International Infantry & Joint Services Small Arms Systems Annual Symposium,
Exhibition and Firing Demonstration

Atlantic City, NJ
"Meeting the Needs of Our Joint Ground Forces in the Fight Against Terrorism and Developing the Tools forFuture Combat"

16-19 May 2005

Agenda

Tuesday, 17 May 2005

Welcome Address, by BG Paul Izzo, USA, Program Executive Officer, Ammunition
Topical Address, by COL Mark Rider, USA, Project Manager Maneuver Ammunition Systems

Panel*:* Lessons Learned - Industries' Response & Acquisitions' Real Needs
Moderator:

- Mr. Dave Broden, Broden Resource Solutions & Alliant Techsystems

Panelists:

- Dr. Michael Hockenberger, CEO/President, PGM Corporation (NOTE: This presentation may take time to download!!)

Panel*:* Joint Service Small Arms Synchronization Team (JSSAST)
Moderator:

- COL Scott Crizer, USA, Chairman, JSSAST

Panelist:

- Major Glenn Dean,, USA, US Army Representative
- CAPT Rowland Huss, USN, US SOCOM Representative
- LtCol Doug Miller, USAF, US Air Force Representative
- CDR Rick Button, USCG, US Coast Guard Representative
- Mr. Kevin Swenson, Joint Non-Lethal Weapons Directorate

Session I: Ammunition
Chairman: Mr. Dennis Conway, US Army - ARDEC

- Terminal Effects of New Small Arms Ammunition, Mr. John MacDougall, SNC Technologies Inc., SIMULATION
- Lightweight Ammunition: A Material Science Challenge, Mr. Robert Gagné, Chairman & CEO, Mississippi Polymer Technologies, Inc.
- Program Manager-Maneuver Ammunition Systems (PA-MAS) Small Caliber Ammunition Program Support at US Army Research Laboratory, Dr. James F. Newill, US Army Research Laboratory
- Cost Reducing Material for 40mm Practices Cartridgesn, Mr. James Grassi, US Army - ARDEC, 40mm Grenades Special Projects
- Joint Non-lethal Warning Munitions (JNLWM) Qualification and Fielding, Mr. Dennis W. Stanton, Project Engineer, NSWC Crane
- Intelligence Assets Below the Battalion Level, Mr. Larry D. Cozine, Martin Electronics, Inc (MEI)
- Lethality 101: A Complex & Controversial Subject, Mr. Shawn Spickert-Fulton, US Army, RDECOM-ARDEC
- Lightweight High Performance Gun Barrels, Mr. Kris Christou, MER Corporation

Session II: Mortars
Chairman: MAJ Paul D. Shuler, USA, Assistant Product Manager, Mortar Systems

- Mortar Overiew, MAJ Paul D. Shuler, USA, Assistant Product Manager, Mortar Systems
- XM395 Precision Guided Mortar Munition (120mm PGMM), Dr. Anthony Pezzano, OPEO Ammunition/OPM CAS/ OPM Mortars
- Linking Mortars to the Joint Fires Network, Mr. Tom Bradley, APM Fire Control, PM Mortar Systems
- Lightweight 81mm Mortar, Mr. Jose Santiago, Lightweight Dismounted Mortar Weapon STO Manager, US Army - ARDEC
- Lightweight Composite Monopack for 120mm Mortar Ammunition, Mr. Jack Lam, P.E., Project Officer U.S Army RDECOM-ARDEC
- 120mm Mortar System Accuracy Analysis, Mr. Raymond Trohanowsky, US Army RDECOM-ARDEC

- Mortar Systems Program Review: Mortar Weapon Sustainment Effort, Mr. Steven Mozeson, Mortar Sustainment IPT, US Army - ARDEC
- Enhanced Live Fire Mortar Training Using The M769 Full Range Practice Cartridge, Mr. Jason Surmanek
  ARDEC Project Officer (APO), US Army - ARDEC

Wednesday, 23 May 2005

Soldier Lethality and Wound Ballistics from a Swedish Perspective, Mr. Per G. Arvidsson, Product Manager Small Arms Systems, Swedish Armed Forces Materiel Command
Panel: Soldier Weapons

- PM Soldier Weapons Overview, COL Michael Smith, USA, PM Soldier Weapons
- PM Individual Weapons Overview, LTC Matthew Clarke, USA, PM Individual Weapons
- PM Crew Served Weapons Overview, LTC Kevin P. Stoddard, PM Crew Served Weapons

Panel: National Small Arms Center (NSAC) & National Small Arms Technology Consortium (NSATC) Update, Mr. Frank P. Puzycki, Research Program Director, NSAC
Panel: NDIA Armament Division - 2005 Division Status, Mr. Dave Broden, Chairman, Armaments Division, NDIA
Luncheon Address: "A Bold Initiative: Colonel Miles and the Lee Magazine Rifle in 1879", Dr. Stephen C. Small, Joint Services Small Arms Program (JSSAP)

SessionIII: Joint Service Arms Program (JSSAP) Update
Chairman: Mr. Joel M. Goldman, Chief, JSSAP Office, US Army - ARDEC

- Joint Service Small Arms Capabilities Update: Capability Gaps into Context and Solicitation of Good Ideas from Industry, Mr. Joel M. Goldman, Chief, JSSAP Office, US Army - ARDEC
- Probable NATO Restructuring, Mr. Robert M. Pizzola, US Army - ARDEC
- Component Technology Investigations for Light Machine Gun Applications, Mr. Lucian M. Sadowski, US Army - ARDEC
- Lightweight Small Arms Technologies, Ms. Kori Spiegel, Joint Service Small Arms Program and Mr. Paul Shipley, AAI Corporation
- Caseless Ammunition & Advances in the Characterization of High Ignition Temperature Propellant, Ms. Patricia M. O'Reilly, US Army - ARDEC
- Safety Test of the XM109 Rifle, Mr. Neil Lee, US Army - ARDEC

SessionIV: Soldier System Interoperability
Chairman: Mr. Vernon E. Shisler, US Army - ARDEC

- Soldier System in NATO, Mr. Vernon E. Shisler, US Army - ARDEC
- NATO Future Weapons R&D: SCI-P130ET - Integration and Interoperability Issues for Dismounted Soldier System Weapon Systems, Mr. Jason Panak
- The Marine Expeditionary Rifle Squad Initiative, Mr. Dave Hansen, USMC - Quantico
- Future Force Warrior Advanced Technology Demonstration Update, Mr. John H. Edwards, FFW Technical Program Office, US Army - ARDEC

Session V: International Armaments Cooperation & Foreign Comparative Testing
Part I: International Armaments Cooperation
Chairman: COL Michael G. Padgett, USA, International Technology Center

- US/German Science and Technology Cooperation, Mr. Holger Mundt, German Head LNO to US
- NATO Allied Ordnance Publication (AOP-6), Mr. Victor Charles, US Army - ARDEC

Part II: Foreign Comparative Testing Programs
Chairman: Mr. Al Trawinski, Army FCT/DAC Program Manager

- Army Comparative Testing Programs: Foreign Comparative Testing (FCT) & Defense Acquisition Challenge (DAC), Mr. Al Trawinski, Army FCT/DAC Program Manager
- Mortar Propulsion FCT Programs Swiss 120mm Mortar Propelling Charge Austrian Celluloid Mortar Increment Containers, Mr. Wayne Miller, US Army - ARDEC
- 40MM Tactical IR Marker, Mrs. Kelly Shuttleworth, Naval Surface Warfare Center
- 40mm Day/Night Training Cartridge, Mr. Percy Mistry, US Army - ARDEC
- FCT and SOCOM Shoulder Fired Weapons, Mr. Keith Martin, US Army - ARDEC

Session VI: Non-Lethal Systems
Chairman: Mr. Kevin Wong, PM CCS

- Individual Serviceman Non-Lethal System, Mr. Jeremy D. McLain, US Army - ARDEC
- Military Application of Electro-Stun Devices, Mr. Azamat Villar, US Army - ARDEC
- US Army's Search for an Economical Device for Stun Hand Grenade Training, Mr. Fred Fitzsimmons, Camber Corporation

Thursday, 24 May 2005
Session VII: Fire Control, Sensors and Other Ancillary Devices
Chairman: Mr. Charles Buxton, NSWC, Crane

- Small Arms Fire Control Systems for the Individual Soldier, Mr. Pete Plocki, XM29 Technical Director, L-3 Communications, Brashear Division
- Sensor Fusion Technology Assessment, Mr. John Edwards, JSSAP Office, US Army - ARDEC
- Weapon Shot Counter Program for Small Arms Maintenance, Mr. Darin Ashley, NSWC, Crane

- Miniature Day/Night Sight (MDNS) Development, Mr. Barry Gatewood, NSWC Crane
- SOPMOD Program Overview, Mr. Gus Taylor, SOPMOD Program Manager, NSWC, Crane

***Session VIII**:* Weapons and Ammunition
Chairman: Mr. James Zoll, US Army - ARDEC

- Product Improvement 40mm Ammunition, Mr. Art Pizza, Chief, 40mm Ammunition Engineering, and Ms. Melissa Wanner, 40mm Low Velocity, US Army - ARDEC
- MK93 Smoke Deterrence System, Ms. Dawn Hoffa, NSWC, Crane
- The Oto Melara HITROLE® 7,62 – 12,7 – 40 mm Remote Overhead, Light Electrical Turret, Dr. Alessandro Pollastrini, OTO MELARA S.p.A
- Lightweight Remotely Operated Weapon Systems, Mr. Anthony J. Sebasto, US Army - ARDEC

***Session IX**:* Individual Weapons
Chairman: Mr. George Kontis, PE., Heckler & Koch, Inc.

- S.C.A.R - SOF Combat Assault Rifle, Mr. Troy Smith, NSWC, Crane
- MPRS - Multi-Purpose Rifle System, Mr. Alon Guttel, Deputy Vice President R&D, Israel Military Industries, Ltd.
- The Modular Combat Shotgun, Mr. Ed Schoppman, Remington Military Products Division, Remington Arms Company, Inc.
- 40mm Air Bursting Munition System (ABMS) and Light Weight Automatic Grenade Launcher (LWAGL), Mr. Fong Kok Chung and Aw Cheng Hok, Singapore Technologies Kinetics

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

STRENGTH THROUGH INDUSTRY & TECHNOLOGY

On-Site Agenda

International Infantry & Joint Services Small Arms Systems Annual Symposium, Exhibition and Firing Demonstration

"Meeting the Needs of Our Joint Ground Forces in the Fight Against Terrorism and Developing the Tools for Future Combat"

Atlantic City Convention Center
Atlantic City, NJ
Event # 5610
May 16-19, 2005

CONFERENCE AGENDA

Monday, May 16, 2005

5 - 7 PM — Registration

6 - 7:30 PM — Opening Reception in Exhibit Hall (Hall A)

Tuesday, May 17, 2005

7 AM — Registration & Continental Breakfast

7:45 AM — Welcome and Administrative Remarks
Mr. Sam Campagna, Director, Operations, NDIA
Mr. Brian Berger, Chairman, Small Arms Section, Vice-President, SNC Technologies Corporation
National Anthem

8 AM — Welcome Address
BG Paul Izzo, USA, PEO Ammunition *(Invited)*

8:30 AM — Keynote Address
BGen William Cato, USMC, Commanding General, Marine Corps Systems Command

8:50 AM — Topical Address
COL Mark Rider, USA, PMMAS

9:15 AM — Lessons Learned - Industries' Response & Acquisitions' Real Needs
Moderator:
Mr. Dave Broden, Broden Resource Solutions & Alliant Techsystems
Panelists:
Mr. Kevin Brown, Colt Defense
Mr. Peter Simon, Heckler & Koch,USA
Mr. Jean-Louis Vanderstraaten, FN Manufacturing, Inc.
Ms. Karen Davies, ATK, Ammunition Systems, Lake City
Mr. Michael Hockenberger, PGM Corporation

10 AM — Break in Exhibit Hall

10:30 AM — Joint Service Small Arms Synchronization Team (JSSAST) - Panel
Moderator:
COL Scott Crizer, USA, Chairman, JSSAST
Panelists:
COL Chuck Durr, USA, US Army Representative
COL Mike Smith, USA, PM Soldier Weapons
CAPT Rowland Huss, USN, US SOCOM Representative
LtCol Rick Adams, USMC, US Marine Corps Representative
Lt Col Doug Miller, USAF, US Air Force Representative
CDR Rick Button, USCG, US Coast Guard Representative
Mr. Jerry Gaskill, US Navy Representative
Mr. Kevin Swenson, Joint Non-Lethal Weapons Directorate

12 Noon — Awards Luncheon
Chinn Award Presentation
Mr. Richard Audette, Chinn Award Recipient, 2005
Presented by Mr. Joel Goldman
Hathcock Award Presentation
Mr. Christopher P. Mitternight, Hathcock Award Recipient, 2005
Presented by Mr. Charles Buxton

