to 1,000M w/ unprecedented lethality
- “Metal Storm” Type KE pod tube for close quarter engagements
- Forearm or pistol grip mounted
- Design architecture permits use for other weapon platforms
- Hands-Free operation & ergonomics
- Exceed 75% Probability of Incapacitation
- Lethality component of NRDEC Light Weight Warrior initiative



OPM: DARPA, Oak Ridge Nat. Lab.

Dramatically Reduced Warfighter Weight Plus Near 100% Lethality for AAN



WHAT IS THE SCHEDULE AND COST?

(Key Milestones)



<i>Activity</i>	<i>FY00</i>	<i>FY01</i>	<i>FY02</i>	<i>FY03</i>		
System Conceptualization	██████████	██████████				
Systems Analysis	██████████					
Constructive Simulation	██████████	██████████				
Munition Design	██████████	██████████	██████████			
Munition Pod Design		██████████	██████████			
Critical Sub-System Demonstrations			██████████	██████████		
* Propulsion/Seeker/Guidance System						
Funding (\$K)						
PE62623A/AH21	881	1,000	3,328	3,340		



Light Fighter Lethality After Next

- **Stephen C. Small, Ph.D.**
- **(973) 724-7043**
- **ssmall@pica.army.mil**



ARD-04 Light Fighter Lethality After Next

OBJECTIVE:

- Define, develop and demonstrate versatile, light weight combat system technologies having a common system architecture (Individual/Crew/Personal/Mission Specific) that dramatically reduce warfighter system weight, provide near 100% lethality, and maximize operational utility and survivability in the Force XXI and Army After Next battlefields. Specific goals include: (1) In FY00, establish initial weapon system architecture and preliminary error budget for a dual-munition pod firing micro-sized, course correcting seeker projectiles; In FY01, verify through constructive simulation, individual system and force-on-force empirical performance, and conceptualize preliminary individual system designs; (3) In FY03, demonstrate critical, sub-system seeker projectile technologies to permit single munition weight less than 0.5 lbs and inertial guidance/course correction for a Probability of Incapacitation greater than 75% at 500M.

SUPPORTS: Army After Next, Land Warrior, OICW, OCSW; Transitions to PM Small Arms

FUNDING (\$K): PE/PROJ	<u>FY00</u>	<u>FY01</u>	<u>FY02</u>	<u>FY03</u>
62623/AH21	881	1,000	3,328	3,340
DARPA	480	510		
Total	1,361	1,510	3,328	3,340

STO Manager:

Matthew Zimmerman, ARDEC
973-724-7993,
DSN: 880-7993

TSO:

John Appel SARD-TT
703-601-1537
DSN 329-1537

TRADOC POC:

COL F. Stone, DCD
706-545-1515
DSN: 835-1515

Chris Kearns, DBBL
706-545-6391
DSN: 835-6391

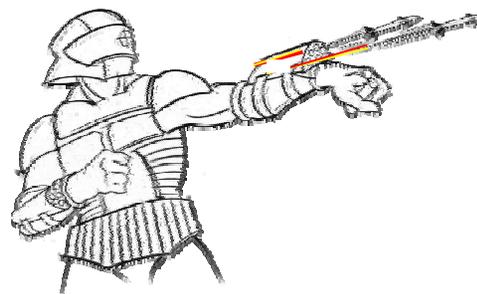
Light Fighter Lethality After Next: ARD-05

OBJECTIVE:

- Define, Develop and Demonstrate Ultra-Light And Versatile (Individual/Crew Served/Personal/Mission Specific) Lethality System Technologies That Dramatically Reduce Warfighter Weight, Provide Near 100% Lethality & Maximizes Operational Utility And Survivability

JUSTIFICATION:

- Critical Performance Metrics:
 - Individual System Weight < 10 lbs. (T); < 5 Lbs. (G)
 - Probability of Incapacitation > 0.75 @500M (T); @ 1000M (G)
- Decreased System Weight By Integrating Micro-Size Munition/Seeker/Guidance Technologies For Versatile & Unequaled System Lethality
- Joint Service Small Arms Master Plan(JSSAMP)
- FOC: IN97-100, 110, 111, 119, 130, 140, 150, 160, 200, 210; TR97-021, 022, 023 **BATTLE LAB:** DBS **TRADOC:** AAN OFFICE
- TRANSITION:** Following Technology Demonstrations



PROGRAM SCHEDULE & FUNDING:

Systems Analysis	██████████							
* Feasibility, Error Budget & Lethality								
Constructive Simulation	██████████							
Prototype (Mock-Up) Delivery			▲		▲			
Critical Sub-System Design/Demo			██████████					
System Integration Plan							▲	
Funding (\$K)								
PE62623A/AH21	881	1,000	3,328	3,340				
DARPA	480	510						

APPROACH:

- Conduct “Future Conclaves”:
 - Establish Team of Military & Engineering Experts
 - Tour National Labs, DARPA, DOD Research Labs, Etc
 - Identify Innovative Concepts & Applicable Technologies
- Perform Unconventional, Systematic Conceptualization
 - Exploit Miniature Seeker Munition & Sensor Technology
- Determine System Data Gaps & Error Budgets
- Formulate Tech Base Development Plan
- Leverage Technology/Resources From LW, DARPA, OGAs, National Labs, SBIRs, ILIRs,
- Demonstrate Sub-System Componentry
- Demonstrate System Proof-of-Principle
- Formulate Complete Light Weight Soldier Concept for AAN and Follow on Demonstration Program

APPLICATIONS:

- Army After Next
- Land Warrior, OICW, OCSW