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# Objective Individual Combat Weapon (OICW)

## *Revolutionizing The Infantry Weapon - Enhancing the Capabilities of the 21<sup>st</sup> Century Infantryman*

14 August 2001



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## Report Documentation Page

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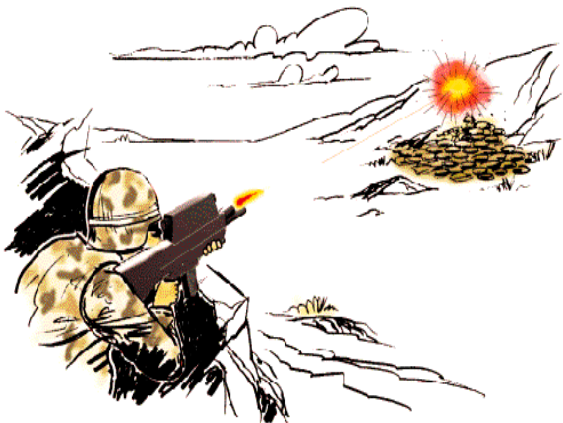
# Users Vision



- **Soldier's Individual Combat Weapon – well into 21st century!**

- **Bursting Munition Concept**

- Provides revolutionary capability
- Offsets aim error associated with iron sights
- Provides more efficient lethal mechanism



- **Dual Mmunition System**

- 20mm High Explosive
- 5.56mm Bullets

- **Increases range/lethality**

- **Target Acquisition/Fire Control System**

- Laser Range Finder
- Ballistic Computer
- Fuze Setter
- Electronic Aim Point



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# Method of Operation



1. Operator places aimpoint on the target and activates the laser rangefinder.

2. The fire control system computes the distance to burst and provides an adjusted aimpoint based upon target range information, the ballistic characteristics of the ammunition and environmental conditions...*transparent to the User.*

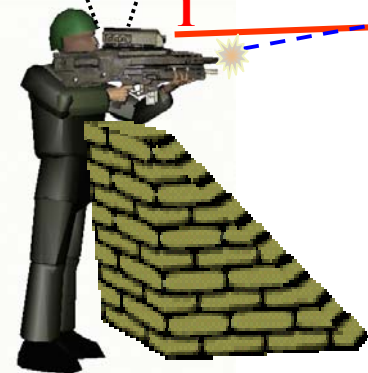
3. The operator places the adjusted aimpoint on the target and pulls the trigger. Upon firing, the fuze is inductively set in the weapon where it will fly along a predictable path and air-burst at the target area defeating it and any other targets and/or equipment that may be in the vicinity of the lethal footprint.



2

3

1



*LASE... AIM... FIRE...*



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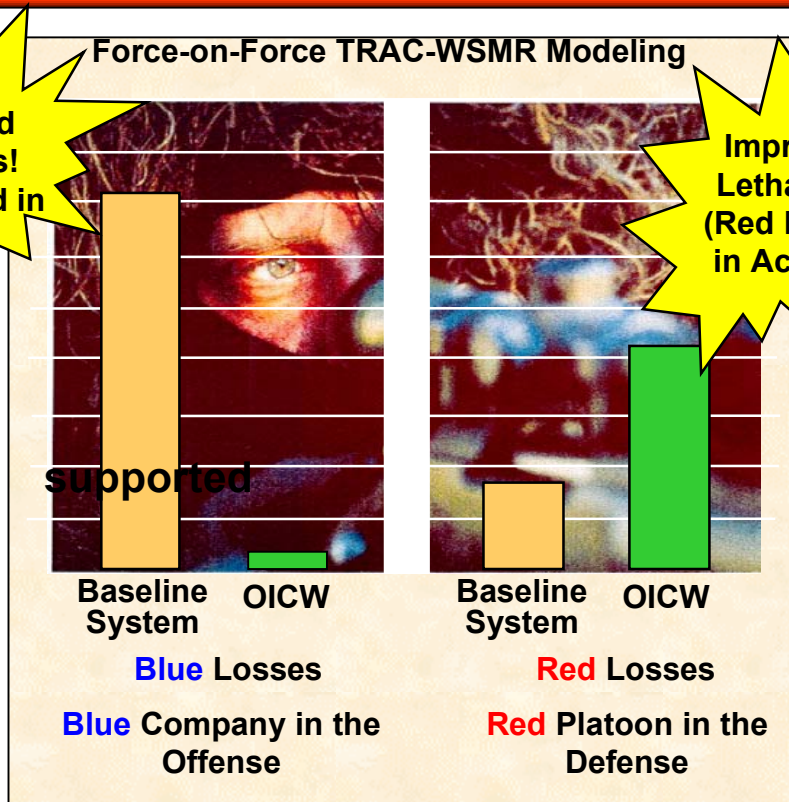
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# Constructive Simulation: Modeling



