

FIRESTORM

Objective Individual Combat Weapon (OICW)

Presentation to the
Ninth Annual
Special Operations/Low
Intensity Conflict
(SO/LIC)

Symposium

February 18, 1998



Raytheon



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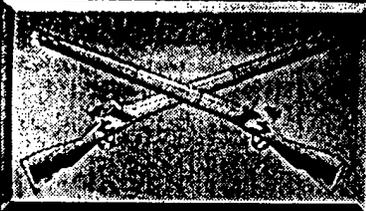
Programmatic Details

- Customer:
 - Joint Service Small Arms Program (JSSAP) Office, Picatinny Arsenal NJ
 - JSSAP management committee includes all 6 services
 - Army and Marines primary users
- Competition: Alliant TechSystems

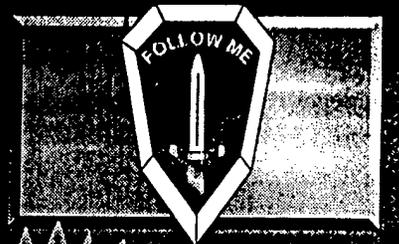


20 November 1997



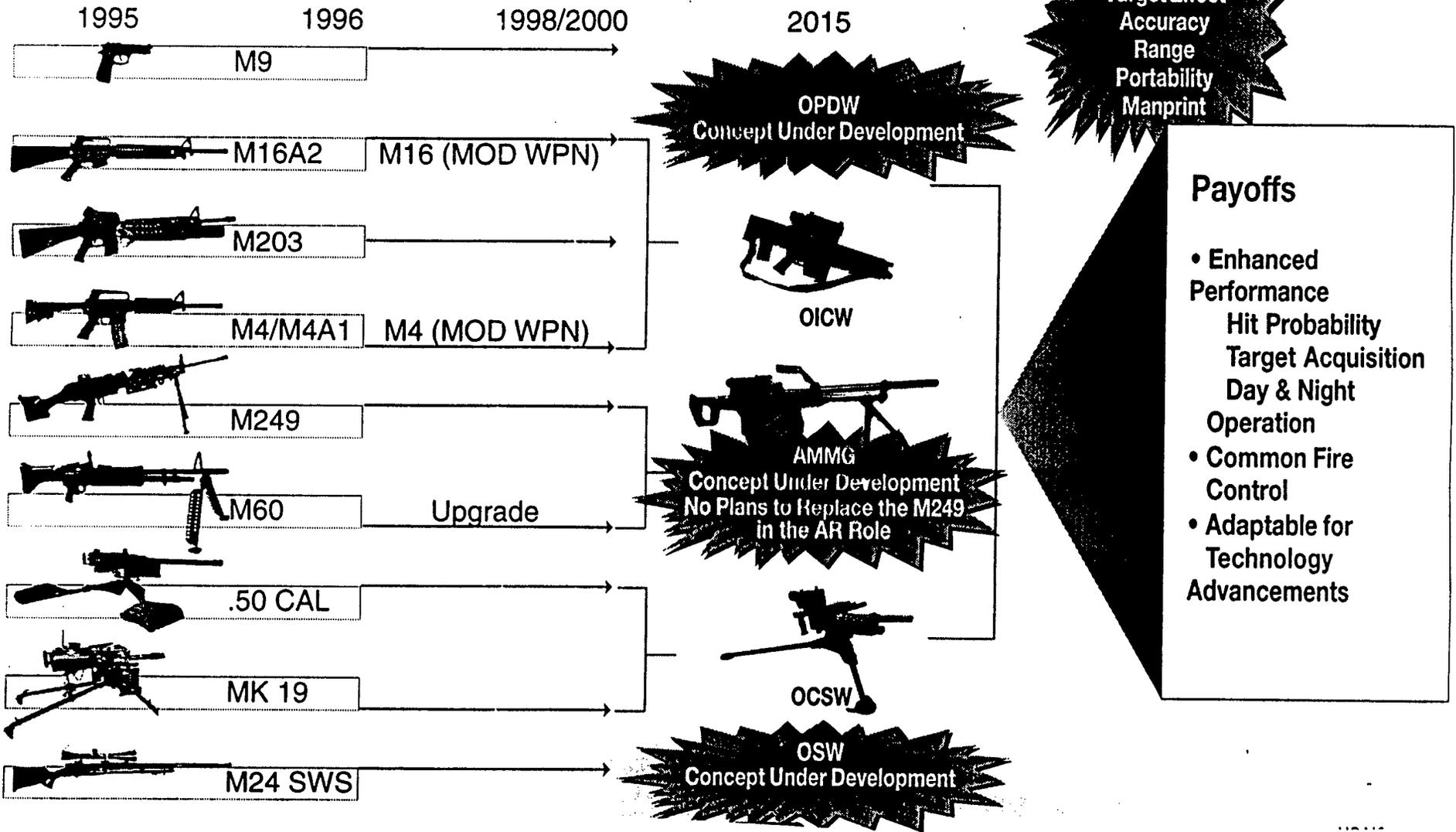


Small Arms Evolution Plan



Phase I

Phase II



Payoffs

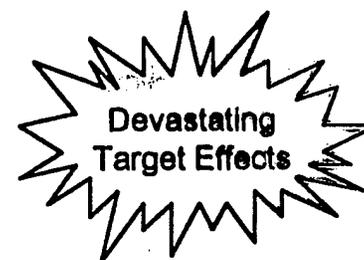
- Enhanced Performance
 - Hit Probability
 - Target Acquisition
 - Day & Night Operation
- Common Fire Control
- Adaptable for Technology Advancements



What Is The OICW?



- Ergonomically Designed, Multi-Functional Combat Weapon System
 - High Explosive, Air-Bursting Munition (20mm)
 - Kinetic Energy Projectile (5.56mm)
 - Modular & Compact, Full Solution Fire Control
 - Laser
 - Ballistic Computer
 - Environmental Sensors
 - Electronic Compass
 - Thermal Sensor
- 21st Century Individual Weapon System
- Replacement For The M16 Rifle Family





*OICW
Leap Ahead
Solution*

A NEW INDIVIDUAL COMBAT WEAPON WHY?