1:30 - 5 PM — Concurrent Sessions

CONFERENCE AGENDA

Tuesday, May 17, 2005 (Continued)

SMALL ARMS & INTERNATIONAL INFANTRY DUAL CONCURRENT SESSIONS

	Session I: Ammunition ***Session Chairman:*** *Mr. Dennis Conway, US Army - ARDEC, Picatinny*	*Session II: Mortars* ***Session Chairman:*** *MAJ Paul Shuler, USA, PM Mortar Weapons & Fire Control*
1:30 PM	Terminal Effects of New Small Arms Ammunition *Mr. John MacDougall, SNC Technologies Inc., SIMUNITION*	Mortars Overview *MAJ Paul Shuler, USA, PM Mortar Weapons & Fire Control*
1:50 PM	One Solution for Lightweight Cartridge Cases for Small Arms Ammunition *Dr. Robert Gagne, Mississippi Polymer Technologies, Inc.*	Applying Six Sigma Principles to Implementation of the PGMM Training Concept *Dr. Tony Pezzano, PM Mortar Systems*
2:10 PM	Program Manager-Maneuver Ammunition Systems (PA-MAS) Small Caliber Ammunition Program Support at US Army Research Laboratory *Dr. James F. Newill, US Army Research Laboratory*	Mortar Ballistic Computer and Lightweight Hand Held Mortar Ballistic Computer - Key Elements in Linking Mortars to the Joint Fires Network *Mr. Tom Bradley, PM Mortar Systems*
2:30 PM	Cost-Reducing Material for 40mm Practice Cartridges *Mr. James Grassi, US Army - ARDEC, Picatinny*	Lightweight Dismounted Mortar Weapon STO *Mr. Jose Santiago, US Army - ARDEC*
2:50 PM	Qualification and Fielding of 12 Gauge and 40mm Airburst Warning Munitions for Joint Military Services *Mr. Dennis W. Stanton, NSWC, Crane*	Lightweight Composite Monopack for 120mm Mortar Ammunition *Mr. Yuen H. Lam, US Army - ARDEC*
3:10 PM	*BREAK IN EXHIBIT HALL*	
3:50 PM	Providing Intelligence Assests Below the Battalion Level *Mr. Larry D. Cozine, Martin Electronics, Inc.*	120mm Mortar Weapons System Accuracy Analysis, a Six Sigma Black Belt Project *Mr. Efthimios Papayianis, US Army - ARDEC*
4:10 PM	Lethality 101 *Mr. Shawn Spickert-Fulton, US Army - ARDEC*	Mortar Weapon Systems Sustainment Improvement Programs *Mr. S. Mozesen, US Army - ARDEC*
4:30 PM	New Developments in Non-Toxic/Lead Free and IR/Dim Tracer Ammunition *Mr. Thomas Mauritzon and Mr. Mart Pella, Nammo Small Caliber Division*	Enhanced Live Fire Mortar Training Using the 60mm M769 Full Range *Mr. Jason Surmanek, US Army - ARDEC*
4:50 PM	Lightweight High Performance Gun Barrels *Mr. Kris Christou, MER Corporation*	
5:10 PM	*RECEPTION IN EXHIBIT HALL*	

CONFERENCE AGENDA

Wednesday, May 18, 2005

7 AM	Registration and Continental Breakfast
7:50 AM	Administrative Remarks
8 AM	Theme Address *Mr. George Solhan,* SES, Office of Naval Research
8:30 AM	Soldier Lethality and Wound Ballistics from a Swedish Perspective *Mr. Per Arvidsson*, FMV, Sweden
9 AM	Soldier Weapons - Panel *COL Michael Smith, USA,* PM Soldier Weapons
10 AM	Break in Exhibit Hall
10:30 AM	The National Center for Small Arms and CSAP - Panel Panelists: Mr. Jean-Louis Vanderstraaton, FN Manufacturing, Inc. Mr. Darrold Griffin, Engineering & Management Executives Mr. Frank Puzycki, US Army - ARDEC
11:45 AM	NDIA Armament Division Status Overview Mr. Dave Broden, Chairman, Armaments Division, NDIA
12 - 1:30 PM	NDIA Award Luncheon Professional Services Award Recipients: LTC Matthew Clarke, USA LTC Rob Carpenter, USA COL Michael Smith, USA, PEO Soldier Mr. Salvatore Fanelli, Heckler & Kock, Inc. Mr. Marvin Maule, Aberdeen Test Center Mr. Jim Schatz, Heckler & Kock, Inc. Presented by: Mr. Brian Berger, SNC Technologies ***Hon Les Brownlee, Gold Medal Award Recipient*** *Presented by: Lt Gen Lawrence P. Farrell, USAF (Ret),* *President & CEO, NDIA* Luncheon Address: "A Bold Initiative: Colonel Miles and The Lee Magazine Rifle in 1879" Dr. Stephen C. Small, JSSAP
1:30 - 6 PM	Concurrent Sessions

CONFERENCE AGENDA

Wednesday, May 18, 2005 (Continued)

SMALL ARMS & INTERNATIONAL INFANTRY DUAL CONCURRENT SESSIONS

	Small Arms Session	International Infantry Session
	Session III: Joint Service Small Arms Program (JSSAP) Update	*Session V: International Armaments Cooperation & Foreign Comparative Testing*
	Session Chairman: *Mr. Joel M. Goldman, Chief, JSSAP Office, US Army - ARDEC, Picatinny*	***Part I: International Armaments Cooperation Session Chairman*** *COL Michael G. Padgett, USA, International Technology Center*
1:30 PM	Application of the Joint Capabilities Integration and Development System *Ms. Liliana M. McShea, US Army - ARDEC, Picatinny*	Army's Initiatives to promote International Armaments Cooperation *COL Michael G. Padgett, USA, International Technology Center*
1:50 PM	MOUT and Non-Lethal Weapons in NATO *Mr. Robert M. Pizzola, US Army - ARDEC, Picatinny*	US/German Science and Technology Cooperation *Mr. Holger Mundt, German Head LNO to US*
2:10 PM	Component Technology Investigations for Light Machine Gun Applications *Mr. Lucian M. Sadowski, US Army - ARDEC*	The Challenges of Urban Warfare *COL Yoav Zacks, R&D Attaché, Embassy of Israel*
2:30 PM	Lightweight Weapons and Ammunition - the "Clean Slate" Update *Ms. Kori Spiegel, US Army - ARDEC, JSSAP*	NATO Allied Ordnance Publication (AOP-6) *Mr. Victor Charles, US Army - Picatinny*
2:50 PM	Caseless Ammunition & Advances in the Characterization of High Ignition Temperature Propellent (HITP) for Small Arms Caseless Ammunition *Ms. Patricia O'Reilly, US Army - ARDEC*	***Part II: Foreign Comparative Testing Programs Session Chairman*** *Mr. Al Trawinski, Army FCT/DAC Program Manager* Swiss Nitrochemie Mortar Propellant and Extruded-impregnated Mortar Ignition Cartridge, and Austrian KAGO Celluloid Mortar Increment Container *Mr. Wayne Miller, US Army - ARDEC*
3:10 PM	*BREAK IN EXHIBIT HALL*	
3:40 PM	XM109 Anti-Material Payload Rifle *Mr. Neil E. Lee, US Army - ARDEC*	40 mm Tactical Marker *Ms. Kelly Shuttleworth*
4:00 PM	Development of the KRISS .45 Caliber Machine Pistol: A Novel Approach *Mr. Andrew E. Finn, Gamma/Transformational Defense Industries*	40mm Low Velocity Day/Night Training Cartridges *Mr. Percy Mistry, US Army - ARDEC*
	Session IV: Soldier System Interoperability	
	Session Chairman: *Mr. Vernon E. Shisler, US Army - ARDEC, Picatinny*	
4:20 PM	Soldier System in NATO *Mr. Vernon E. Shisler, US Army - ARDEC, Picatinny*	FCT & SOCOM Shoulder Fired Weapons *Mr. Keith Martin, US Army - ARDEC, Picatinny*
4:40 PM	Integration and Interoperability Issues for Dismounted Soldier System NATO Research Development and Technology Agency SCI-P130 Exploratory Team Members *Mr. Jason Panak*	*Session VI: Non-Lethal Systems* ***Session Chairman:*** *Mr. Kevin Wong, PM CCS* Mk19 Short Range Non-Lethal Munition Development *Mr. Gregory M. Bubniak, US Army - ARDEC*
5:00 PM	Marine Expeditionary Rifle Squad *Mr. Dave Hansen, USMC - Quantico*	Individual Serviceman Non-Lethal System *Mr. Jeremy D. McLain, US Army - ARDEC*
5:20 PM	Future Force Warrior Lethality Update *Mr. John Edwards, US Army - ARDEC*	Military Application of Electro-Stun Devices *Mr. Azamat Villar, US Army - ARDEC*
5:40 PM		Army's Search for an Economical Device for Stun Grenade Training *Mr. Fred Fitzsimmons, Camber Corporation*
6:00 PM	*ADJOURN FOR THE DAY*	

CONFERENCE AGENDA

Thursday, May 19, 2005

7 AM — Registration and Continental Breakfast

7:30 AM — Administrative Remarks

7:40 AM - 11:10 AM — Concurrent Sessions

SMALL ARMS & INTERNATIONAL INFANTRY DUAL CONCURRENT SESSIONS

	Session VII: *Fire Control, Sensors and Other Ancillary Devices*	*Session VIII:* *Weapons and Ammunition*
	Session Chairman: *Mr. Charles Buxton, NSWC, Crane*	***Session Chairman:*** *Mr. James Zoll, US Army - ARDEC, Picatinny*
7:40 AM	Fire Control for Individual and Crew Served Weapons *Mr. Robert J. Coleman, Jr., L-3 Communications, Brashear Div.*	Remote Operated Small Arms Mount *Mr. Nigel Wasil, NSWC, Crane*
8:00 AM	Sensor Fusion for Small Arms Assessment *Mr. John Edwards, US Army - ARDEC, Picatinny*	40mm Family of Ammunition Improvement Programs *Mr. Art Pizza, US Army - ARDEC*
8:20 AM	Weapon Shot Counter *Mr. Darin Ashley, NSWC, Crane*	MK93 Integrated 66mm Smoke Obscurant System *Mrs. Dawn M. Hoffa, NSWC, Crane*
8:40 AM	Miniature Day/Night Sight Development *Ms. Barry Gatewood, NSWC*	The Oto Melara HITROLE 7,62-12,7 mm Remote Overhead, Light Electrical Turret *Dr. Alessandro Pollastrini, OTO MELARA S.p.A.*
9:00 AM	SOPMOD Program Overview *Mr. Gus Taylor, NSWC, Crane*	SWORDS: Lightweight Remote Weapon Systems *Mr. Anthony Sebasto, US Army - ARDEC*

9:20 AM — *BREAK*

Session IX: Individual Weapons
Session Chairman: *Mr. George Kontis, P.E., Heckler & Koch, Inc.*

9:30 AM — SOF Combat Assault Rifle
Mr. Troy L. Smith, NSWC, Crane

9:50 AM — MPRS - Multi-Purpose Rifle System: A Powerful Force Multiplier in Urban Warfare
Mr. Alon Guttel, Israel Military Industries, Ltd.

10:10 AM — The Modular Combat Shotgun
Mr. Ed Schoppman, Remington Arms Company, Inc.