- Force-on-Force
  - Conducted by TRAC-WSMR using CASTFOREM
- Initial parametric assessment of P(I), maximum effective range, and BOI showed increased effectiveness and a significant reduction in number of casualties
- OICW AoA conducted by USAIC by TRAC found:
  - OICW improves Blue force effectiveness through both lethality and survivability
  - Extends incapacitation range well beyond legacy individual combat weapon
  - Increases OPTEMPO – virtually eliminating firefights to destroy a threat even in protected positions
  - BOI of 4 per squad performs statistically the same as BOI with more OICWs providing the lethality and survivability required to win and fight the next fight

**Reduced Casualties!  
(Blue Killed in Action)**



**Improved Lethality!  
(Red Killed in Action)**

(OICW AoA Jan 2000)



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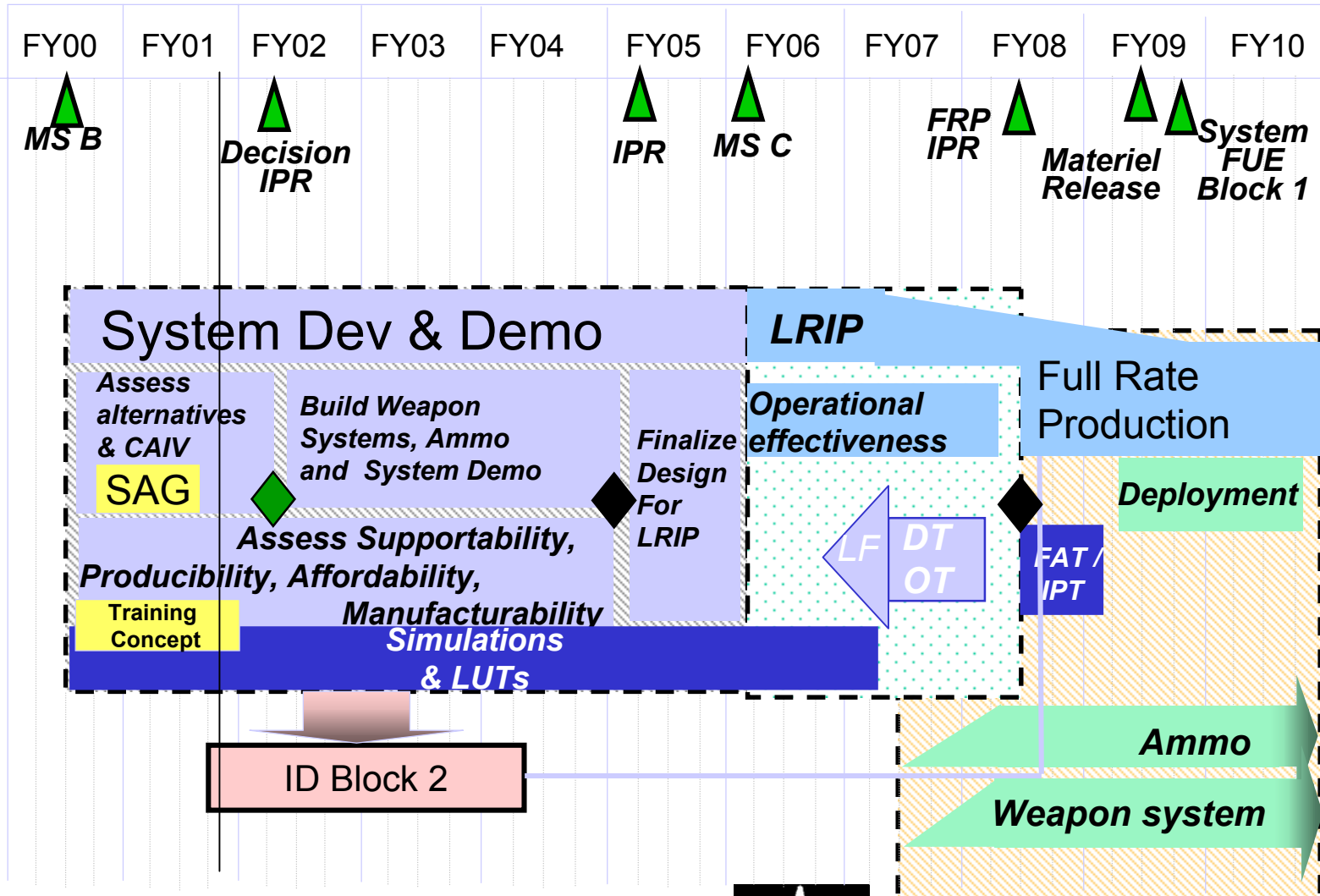
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# OICW Program Schedule