CURRENT KINETIC ENERGY BULLET WEAPONS

- **Effectiveness Requires Direct Hits**
- **Aim Error Limits Effective Range**
 - Human Ability
 - Combat Stress
- **Fire Control Improvements will Provide Only Limited Performance Increase**
- **Potential for Weight Reduction with New Improved Materials**

CURRENT FRAGMENTING MUNITION WEAPONS

- **Limited Range Weapon (~500 meters or Less)**
- **Surface Contact Detonating Munitions Require Impact Near Target**
- **Iron Sights Provide Inaccurate Targeting**
- **Large, Bulky Munitions Limit Soldier Carried Load**
- **Slow Time of Flight Munition**
- **Single Round Weapon with Slow Engagement Timelines**

No Fully Integrated Combined Bullet-Fragmenting Munition Weapon Exists Today



OICW
Leap Ahead
Solution

A NEW INDIVIDUAL COMBAT WEAPON WHY?



US Army Undertaking New 21st Century (Gen II) Land Warrior Thrust

- **Extend Individual Soldier Battlespace
(Less Soldiers, Same Mission)**
- **Overmatch; Leap Ahead Weapon Lethality Increase**
- **Digitized Soldier with Weapon Data Relay Capability**
- **Automated Forward Fire Support Coordinate
Generation**



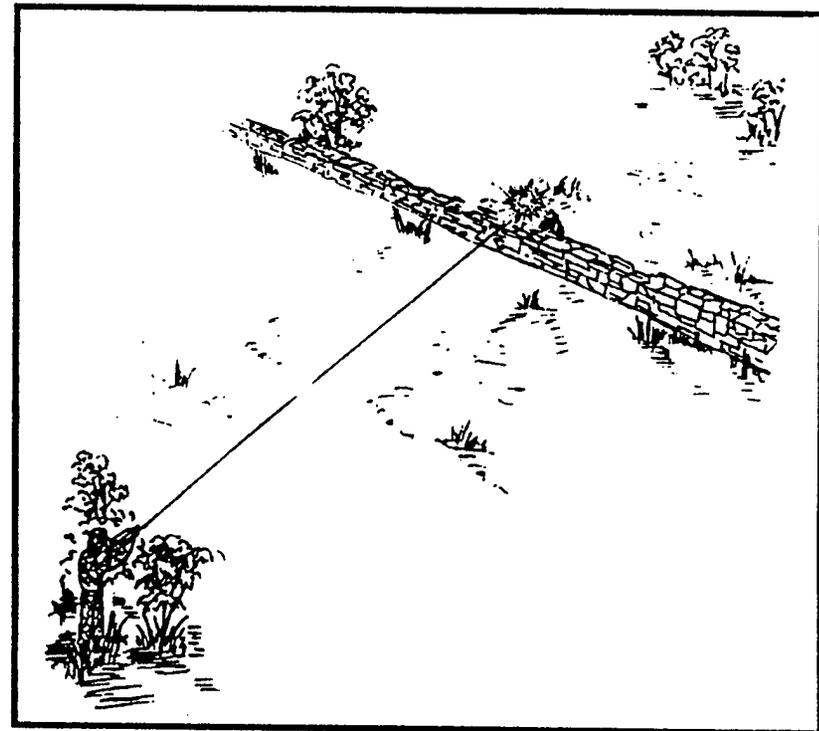
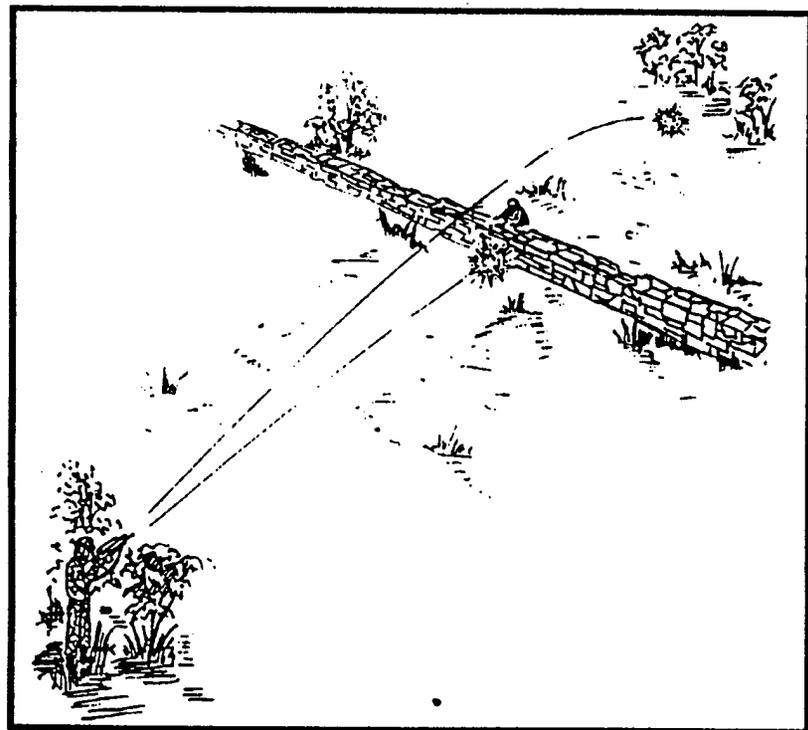
WHY OICW?