10:30 AM — Beretta's PX4
Mr. Phil Degaris, Beretta USA

10:50 AM — 40mm Air Bursting Munition System (ABMS) and Super Lightweight Automatic Grenade Launcher (SLWAGL)
Mr. Aw Cheng Hok, Singapore Technologies Kinetics

11:10 AM — Closing Remarks and Adjournment
Board Buses for Travel to Ft. Dix for Lunch and Firing Demonstration

1:30 PM — Boxed Lunch - Range 59C, Ft. Dix

1:30 PM — *Session X: US Air Force and Contractor Firing Demonstration*
Session Chairman: *Mr. Salvatore Fanelli, Heckler & Kock, Inc.*

3:30 PM — Buses return to Convention Center

NOTES

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION
STRENGTH THROUGH INDUSTRY & TECHNOLOGY
2111 Wilson Boulevard
Suite 400
Arlington, VA 22201-3061
www.ndia.org

Weapon Shot Counter Program for Small Arms Maintenance

Data to Enhance Freedom

Weapon Shot Counter

- Records Shots and Firing Rates for Small Arms
- Requires No Operator Input
- Battery Life of Five Years
- Holds up to 30,000 Rounds
- User: U.S. Special Operating Forces (USASOC/WARCOM/AFSOC)

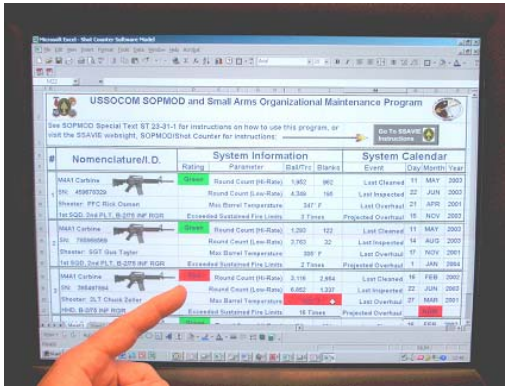
Weapon Shot Counter Purpose

- Logistics Applications Only
- Armorers Able to Monitor Weapon Usage
- Enables Preventative Maintenance Program
- Minimizes Catastrophic Parts Failures and Malfunctions in Combat
- More Cost-Effective…Reliability, & Maintenance
- Improves Operator Success in Combat

Summary of WSC System

Shot Counter

Data Collection Device (DCD)



Email from PC

Maintenance Database on Centralized Server

Acquisition Top Map

NAVSEA CRANE Surface Warfare Center Division

Existing Systems | Emerging Systems | Objective Systems

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

WEAPON SHOT COUNTERS

Requirement approved 16 Dec 2004

SOST Prototypes

WSC - Carbine

WSC - Machineguns

WSC - SCAR

Devices

Program Phases

NAVSEA
CRANE
Surface Warfare Center Division

Phase I

Determine if a Weapon Shot Counter device is technologically feasible, and producible.

Objective completed. Two Vendors delivered successful technology demonstrator prototypes.

Program Phases

NAVSEA
CRANE
Surface Warfare Center Division

Phase II

1. Validate the requirement
2. First Article Production / Testing
3. Develop Basic Reporting / Collecting Process
4. MS-C Package / Production Delivery Order
5. WSC prototypes for MK46, MK48

Program Phases

Phase III

1. Issue to selected field units
2. Further Develop Armorer-Depot Maint Software
3. Refine ammunition usage rates
4. Establish Maintenance Profiles for SOF Weapons
5. Full Rate Production for M4A1, MK46, & MK48

Program Phases

Phase IV

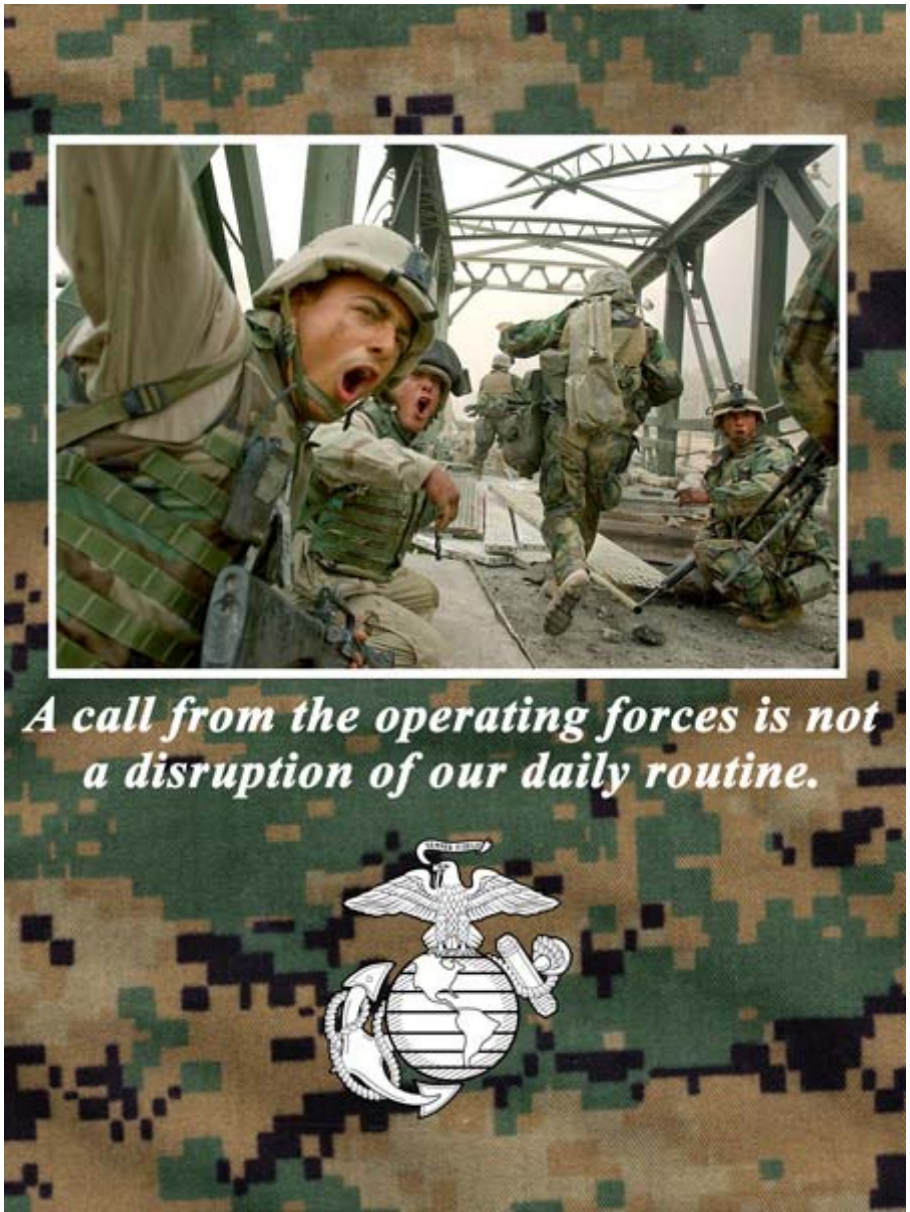
1. Preventative Maintenance Management
2. Sustain the system
3. Adapt the WSC Program to the SOF Combat Assault Rifle

Shot Counter Issues

NAVSEA CRANE Surface Warfare Center Division

Challenges:

- **Minimize Work Load—Transparent to Operator**
- **Simple Process—Computer Compatibility**
- **Trust of the Program—Fail Safes**
- **Participation—Based on Good Practices Not Control**
- **Has to Make the Operator's Job Easier, Not Harder!**



WE'RE AT WAR

ARE YOU DOING ALL YOU CAN?

Sensor Fusion Technology Assessment

Presented
by

John Edwards
JSSAP Office
Armament Systems Integration Center
US Army Armament Research, Development and Engineering Center
Picatinny, NJ 07806

Sensor Fusion Technology Assessment

- Program Sponsor:

  MAJ Tom Young, Office of Naval Research, Expeditionary Warfare Operations Technology Division, Firepower Science & Technology Programs

- Key Principal Scientist:

  Mr. George Ax, Northrop Grumman Mission Systems

- Project Participants:

  Mr. Jack Lillie, US Army Night Vision Electronic Sensors Directorate

  Mr. Joe Costantino, US Army Armament Research, Development and Engineering Center

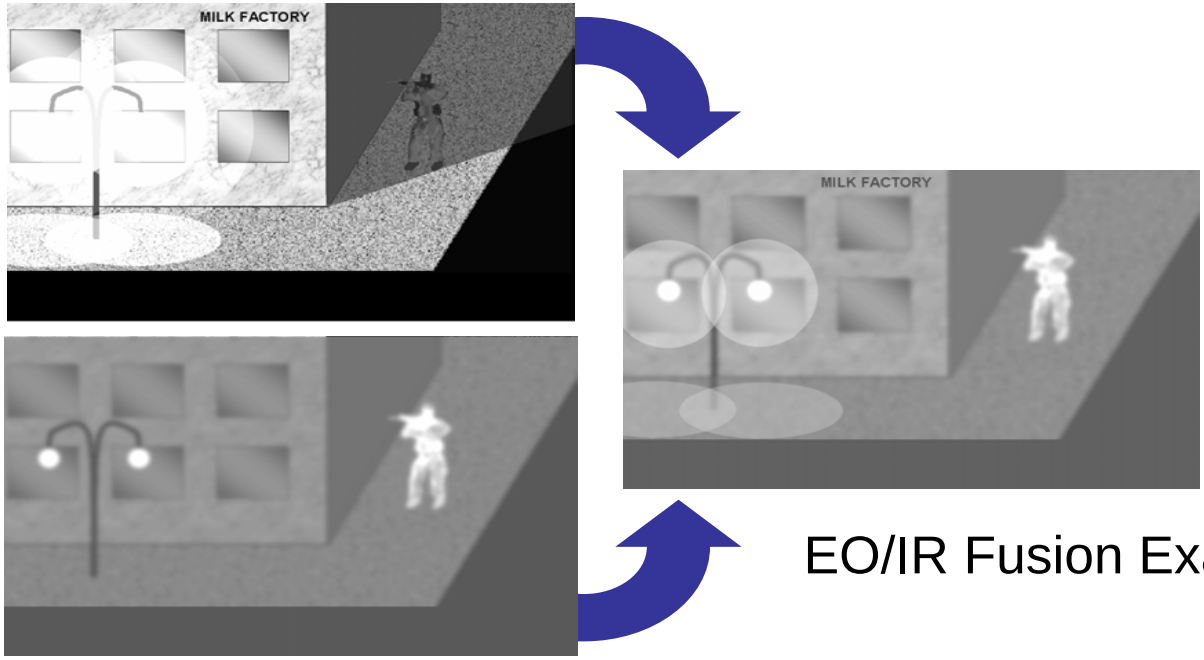
Sensor Fusion Technology Assessment

Objective:

- Assess the state-of-the-art in small arms fire control systems with,
- Maturation projection
- Outline a future road map.

Image Intensification

Thermal Imaging



EO/IR Fusion Example

Project Approach to Sensor Fusion Assessment

The three parts consist of

•Part One – Survey Assessment of Current Systems and Activities,

Completed; Over 125 reports identified. Addition areas of Display and Power Supplies supplement survey.

•Part Two - Technology and Performance Assessment

(includes discussion on Measures of Performance and Environment and Physical limits of Performance and Opportunities)

Complete

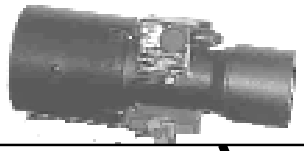
•Part Three – Projection on Full Integration for a full complement of Sensor Fusion Target Acquisition/ Fire Control Systems. (Near, Mid & Far Term)

Wrapping up Final Report

Optical Systems Technology Incorporated

Shared Aperature Fusion Weapon Sight

UNIVERSAL NIGHT SIGHT ™ (UNS)
I^2 CLIP-ON 1X NIGHT SIGHT

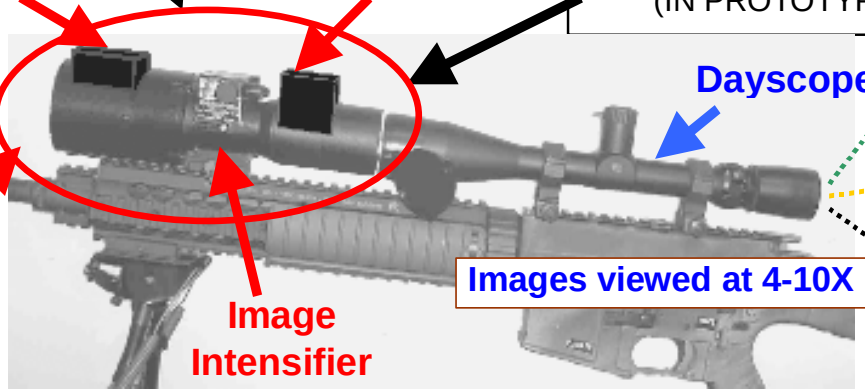


2.0 lbs

(IN PRODUCTION)

DUALBAND IR / I^2 6X TELESCOPE

(IN PROTOTYPE)



CLIP-ON DUALBAND UNIVERSAL NIGHT SIGHT (DUNS)
(UNCOOLED IR + IMAGE INTENSIFIER)

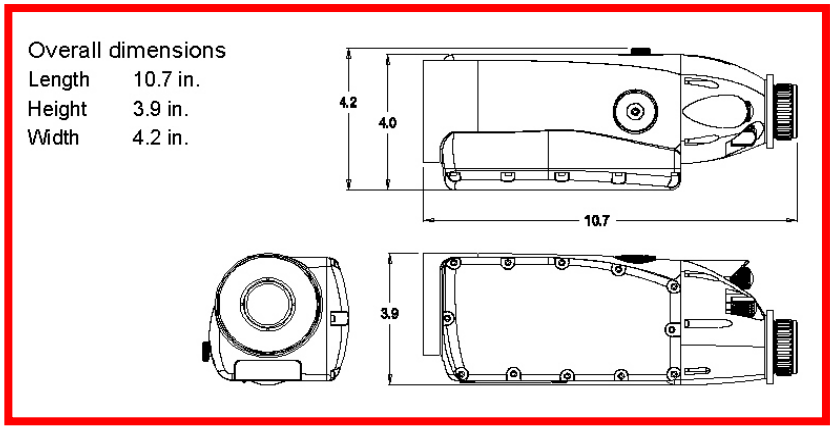
Sample Mature Available Technological Capability – Near Term