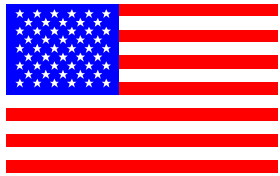


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# Architecture Selection Process



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# Architecture Definition



- Total OICW system integration of weapon, TA/FCS, ammunition and functionality/subsystems/components of each including which items, where located, integrated or modular, etc.
- A particular system level architecture may have multiple sub-architectures
  - Each weapon operating principle is a unique architecture
  - TA/FCS integration is a unique architecture
  - Caliber will be a variant of architecture



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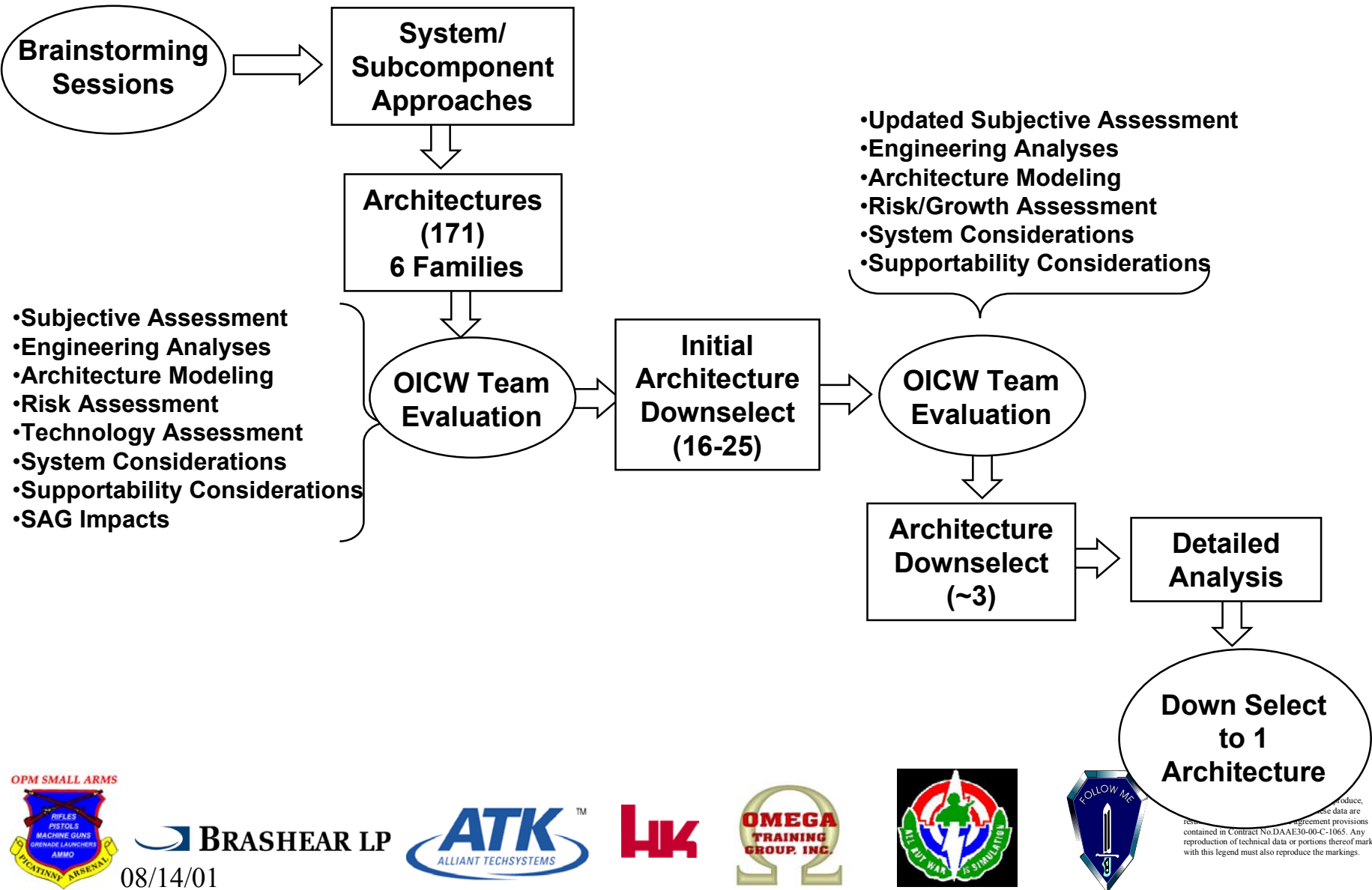
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# Architecture Downselect Process