AIR BURST OICW SUPERIOR TO POINT DETONATING SOLUTIONS

M16/M203

OICW



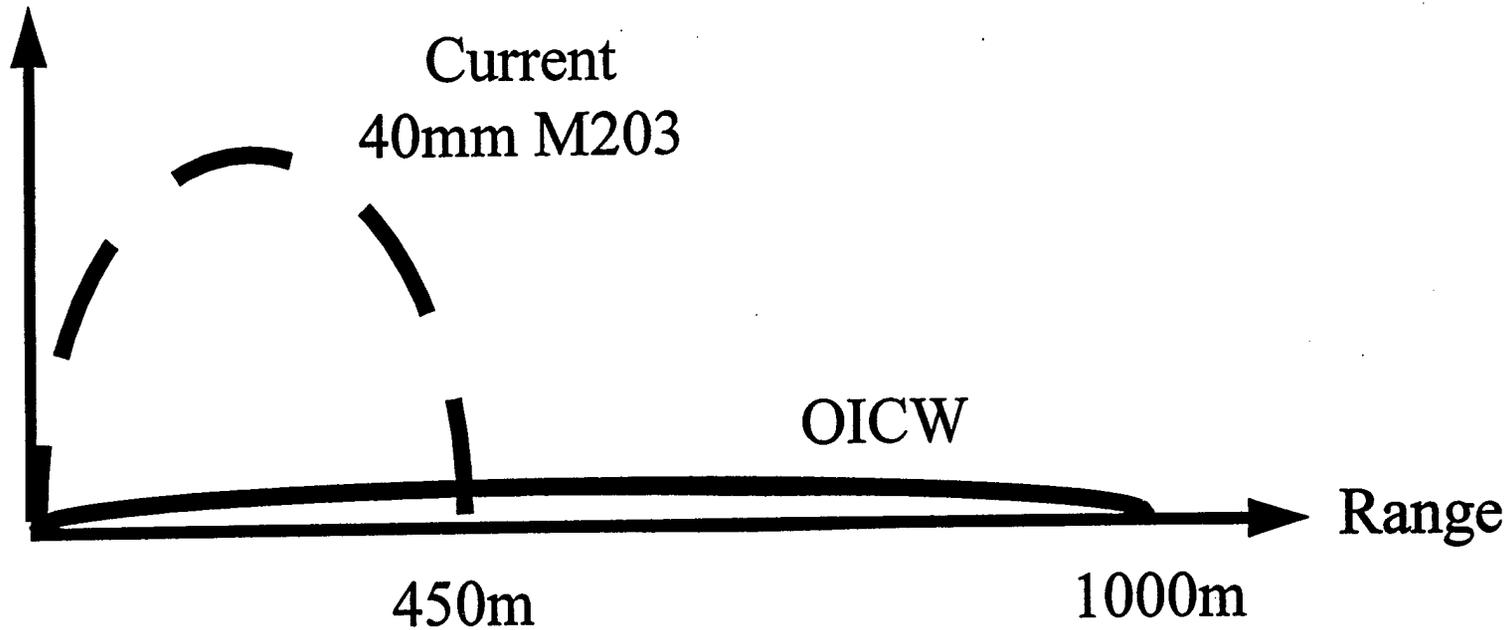
- Point Detonation Only
- Max Range < 500 meters (HE Munition)

- Air Burst Over Target
- Max Range 1000 meters (HE & KE Munitions)



OICW Extends Effective Range with Flat Trajectory

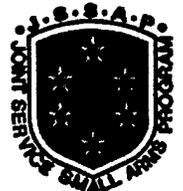
Altitude



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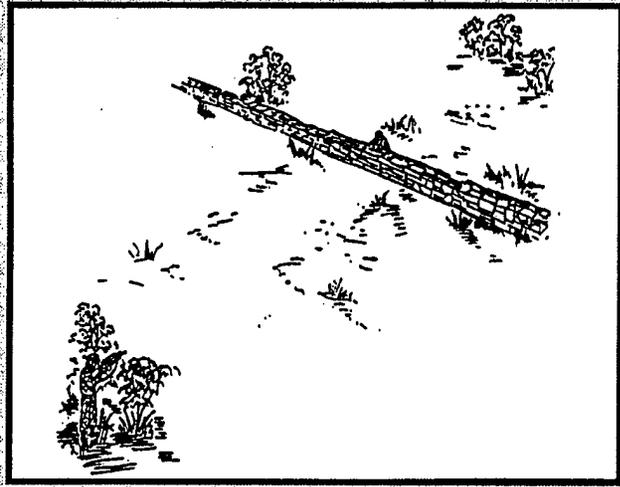