Northrop Grumman EOS and NVESD

Fused Multi-Spectral Weapon Sight (FMWS)

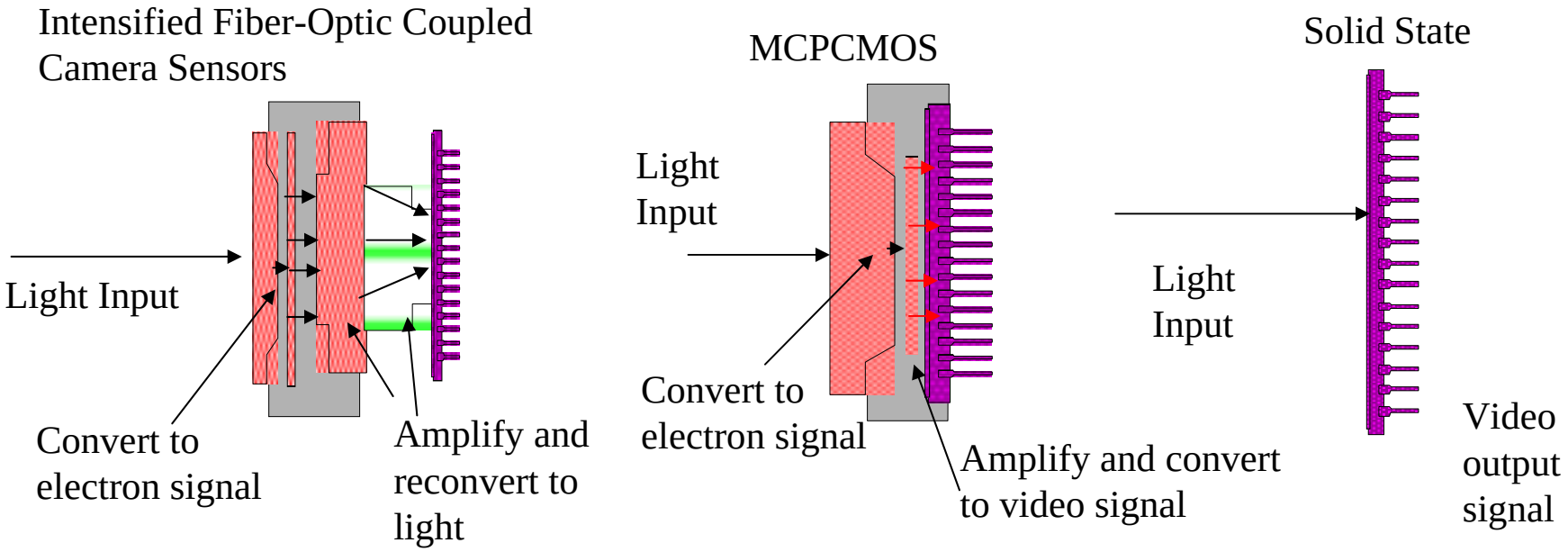
Program Goals

- Dual Band Digital Image Fusion (I^2/IR)
  - HD I2CMOS and U7000 LWIR
  - 2X Digital Zoom
  - Fire Wire Digital Output
- Weight required: < 4 Lbs
- Dimensions: 10.7”x 3.9”x 4.2”
- 12 prototypes fabricated
- Nested optical objectives
- Digital display



Sample Maturing Technological Capability – Mid Term

Candidate Technologies for LLL Imaging (ITT)



- Sensor function is to create an video image based on signal inputs down to overcast starlight environment
  (4e-7 fL sensor illumination)
- Head mounted applications need light weight, compact, high MTF performance, low power, and low cost sensors
- Digital output desired for input into fusion systems

Sample Maturing Technological Capability – Med Far Term

Focal Plane Growth

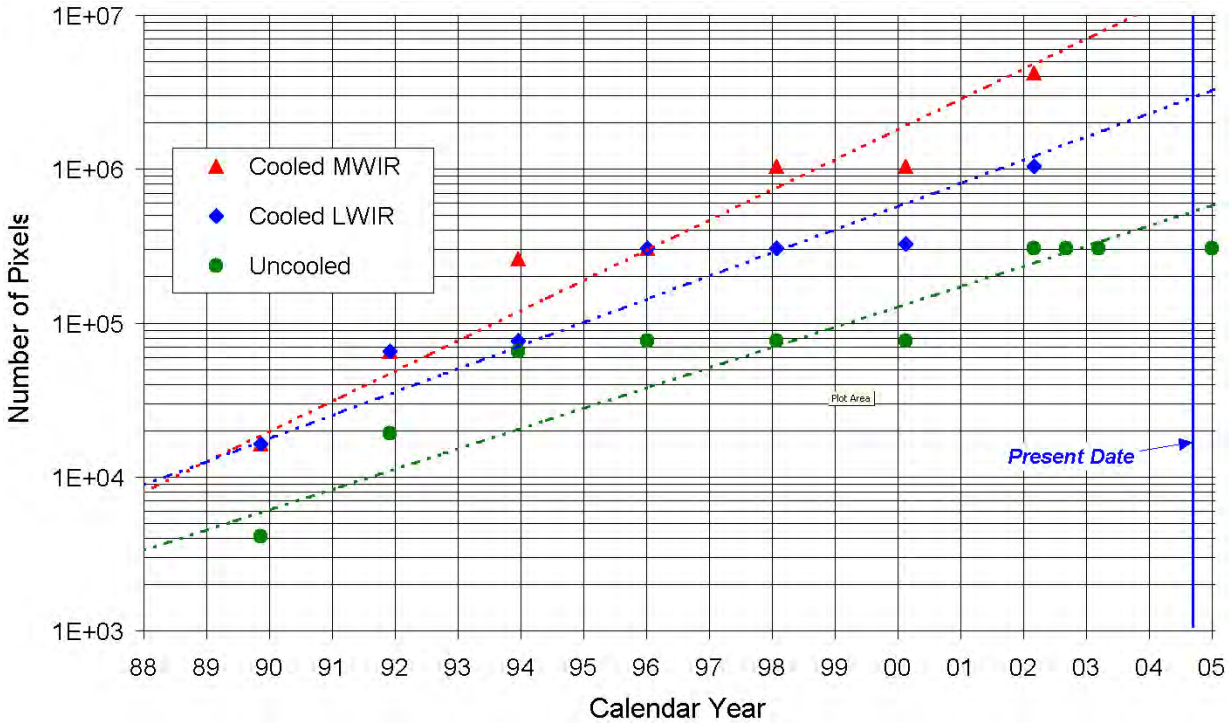


Figure 2-2. Growth in number of pixels (uncooled IR FPAs) over time.

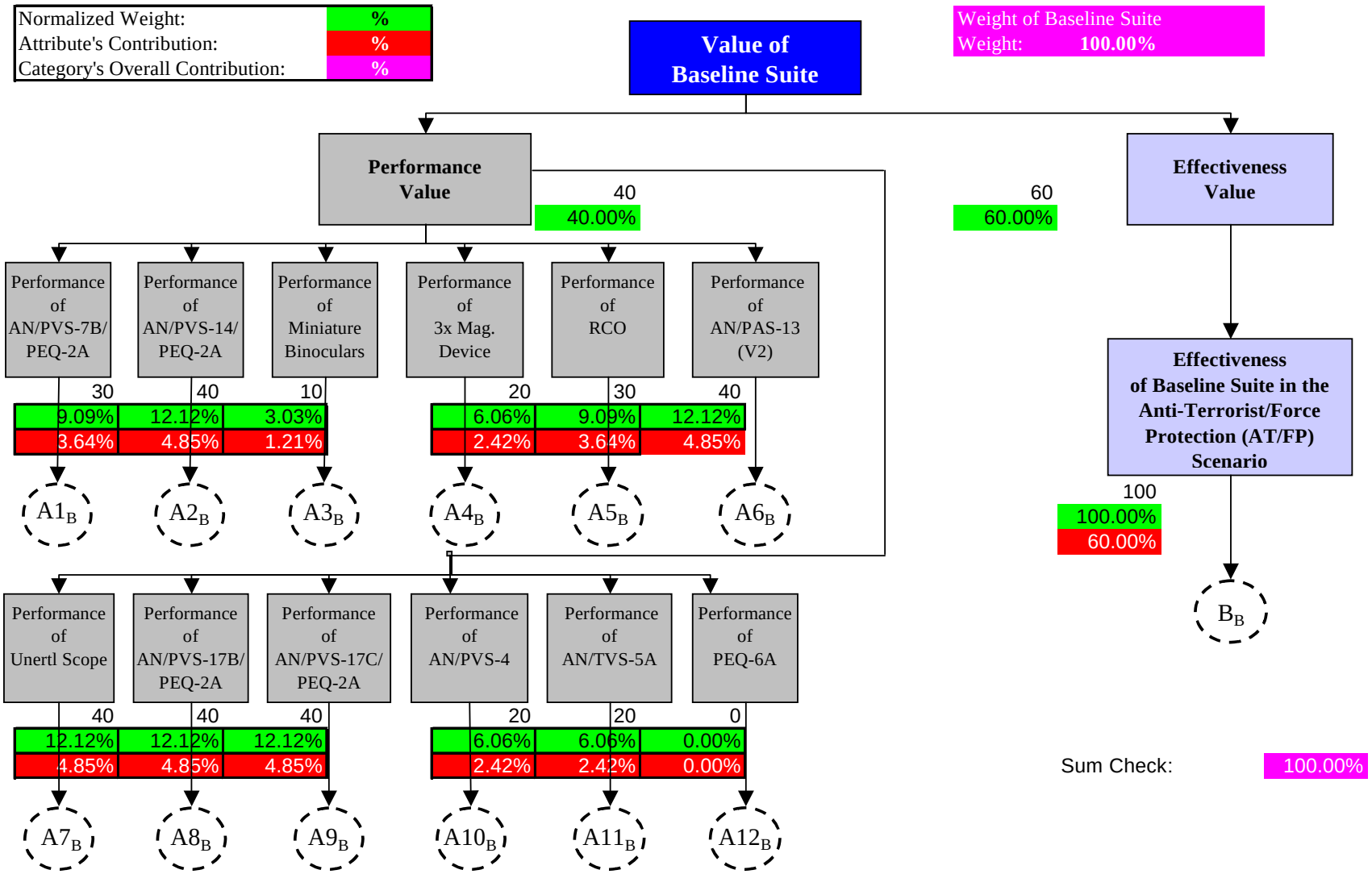
Note: Increase in pixels have a associated cost and power increase

Value Model
(selected Figure of Merit)
Task II

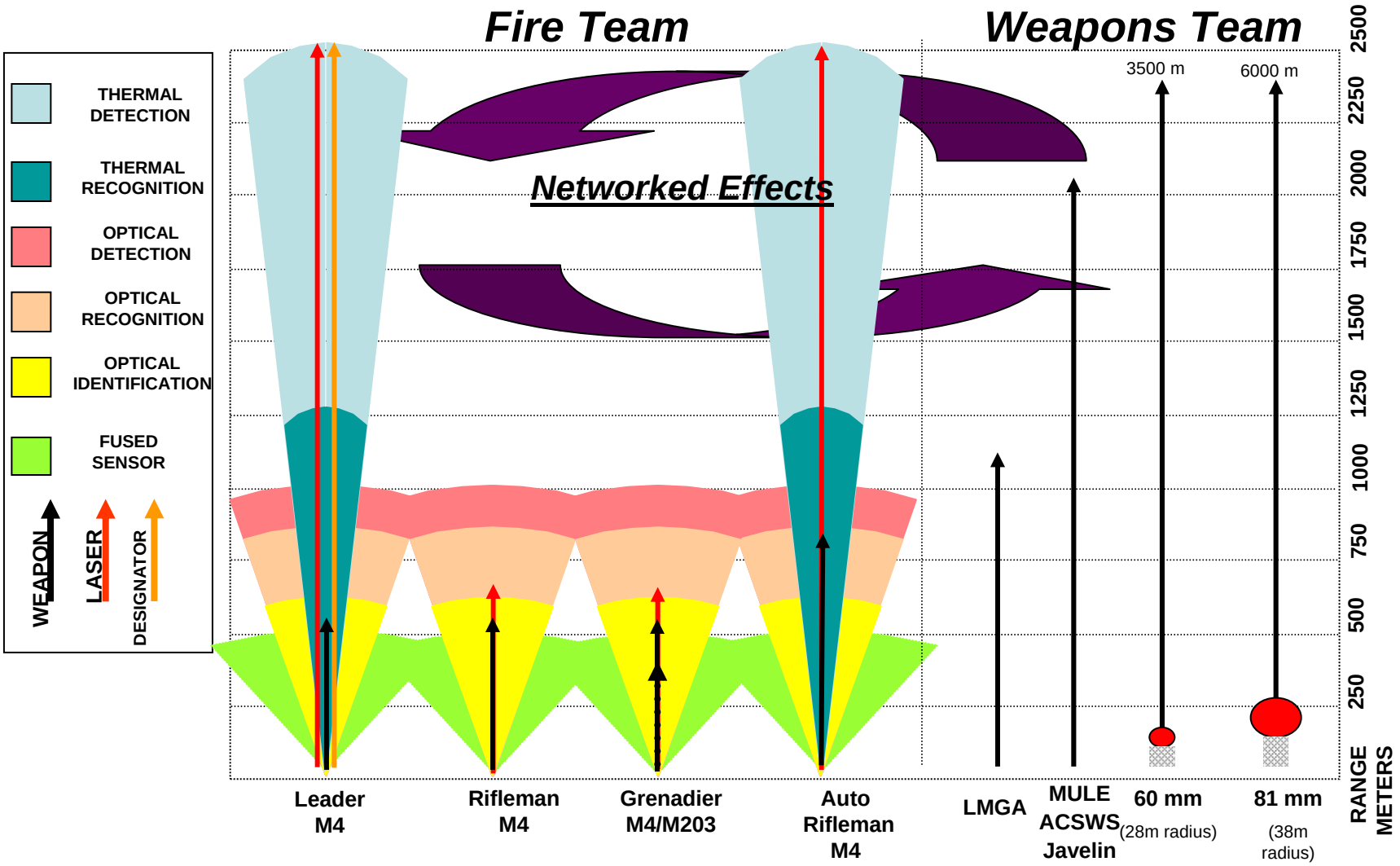
What is a Value Model?