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# Architectures



System*	Weapon Conventional or Bullpup**	TA/FCS	Ammunition
I. Separable Units <ul style="list-style-type: none"> <li>a. Sep. TA/FCS &amp; HE &amp; KE (Phase 4 with mods)</li> <li>b. Sep. TA/FCS only (Weapon Integrated)</li> <li>c. Sep. HE &amp; KE only (TA/FCS Integrated)</li> </ul> II. Fully Integrated (Not Separable)                     III. Integration Module                     IV. HE Attachable to KE <ul style="list-style-type: none"> <li>a. Launcher attachment</li> <li>b. Throw away barrel</li> </ul> V. HE only <ul style="list-style-type: none"> <li>a. KE Attachable                             <ul style="list-style-type: none"> <li>i. Separable TA/FCS</li> <li>ii. Non-sep. TA/FCS</li> </ul> </li> <li>b. HE only (No KE or Equiv.)                             <ul style="list-style-type: none"> <li>i. Separable TA/FCS</li> <li>ii. Non-sep. TA/FCS</li> </ul> </li> <li>c. Shotgun ammo KE variant                             <ul style="list-style-type: none"> <li>i. Separable TA/FCS</li> <li>ii. Non-sep. TA/FCS</li> </ul> </li> </ul>	A. Semi-automatic <ul style="list-style-type: none"> <li>a. Recoil Operated</li> <li>b. Gas Operated</li> <li>c. Recharge Operated</li> <li>d. Fixed Breech</li> </ul> B. Manual Bolt Operated                     C. Attachable <ul style="list-style-type: none"> <li>a. Throw away</li> <li>b. Single vs multiple</li> </ul> D. HE Only <ul style="list-style-type: none"> <li>a. w/ PDW like Attachable</li> <li>b. No KE</li> </ul>	1. Integrated D/N FCS <ul style="list-style-type: none"> <li>a. Separable from Weapon</li> <li>b. Non-separable from Weapon</li> </ul> 2. Distributed FCS – Separable & Integrated into weapon                     3. Distributed FCS – Integrated into weapon                     4. No DVO <ul style="list-style-type: none"> <li>a. Eye piece</li> <li>b. HUD                             <ul style="list-style-type: none"> <li>i. HMD</li> <li>ii. HUD on Weapon</li> <li>iii. HUD on FCS</li> </ul> </li> </ul> 5. Basic FCS with Distributed Functional add-on modules (eg CIDDs, PAC4)                     6. Separable Thermal Module	HE <ul style="list-style-type: none"> <li>– Caliber (20, 25mm)</li> <li>– Type</li> </ul> KE <ul style="list-style-type: none"> <li>– Caliber (5.56, 4.6mm, HE caliber)</li> <li>– Type</li> </ul> Reference Ammo Detail