AIR BURSTING MUNITION/ OICW SYSTEM APPROACH



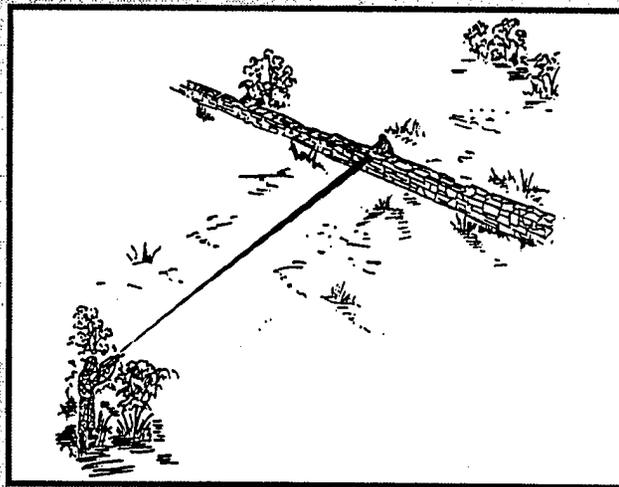
Fire Control Improves Detection/Aiming

1



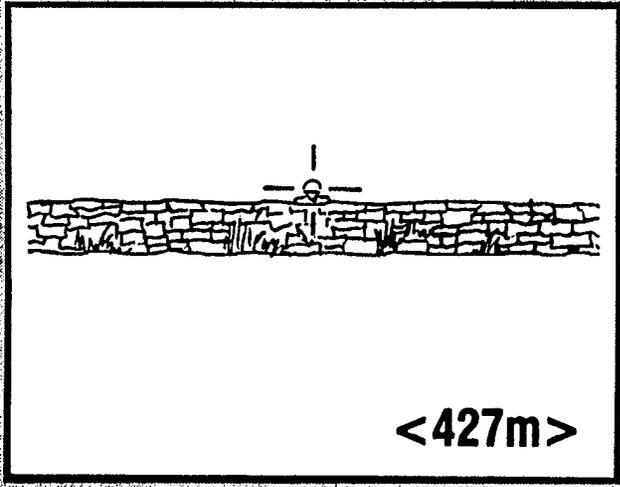
Obtain Range via Laser Range Finder

2



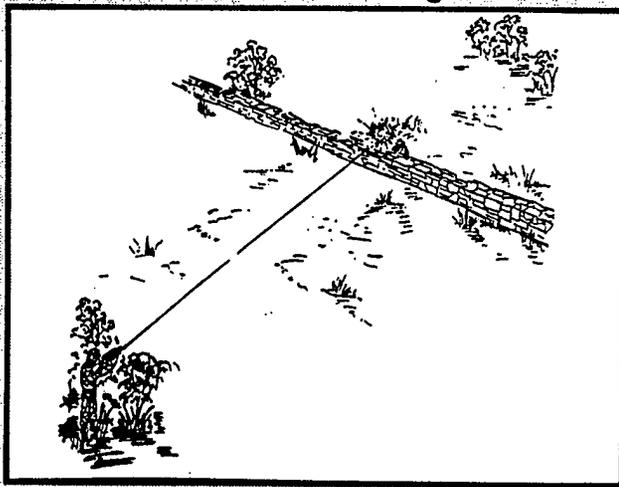
Compute Ballistic Solution & Set Fuze

3

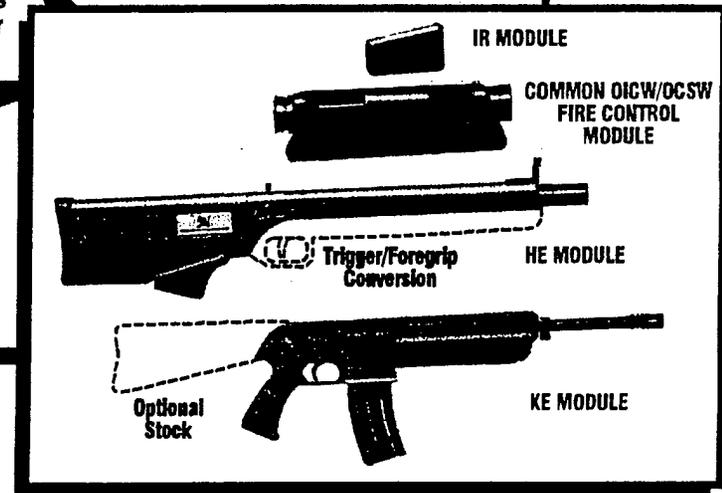
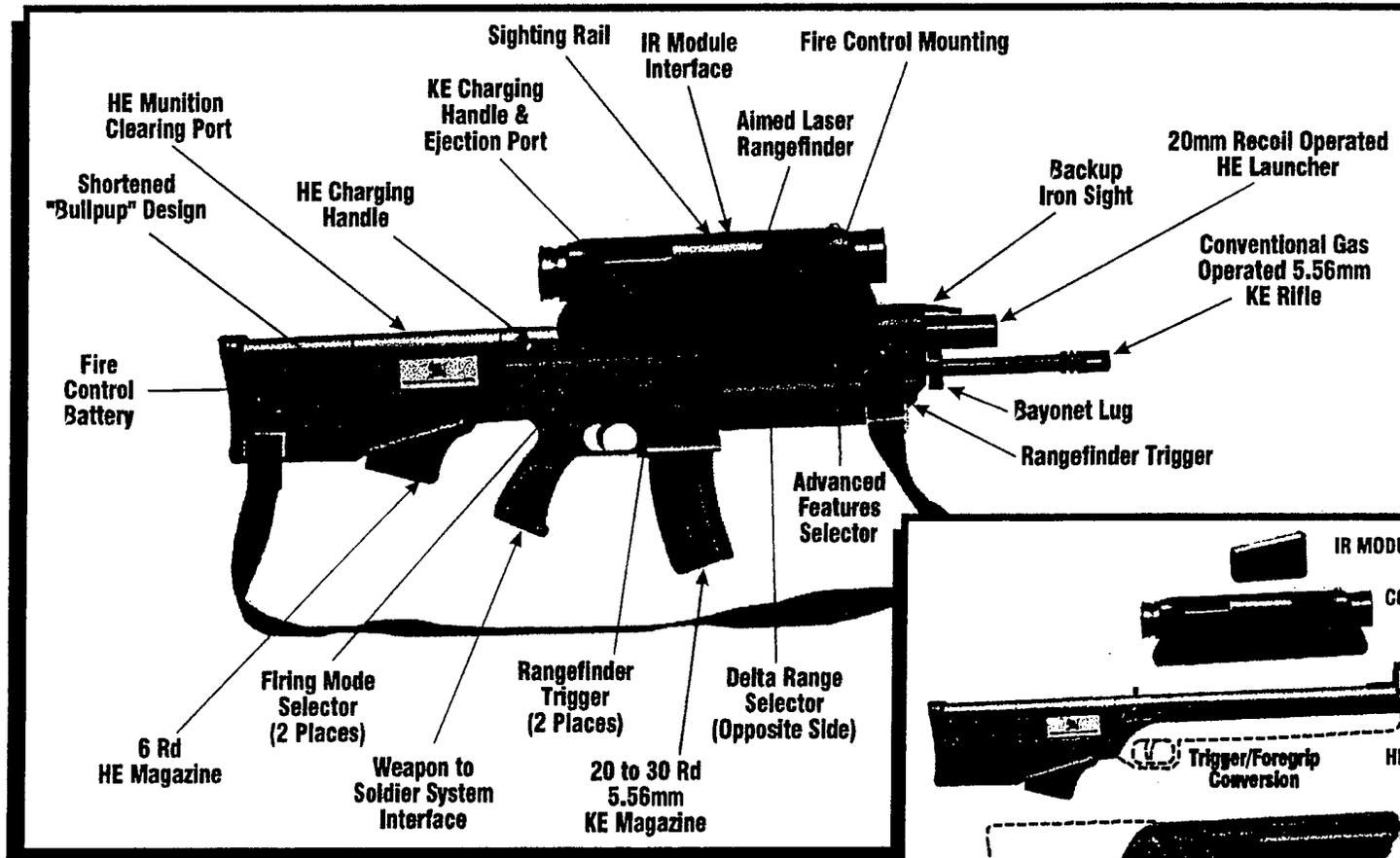