- Based on Multi-Objective Decision Analysis
- A Means To Choose/Decide Among Competing Alternatives by
  - Defining Objectives and Measures Relevant to a Decision
    - Quantitative
    - Qualitative/Subjective
  - Organizing Those Objectives and Measures
    - Hierarchical Value Tree
  - Rating Their Importance
    - Weights Assigned by Operational Subject Matter Experts (SME)
  - Scoring Performance of Competing Alternatives on Each of the Chosen Measures
  - Comparing Overall Desirability on a Consistent, Numerical Scale

Example Value Model
Baseline Suite

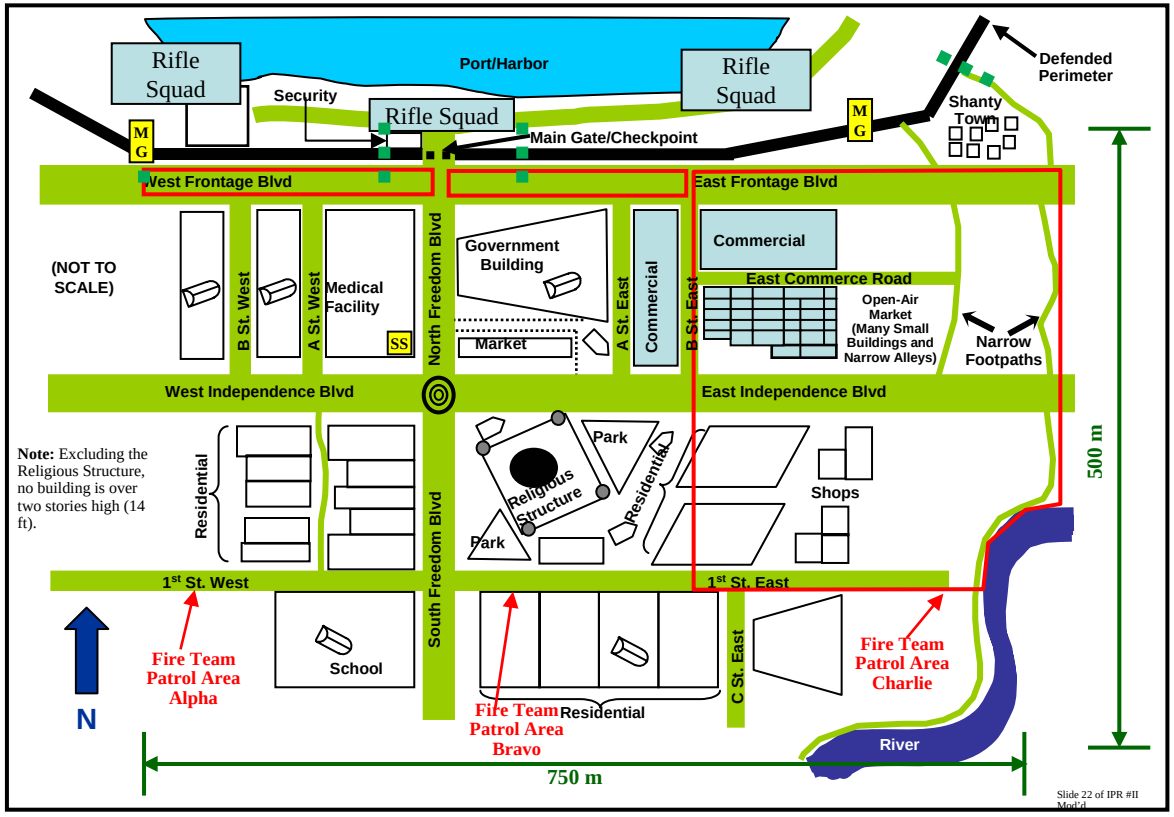


Small Combat Unit Lethality



Use of Pythagoras in an AT/FP Scenario

- USMC Mission: Provide Humanitarian Aid to Local Populace
  - Distribution Point at Pier
  - Persons Processed at Main Gate
- Marine Corps Forces
  - Reinforced Rifle Platoon
    - 2 HMMWVs with M2 HMGs
    - Scout/Sniper Team
    - Roving Rifle Squad
- Indigenous Persons
  - Innocent Civilians (72)
    - Non-Hostile (Seeking Food)
    - Proceeding Toward Port Area
    - If Challenged, Will Stop, Show ID Papers And Proceed Toward Main Gate
  - Terrorists (24)
    - Seek To Cross Defended Perimeter And Disrupt Aid Effort
    - Avoid Main Gate
    - If Challenged, Fled But Not Fight (with Marines in Pursuit)
  - Movement Began at Random Times from Random Locations



- *Model fusion as sequential process (detect > pursue > acquire)*
  - *Use $P_{detection}$ for IR devices*
  - *Use $P_{recognition}$ for LLL devices*

Projection on Full Integration of Target Acquisition Fire Control Small Arms

Task III

- **Utilize the Value Method to define sensitivity of effectiveness that includes multi aspects of consideration (maturity, technology, use, size, weight, power, weapon – sensor linkages, etc.)**
- *Task III technology forecast characterization*

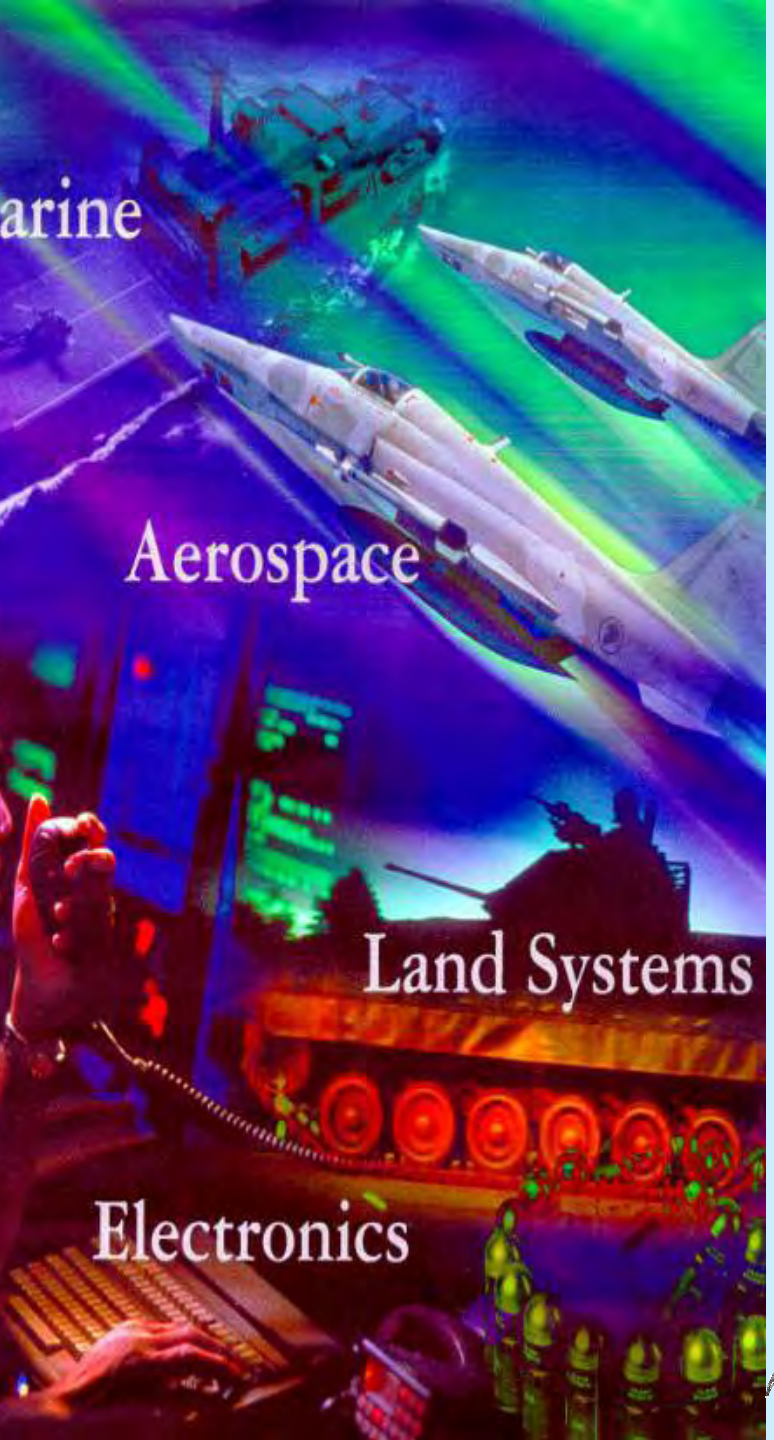
  Not relevant eliminate from consideration

  Monitor: relevant, yet not mature and not ready for investment

  Define Further; opportunities for investment

Conclusions

- **Conclusions**
  - **Assessment nearing completion**
  - **Physical Models are the first step to characterize performance**
  - **Figure of Merit through Value Model aligns with JCIDs**
  - **Couples well with JCIDs for individual weapon**
  - **Logical next step to USMC Optical System Capability Assessment**



Singapore Technologies Engineering

Singapore Technologies Kinetics

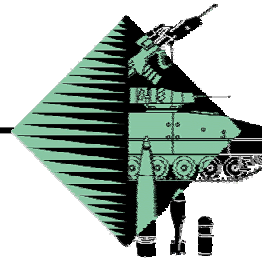
40mm Air Bursting Munition System (ABMS) and Light Weight Automatic Grenade Launch (LWAGL)

Kok Chung, Fong
Cheng Hok, Aw (PM)

19 May 2005

SINGAPORE QUALITY AWARD for business excellence
2002 Winner

Outline



- ABMS ?
- Operation Concept
- LWAGL
- System / Munition Concept
- Fire Control System Concept
- Features
- Possible Applications
- Technical Data
- Live Firing Demonstration

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ABMS ?

The 40mm ABMS is an upgrade of the 40mm AGL with air bursting munition that showers lethal fragments effectively in front, above or from the side of intended targets.