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# Down Select Criteria



Operational Capability

- Detect
  - Recognize
  - Identify
  - Engage
  - Combat objectives
- } Day/night

TA/FCS

- FOV
- Weight
- Sensor capability

Ammunition

- QE
- Ballistics
- Weight
- Impulse
- P(I)

## Conceptual Design



Conceptual Model — Lightweight and Lethal

**CAIV**

Weapon

System

- Impulse
- Weight
- Ergonomics
- Error budget management
- P(I)
- Ergonomics
- Weight
- Supportability
- Training
- Cost – UPC/LCC
- Effectiveness

## ATD Technology Demonstrator



OICW Proof of Principle Testing 1999



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# Recommendation



Recommend CG USAIC select Architecture 2 for System Demo



**Integrated Weapon System  
w/ Separable Fire Control**

**Approved!**

With the following trades:

- Block Upgrade approach to Maximize TA/FCS Functionality
  - Phase in Video, Tracker, Laser Steerer, Aiming Light before LRIP
- Range reductions to 750M – Fire Control Recognition
- Block Upgrade for CIDDs/MILES/Illuminator
- Field of View 10-12 deg



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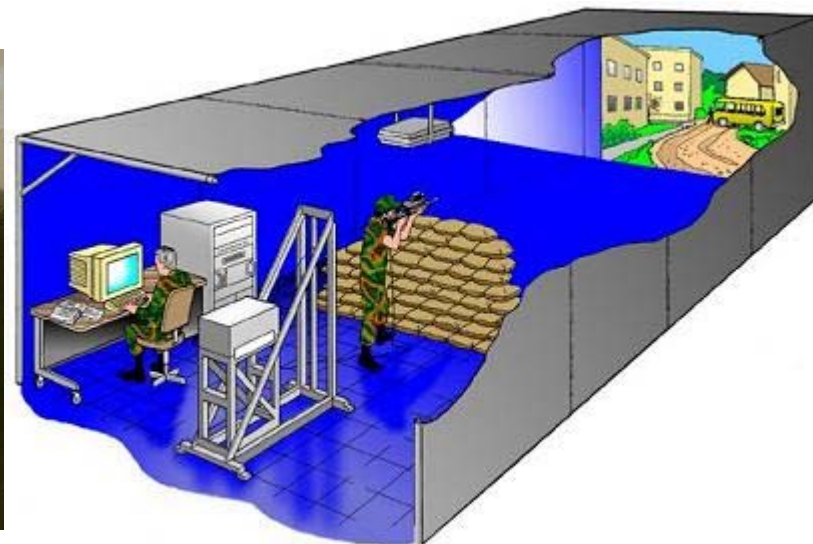
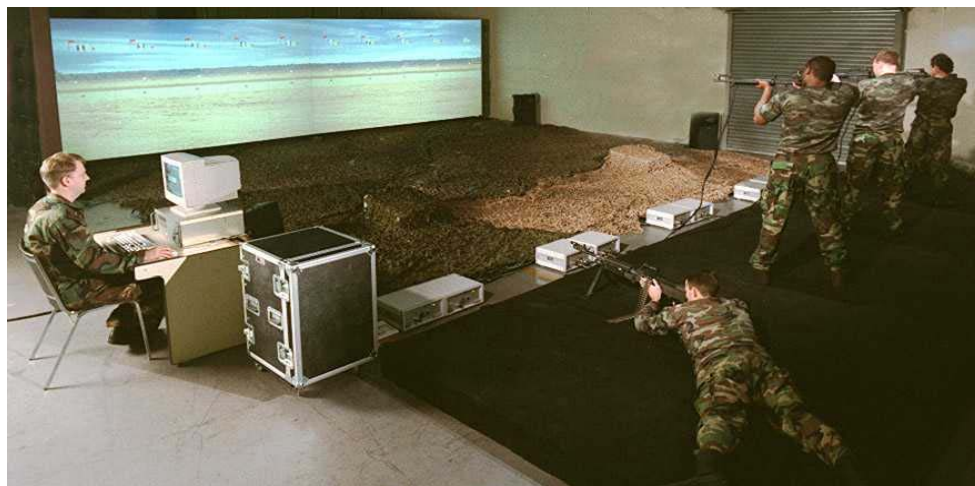