Airburst at Range

4

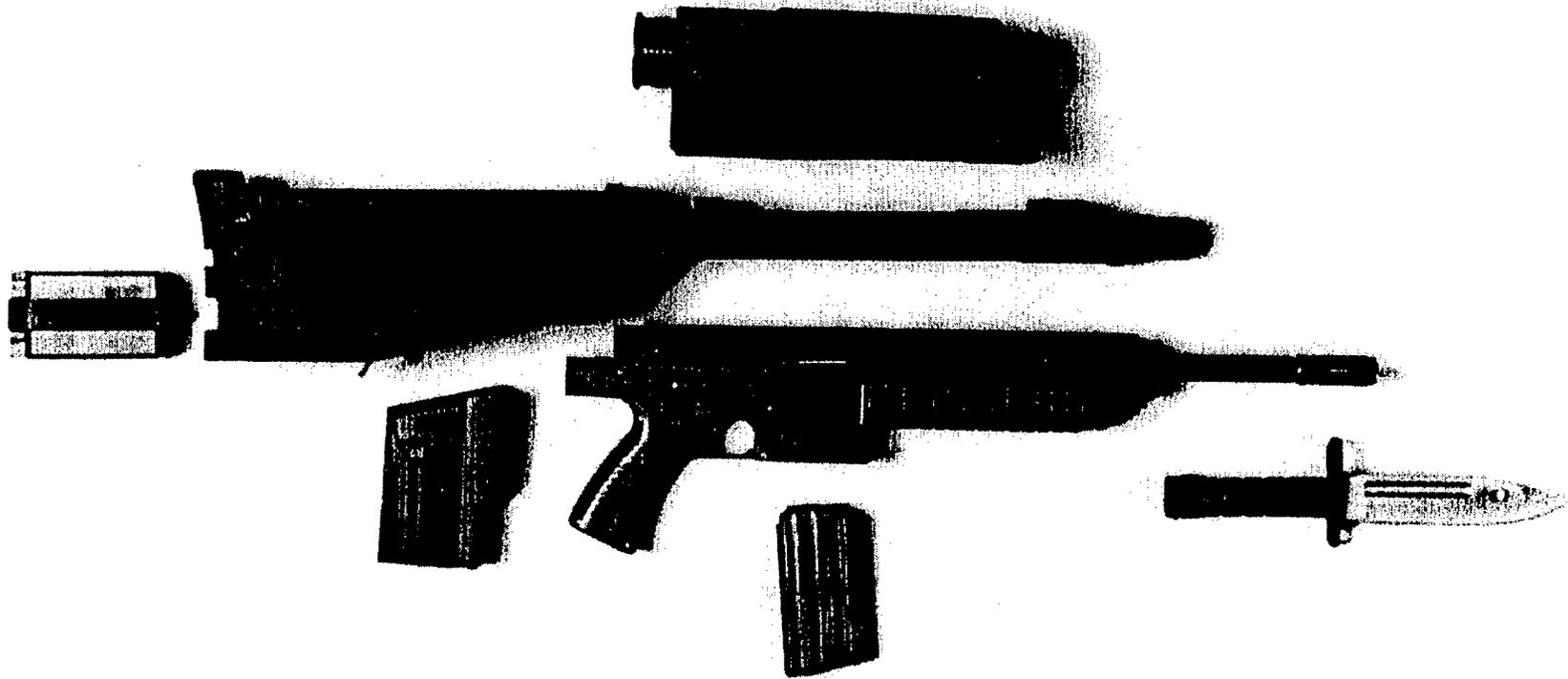


AAI OICW SYSTEM FUE DESIGN





System Design Overview



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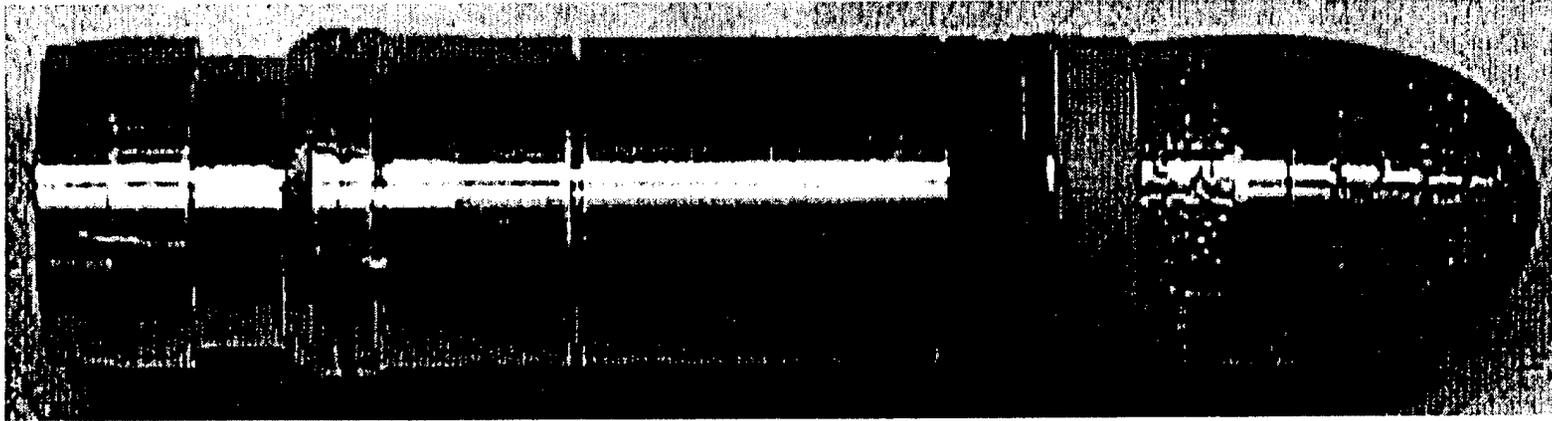
10, 11 & 12 February 1998



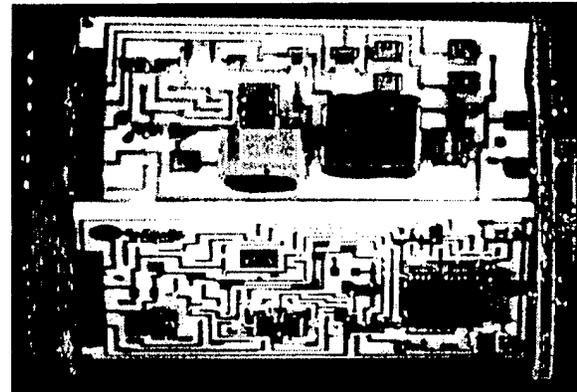


OICW

Phase III HE Ammunition



- Velocity Corrected Time Set Fuze
- Verge/Rotor S&A
- Tungsten Warhead
- Pocket Propulsion