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OPERATION CONCEPT

- **against infantry fighting vehicles**
- **against troops in the open or build-up area**

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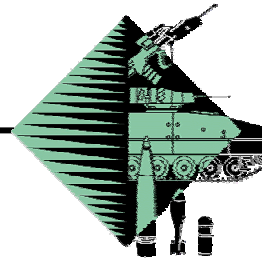
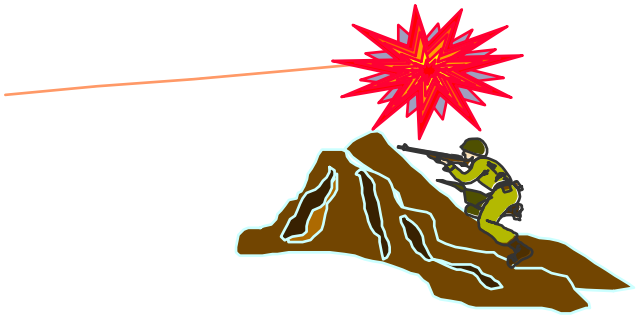
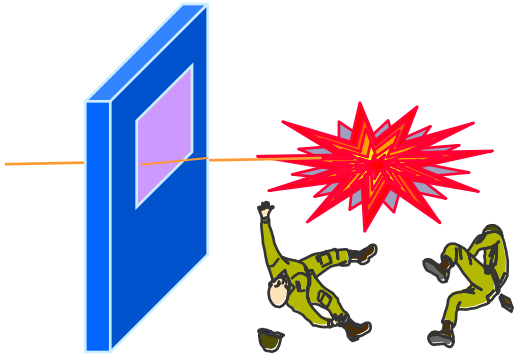
OPERATION - advantages

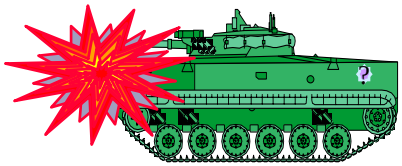


- **More effective**
- **First shot hit**



- **Reduced logistic**
- **Versatile**
  - effective against various types of targets
  - adaptable to various 40AGLs





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OPERATION - weapon versatility

One ABM System for various 40mm AGL with min. modification

FCS

Ammo Programmer

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Man-pack Configuration

3 soldiers with each not carrying more than 25 kg.

Total System Weight = 65 kg

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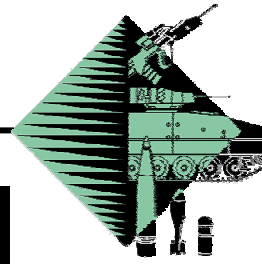

Light Weight Automatic Grenade Launcher Qualification Tests

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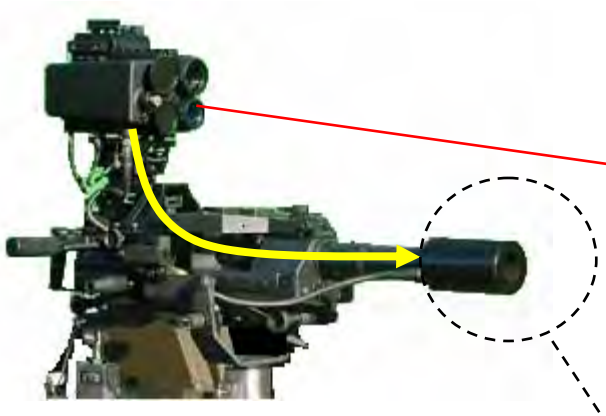
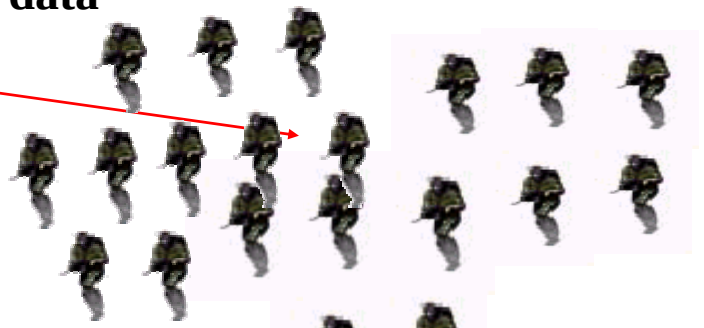
System Concept



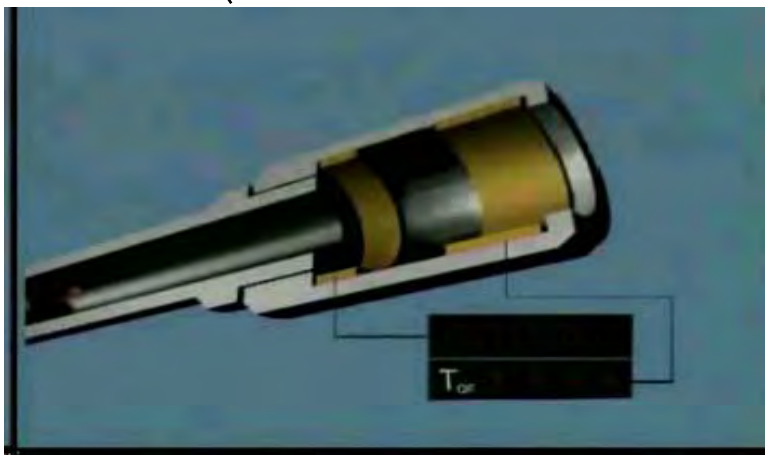
1. Obtain target data

Range



2. FCS computes firing data & transmits to ammunition programmer

3. Programme ABM



4. Fire ABM, HE, HEDP, TP-T and TP

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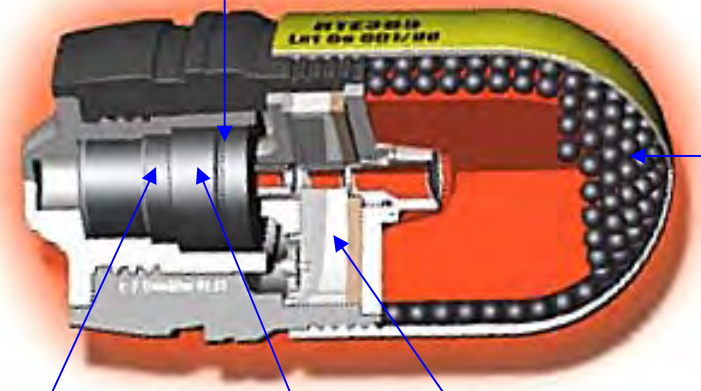
Munition Concept

Receiving Coil for Fuze Programming

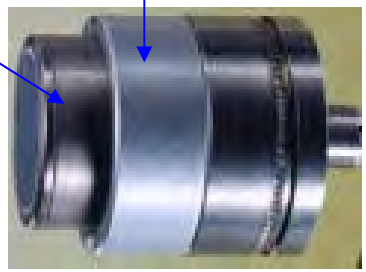


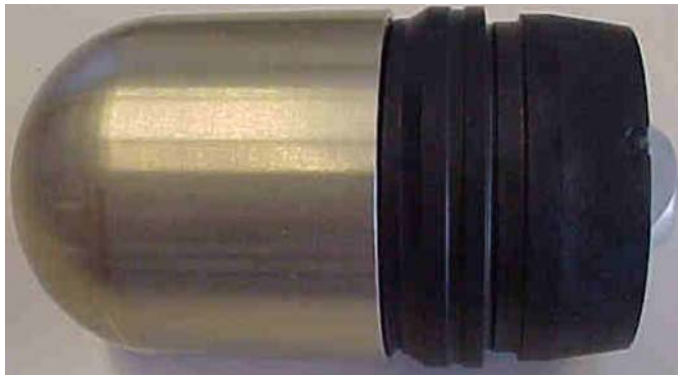
Blast
Fragmentation
Warhead

Safe & Arm

Electronic Timer Module

Power Supply
(Setback
Generator)





ABM Projectile

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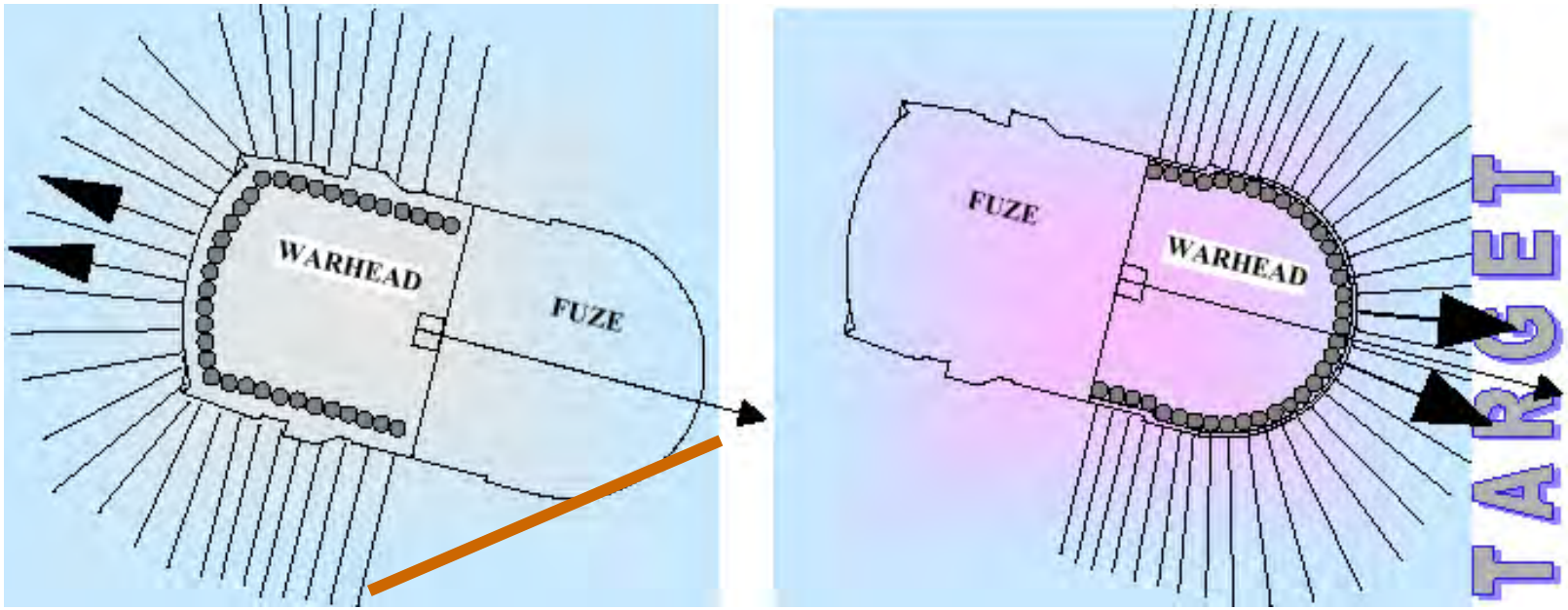
Munition Concept

Warhead



HE (PD Fuze)

ABM

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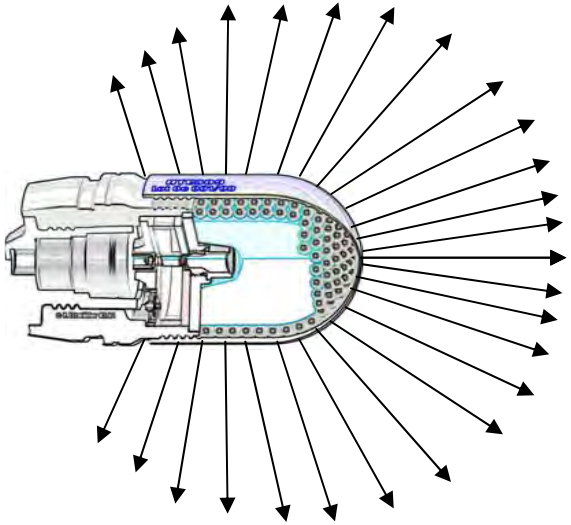
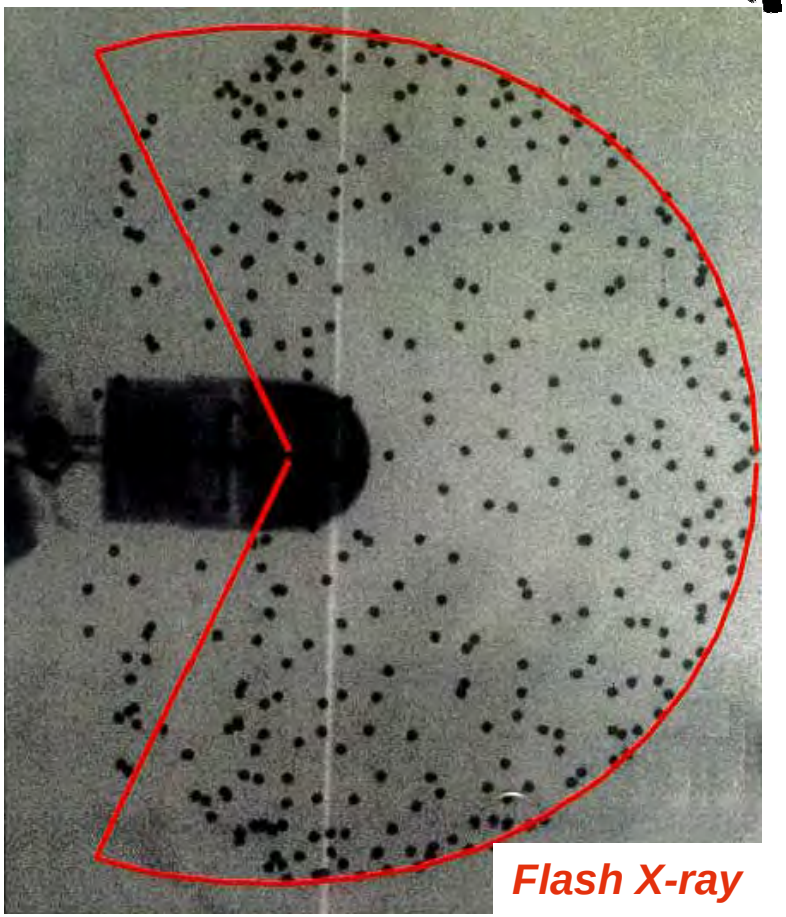
Munition Concept