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# Training Concept Considerations



- Make maximum use of existing ranges
- Minimize new special targetry procurement programs
- Use simulations to decrease service and training ammunition cost and allocations
- Identify follow-on training device/virtual and live simulation requirements
- Minimize institutional and unit training time without sacrificing Soldier proficiency



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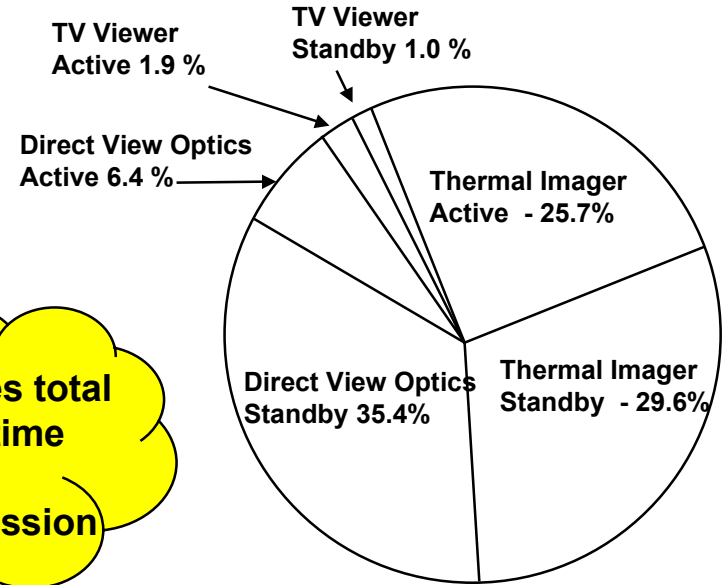


# System Battery



<u>Module</u>	<u>Average Power (W)</u>
CPU Electronics	3.5
Laser Range Finder	0.84
Display Electronics	2.5 day/ 1.25 night
Compass	0.25
Thermal Imager	1.25
Fuze Setter	0.035

**OMS/MP defines total system ON time as 57.4 Hrs per 96-hour mission**



**Preliminary analysis indicates at least 7 hours run time on a single Land Warrior pouch cell**

Assumes 75% power conditioning efficiency and 25% de-rating for battery at 3 amp rate