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OICW
Leap Ahead
Solution

KEY OICW SYSTEM REQUIREMENTS/GOALS

		Requirement	Goal
DESIGN	Loaded Weight (lbs) Basic FCS w/IR Sensor	18 19	12 17
	Magazine Load (Rds) KE HE	≥ 20 ≥ 6	≥ 30 ≥ 10
PERFORMANCE	P _i (Incapacitation) Point Target Defilade Target	$\geq 50\%$ (300m) $\geq 20\%$ (300m)	$\geq 90\%$ (500m) $\geq 50\%$ (500m)
	P _s (Suppression) Area Target, 750m Area Target, 1000m	Suppress Suppress	3 Minute Suppression Suppress



Key OICW Technologies



- *Advanced Fire Control System Features provide Accurate Engagement of Difficult Targets**
 - *Multi-Pulse Laser Rangefinder/Modal Processing**
 - *Image Processing/Laser Steering**
- *Internal Recoil Mitigation System Provides Shoulder Force Equivalent to M14**
- *Wide Angle Spray 20mm Tungsten Warhead Provides Greater Weight, Number of Frags than Current 40mm Grenade**
- *Elapsed Time Fuze Provides Low Cost , Accurate Air Burst Control**



OICW
Leap Ahead
Solution

FIRE CONTROL VS. WARHEAD TRADEOFFS

Range Error is Predominant Error Source
Affecting Lethality

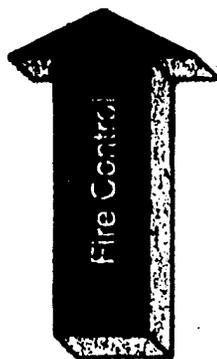
Solutions

Warhead Enhancements

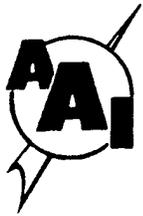
- Proportionally less lethality gain
- Increases weapon wt
- Increases recoil impulse
- Reduces effective range
- Reduces velocity / increases Engagement Time
- Increases ammunition costs

FCS Error Reduction
Enhancements

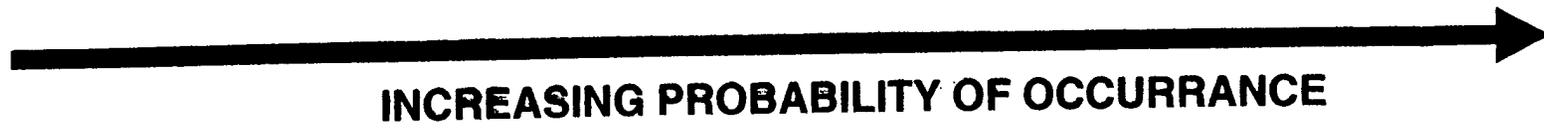
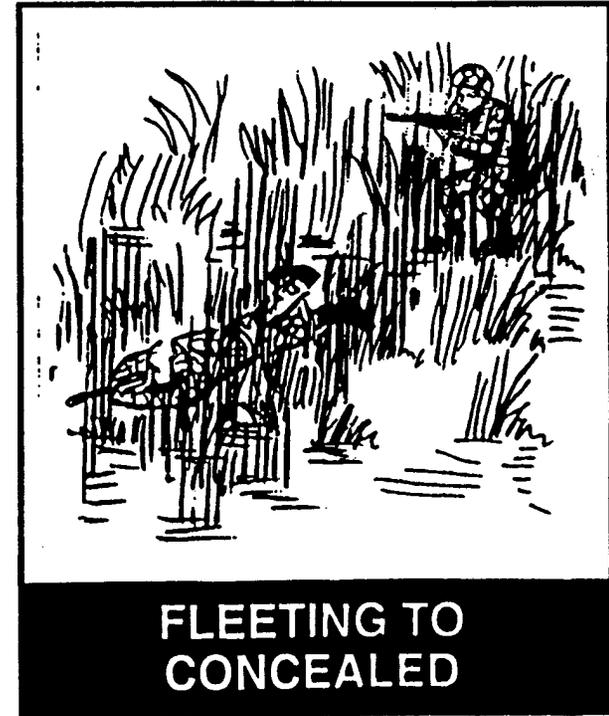
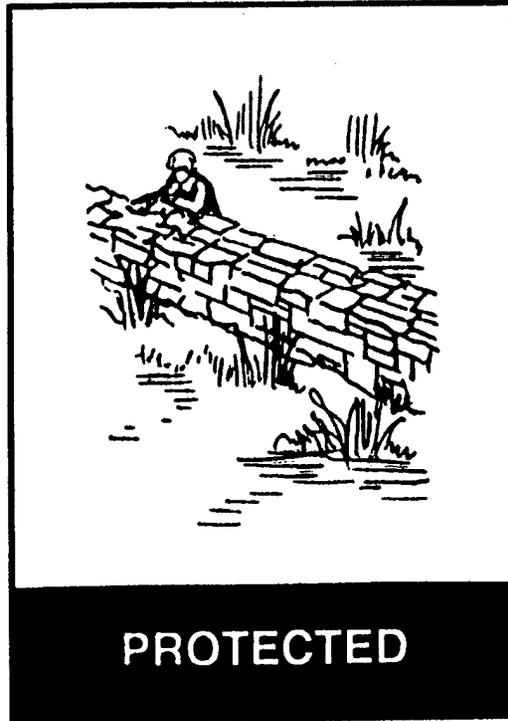
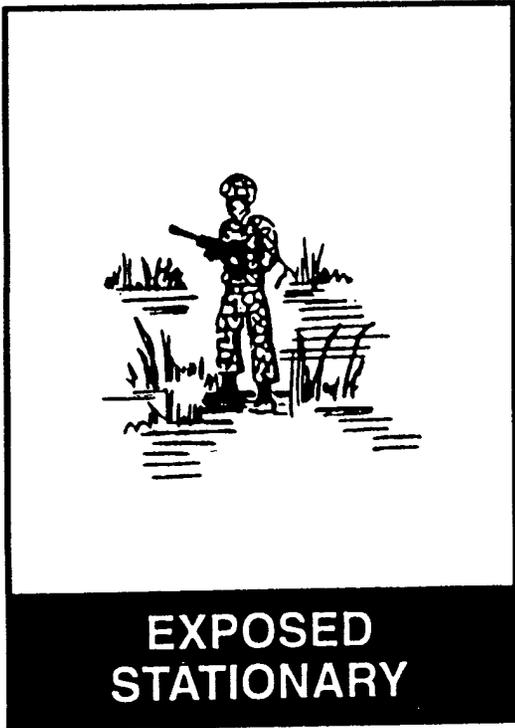
- Addresses difficult scenarios
- Allows optimization of weapon wt
- Provides minimum recoil impulse
- Increases effective range
- Minimizes expendable cost