Warhead



Static Warhead Test



Flash X-ray

Fragment : Tungsten Ball
Nos. of ball : 330
Mass : 0.25g per ball

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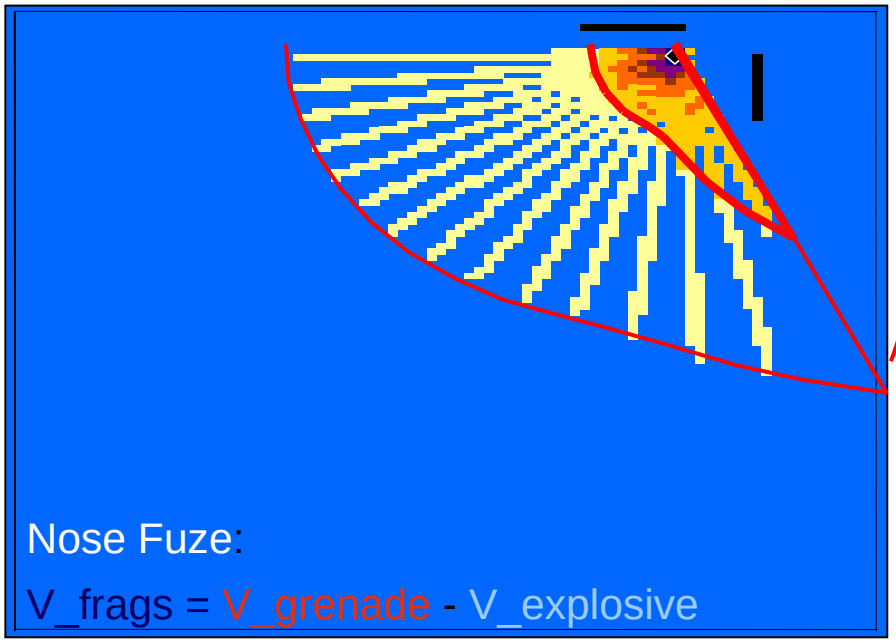
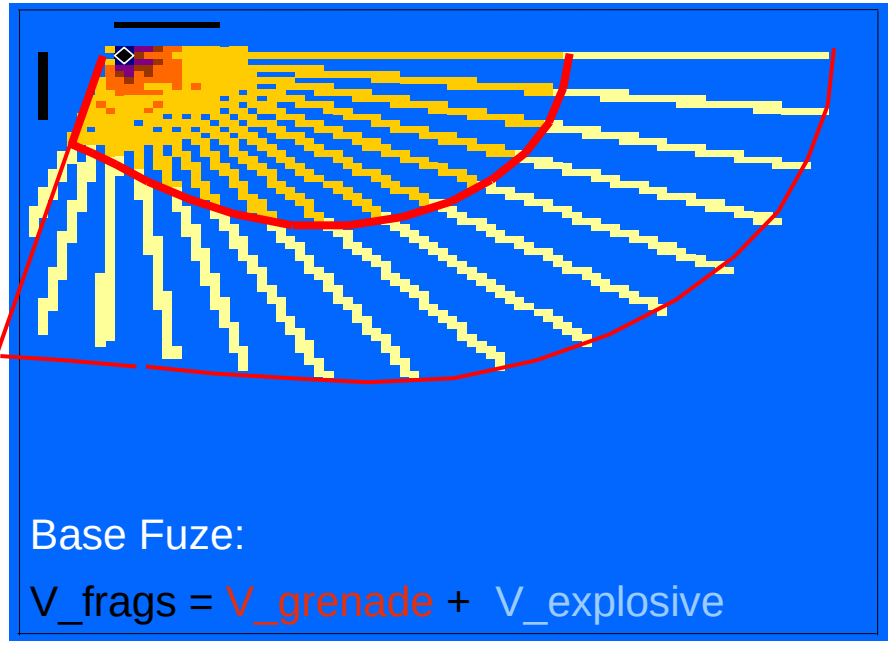
Effectiveness

Analysis : Nose Vs Base Fuze

scale: black bar reference = 5m





V_frags ~750m/s

150m/s

900m/s

V_frags ~ 1050m/s

900m/s

150m/s

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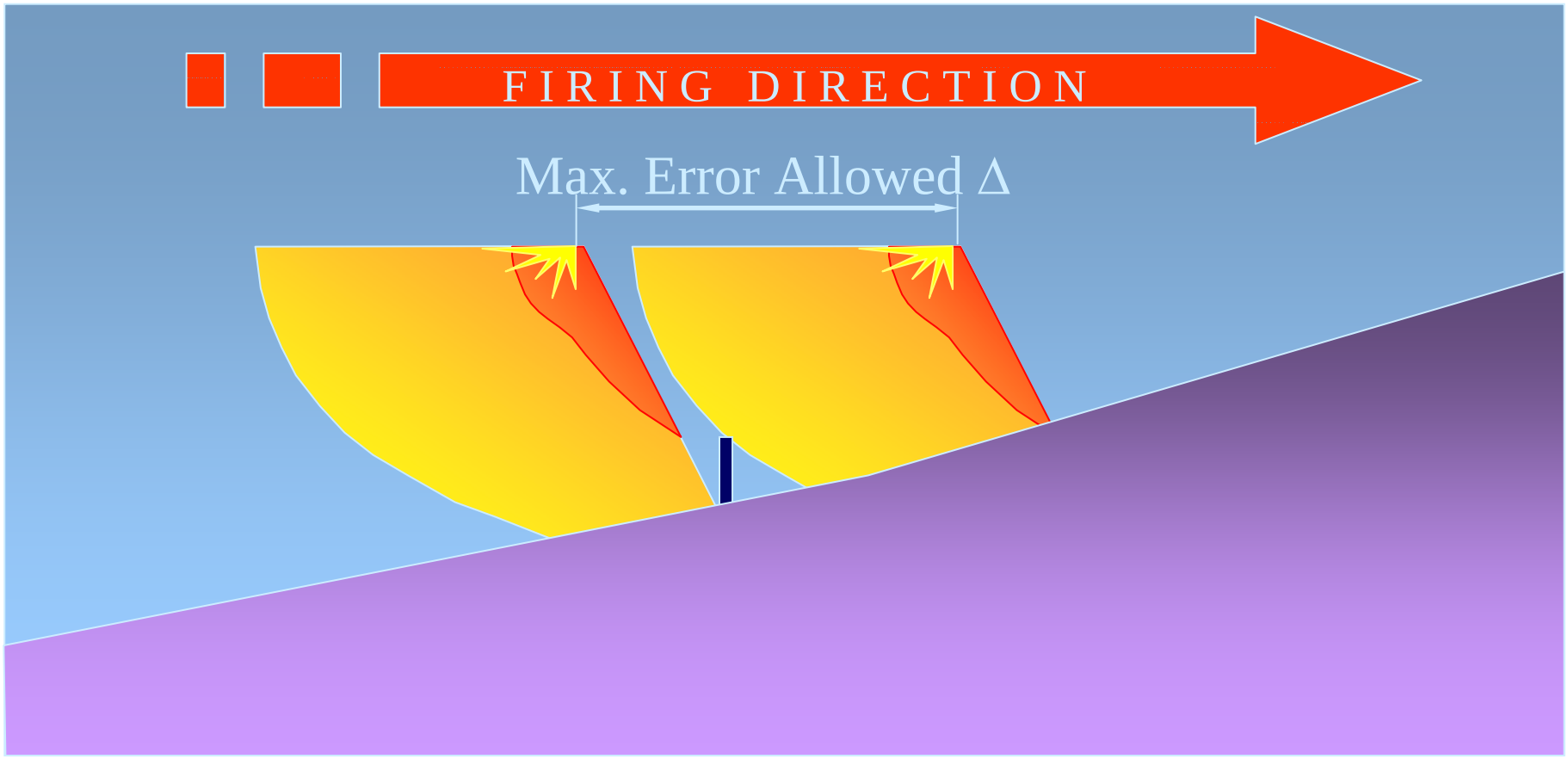
Max. Allowable Error in the Open - Nose Fuze



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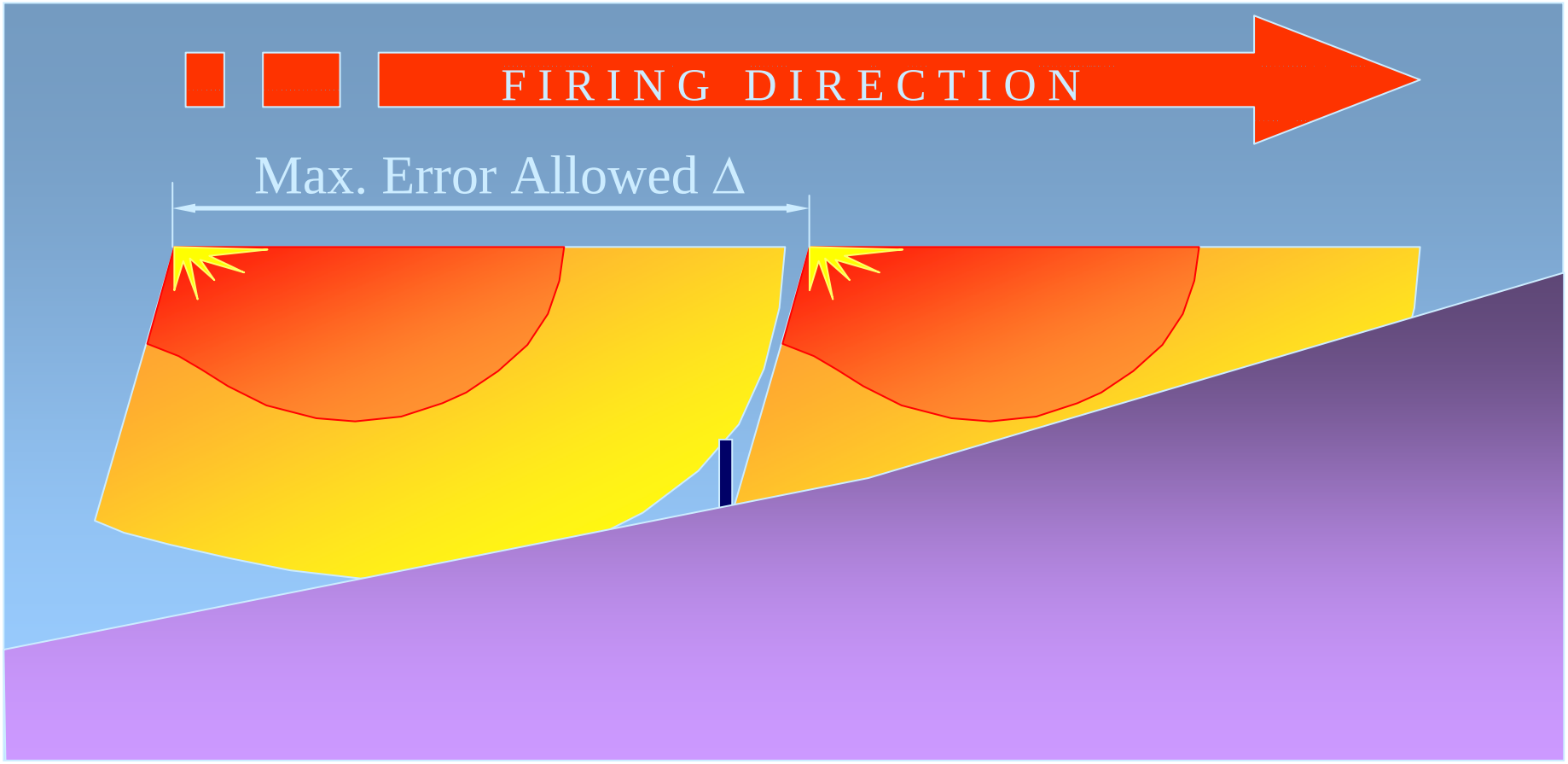
Max. Allowable Error in the Open - Base Fuze