**14 Amp-Hr @ 2 amp rate**



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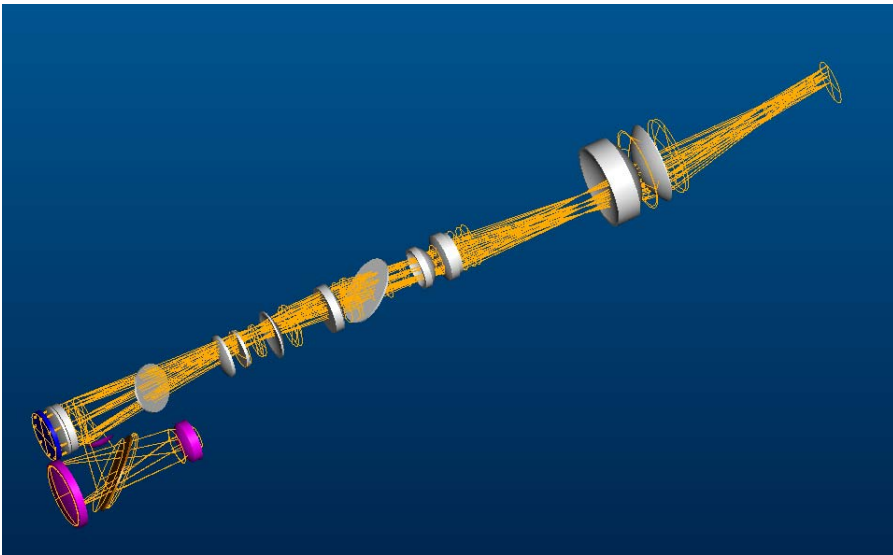
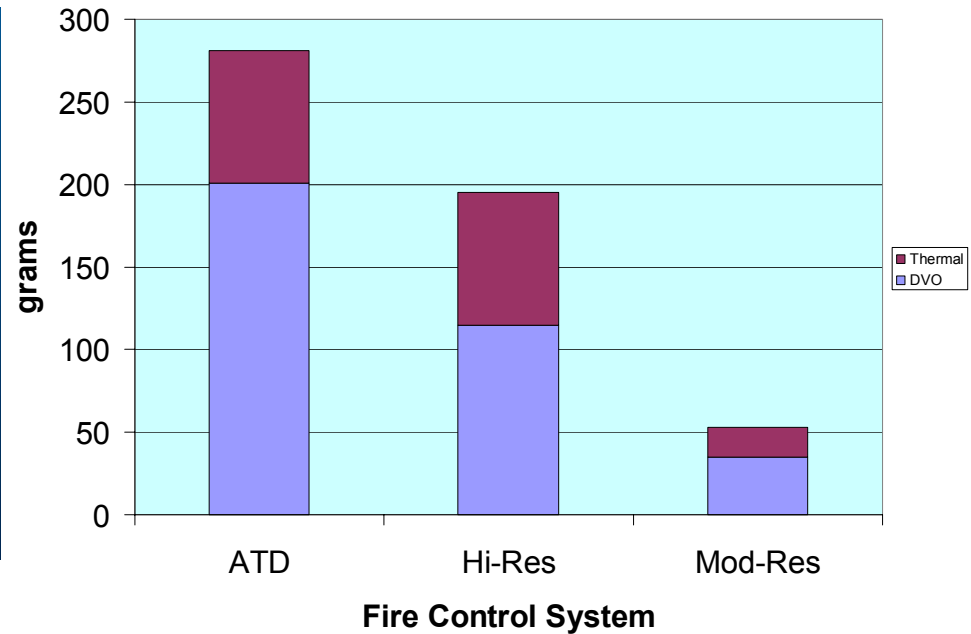


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# Optical Highlights



### Optical Glass Weight



Significant weight savings over the ATD - Also optical analysis indicates improved optical performance



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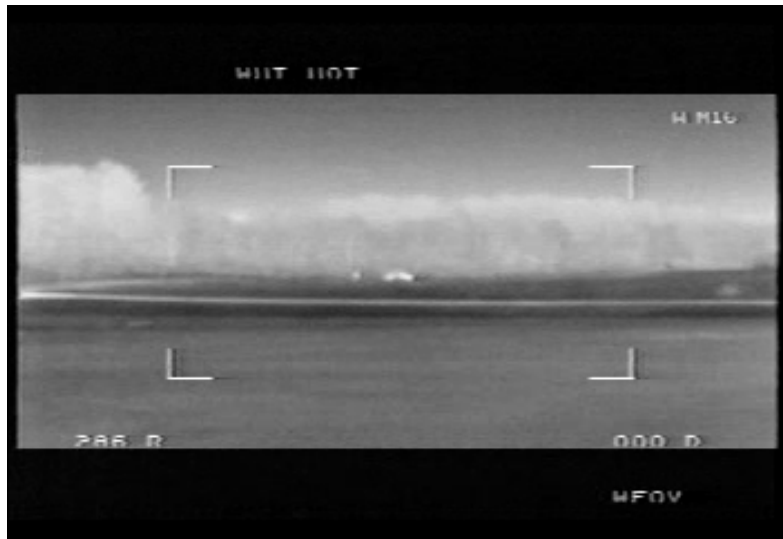
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# Thermal Imager Demo



- Standing personnel & vehicle target at 500 meters
- MTWS 18° & 6° HFOV

MTWS 18°



MTWS 6°



A six degree FOV sensor provides high probability of detecting standing personnel sized targets which are barely visible with 18 ° FOV

However other system parameters must be considered e.g. Target Acquisition Time, Superelevation, and System Size and Weight

# OICW Summary



- OICW Provides Leap Ahead Lethality Capability
- User and PM Are Working Technology Challenges to Meet User's Needs

*Soldier's Individual Combat Weapon – well into 21st century!*



Conceptual Model — Lightweight and Lethal



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# Questions?



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