Relative Benefit of
Range Error Solution



FC MUST ADDRESS REAL WORLD TARGETS





OICW

The Leap Ahead Solution



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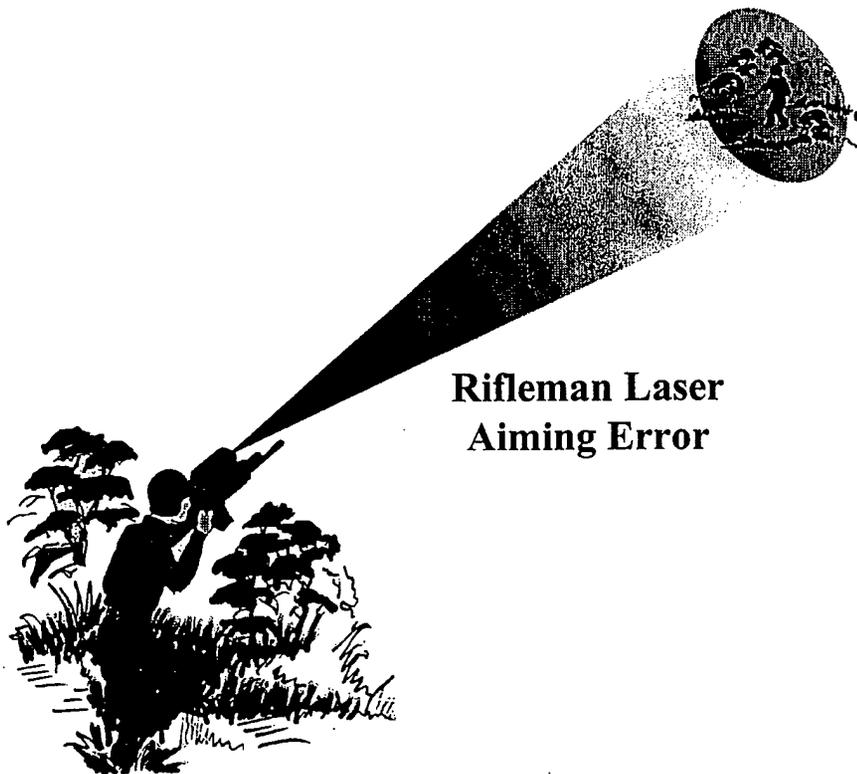


Airbursting System WITHOUT Auto Ranging Assist

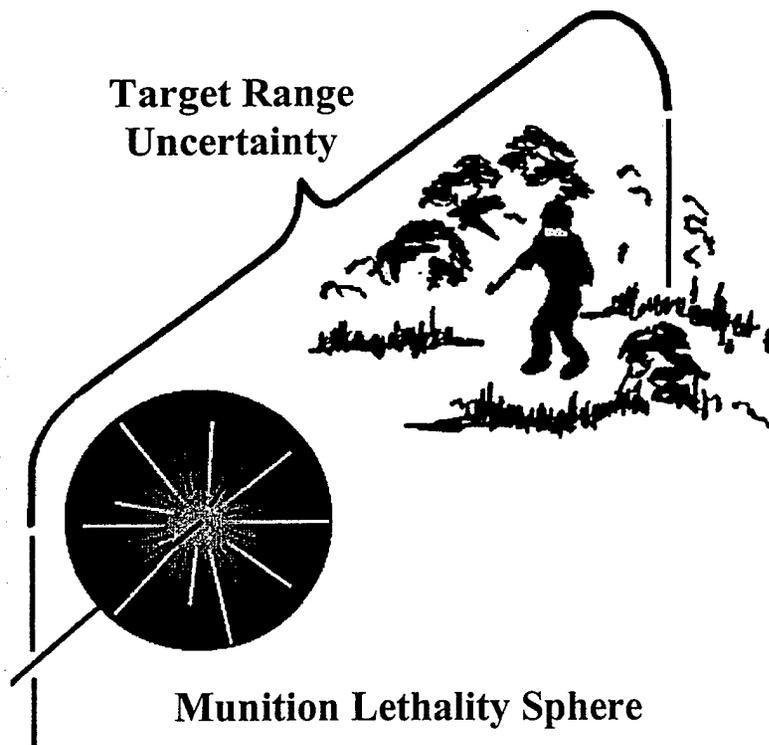
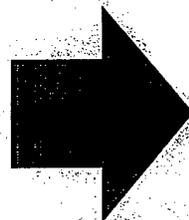


PROBLEM:
Target Range Error

RESULT:
Target Miss



Rifleman Laser
Aiming Error



Target Range
Uncertainty

Munition Lethality Sphere

Human Aiming Limitations:

- Response Time/Capability
- Control/Accuracy



OICW

The Leap Ahead Solution



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Airbursting System WITH Auto Ranging Assist

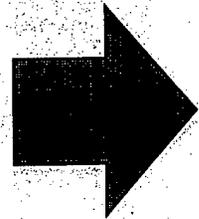
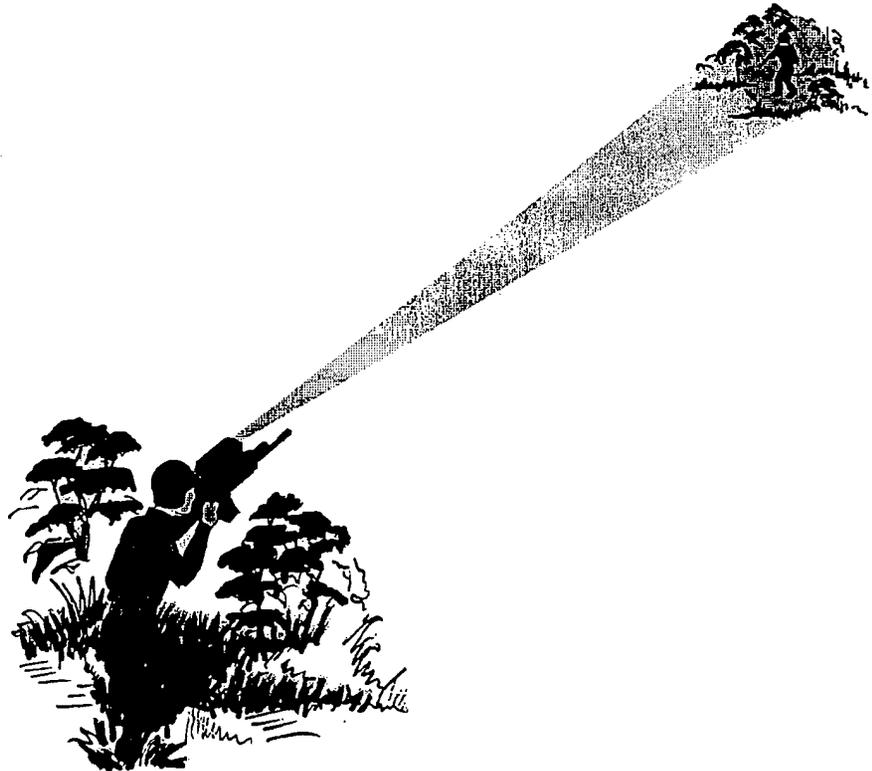


SOLUTION:

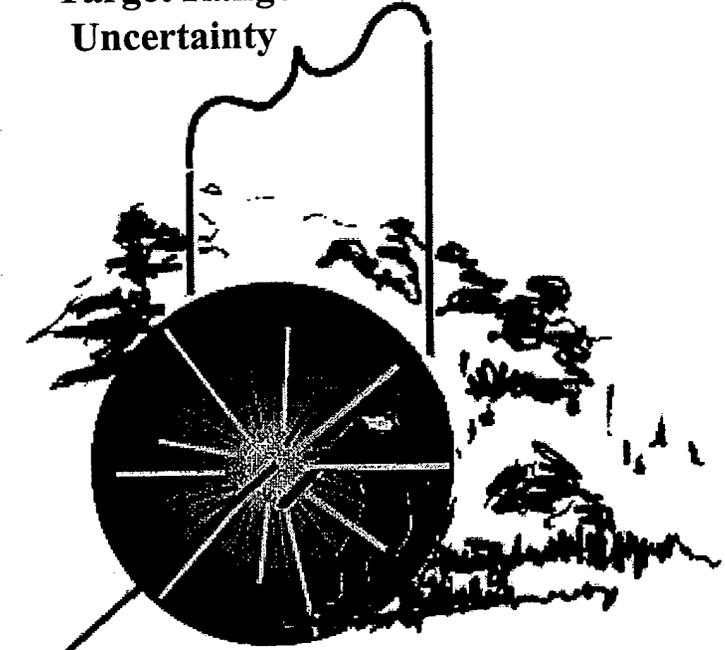
Laser Automatically Steered to Target

RESULT:

Target Hit



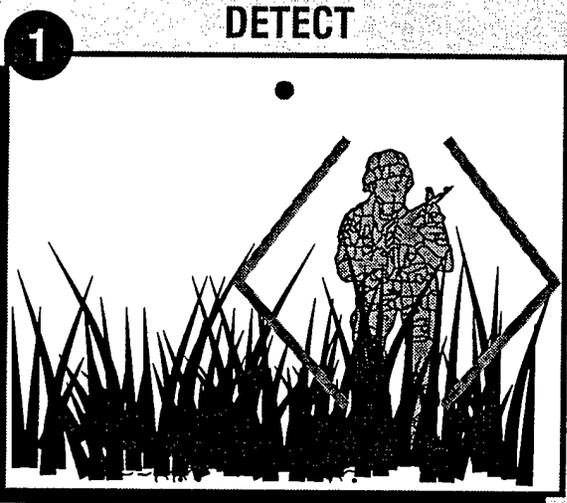
Target Range
Uncertainty



Munition Lethality Sphere

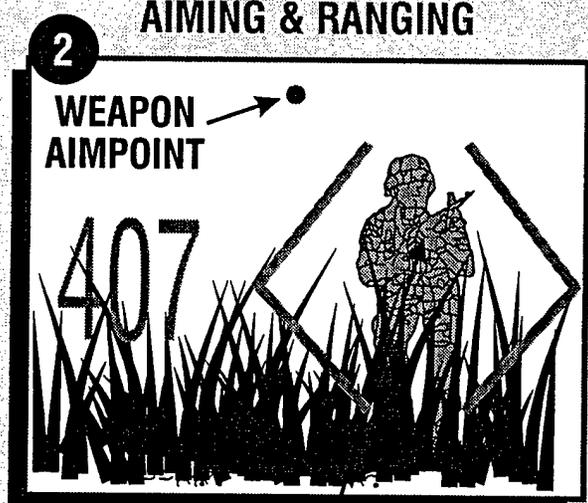


FIRE CONTROL ASSISTED LASER AIMING PROVIDES TARGET RANGES OTHERWISE UNOBTAINABLE



**FLEETING TARGET
(3 to 6 seconds)**

POINT WEAPON



LASER AIMPOINT

HIT LASE BUTTON



TARGET TO GROUND

AIM WEAPON, PULL TRIGGER

INFANTRYMAN ACTION



OICW

Why AAI OICW?

- Technology Innovation and Leadership
- User Focused, Performance Driven Design
- Low Risk Development/Production Team



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