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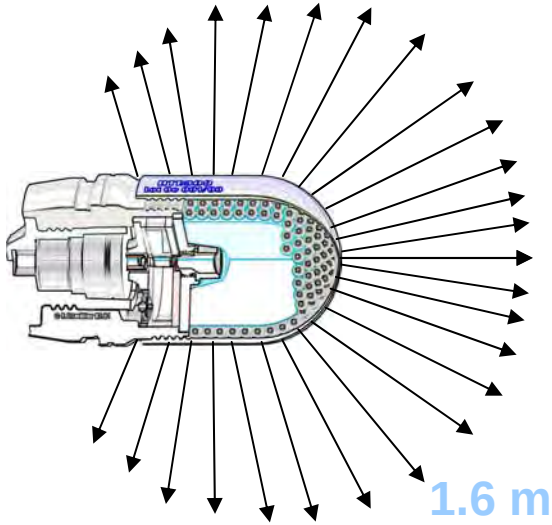
Effectiveness

ABM met the ‘Protected Man criteria of Pk 0.224’



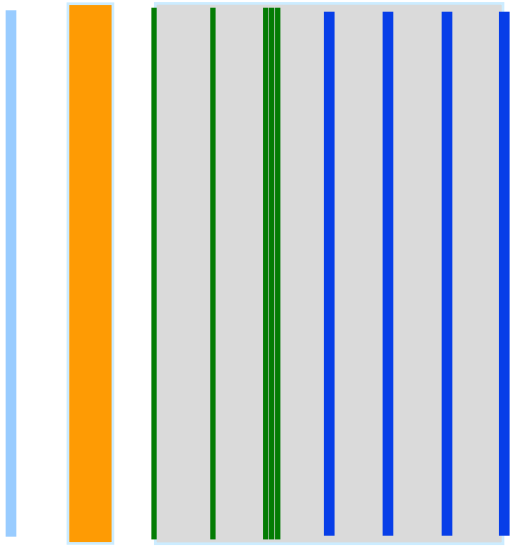


Plate	P_k
1	0.092
2	0.224
3	0.349
4	0.425
5	0.488
6	0.549
7	0.590

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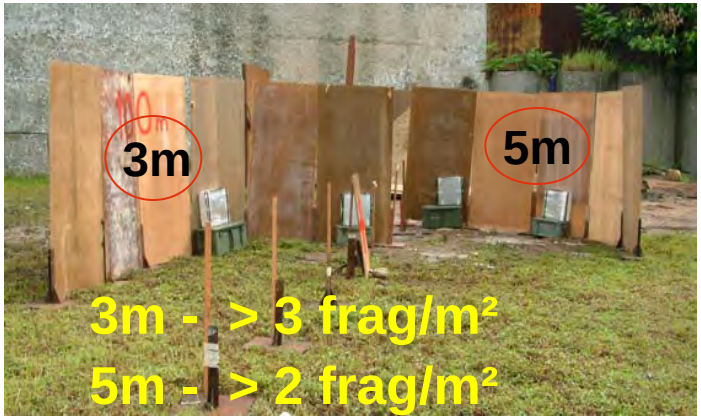
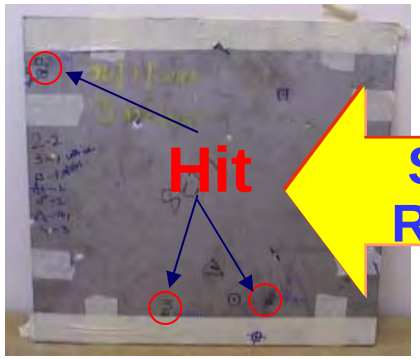
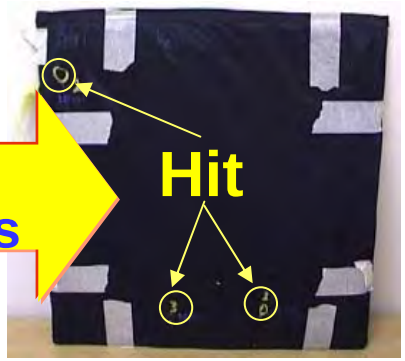
Effectiveness

Static and Dynamic Arena Tests





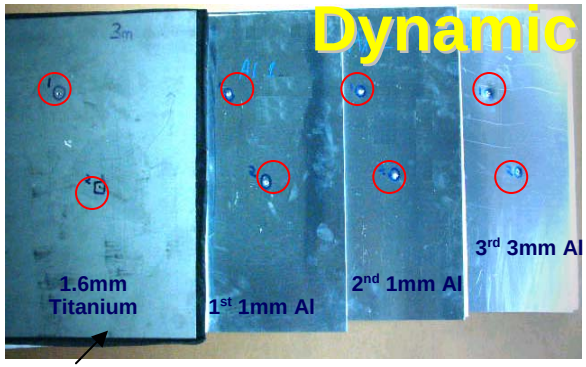
Static Results



1.6mm Titanium

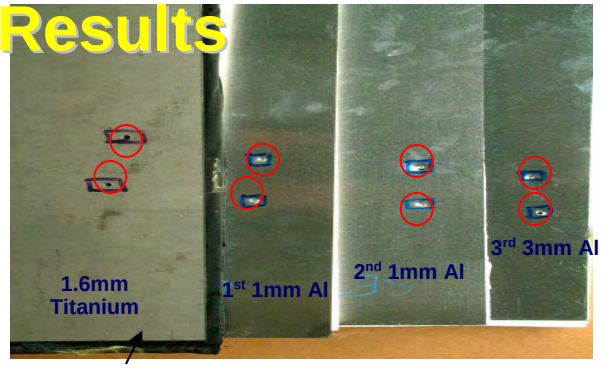
20 layers Kelvar

Dynamic Results



20 layers Kelvar

Target: 3m



20 layers Kelvar

Target: 5m

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Fire Control System Concept

FCS

Eye Guard

3X Optical Scope

Day Camera

Remote Control Pad Input

Video In/Out Port

Night Camera

Sensor Suite Pod

Laser Range Finder

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Fire Control System Concept

Ammunition Programmer

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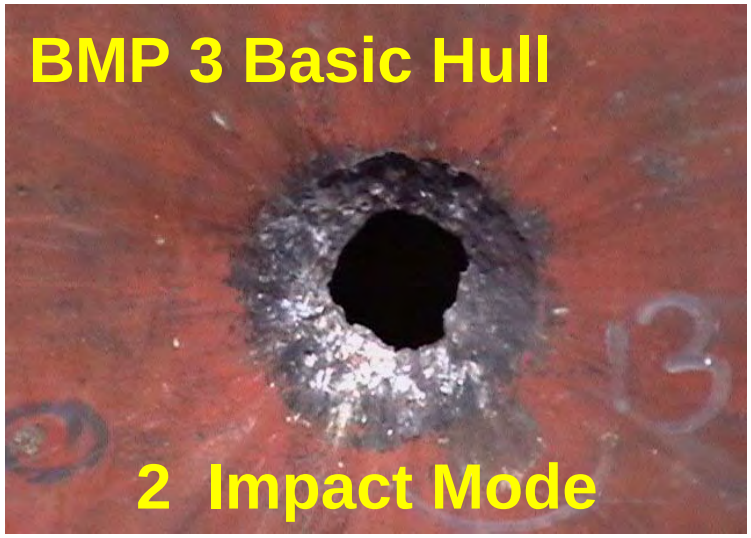
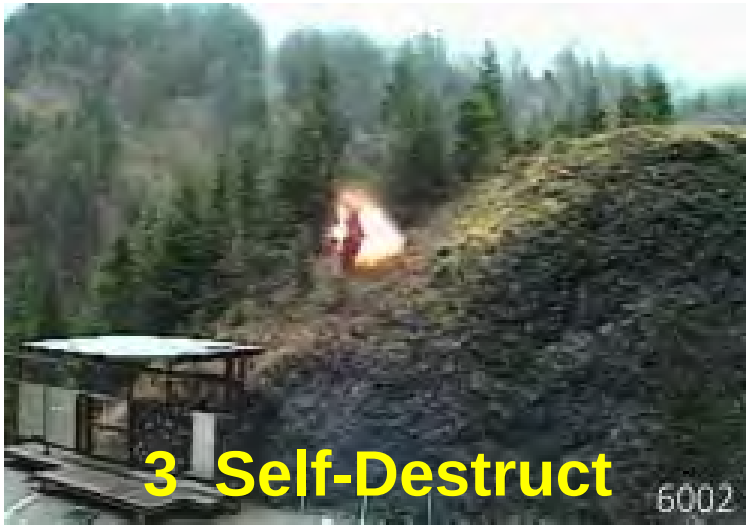
Features





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Simulate firing through foliage

40mm HV HE

40mm ABM HE

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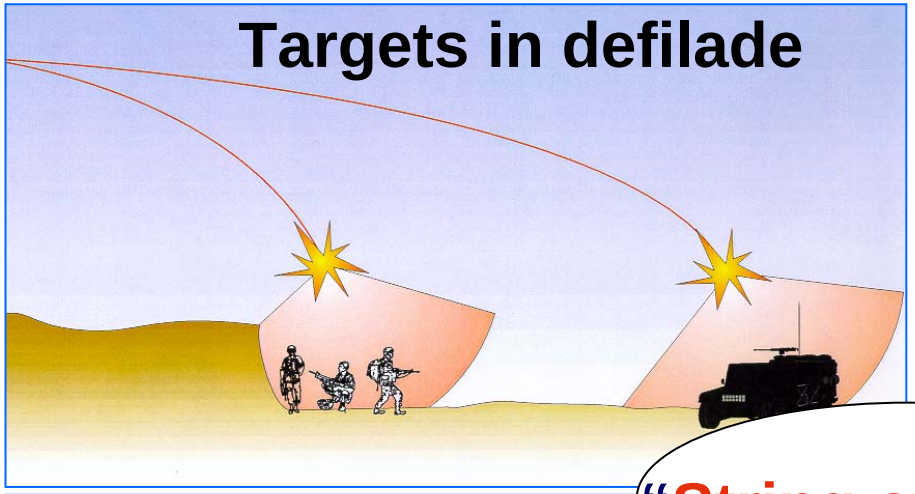
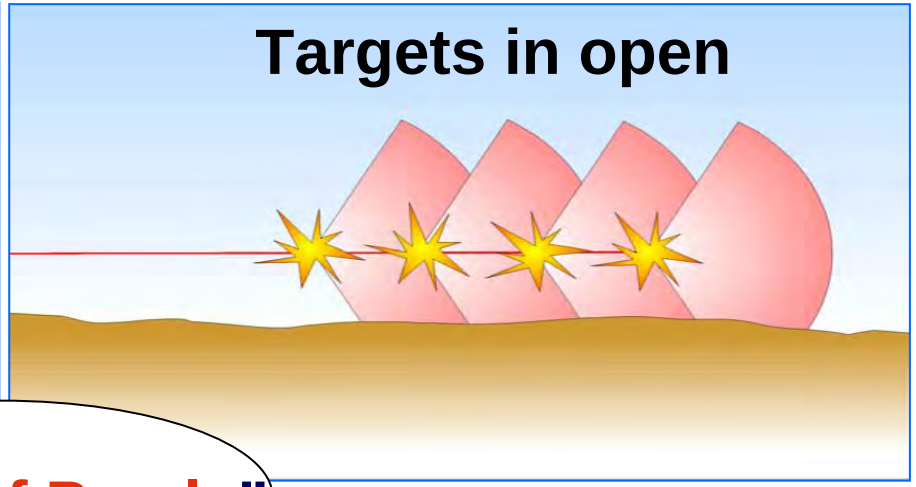
Possible Applications

Operation Versatility of the 40mm ABM





"String of Pearls"

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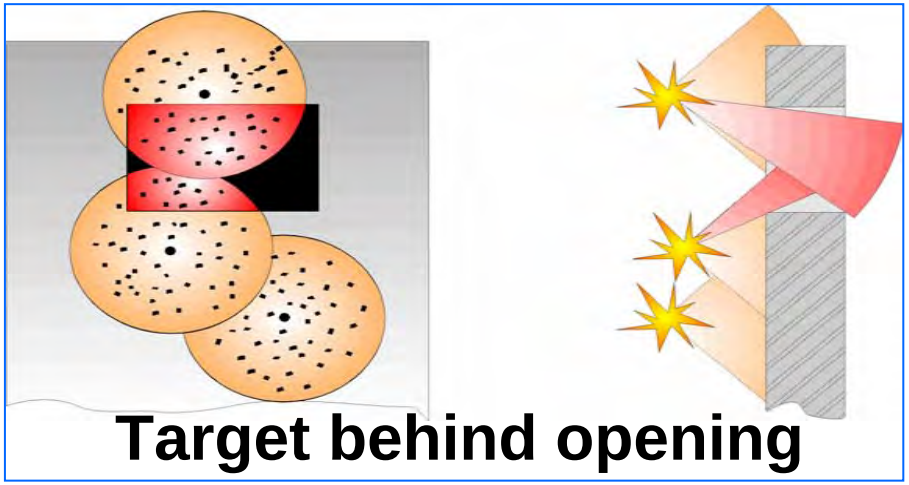
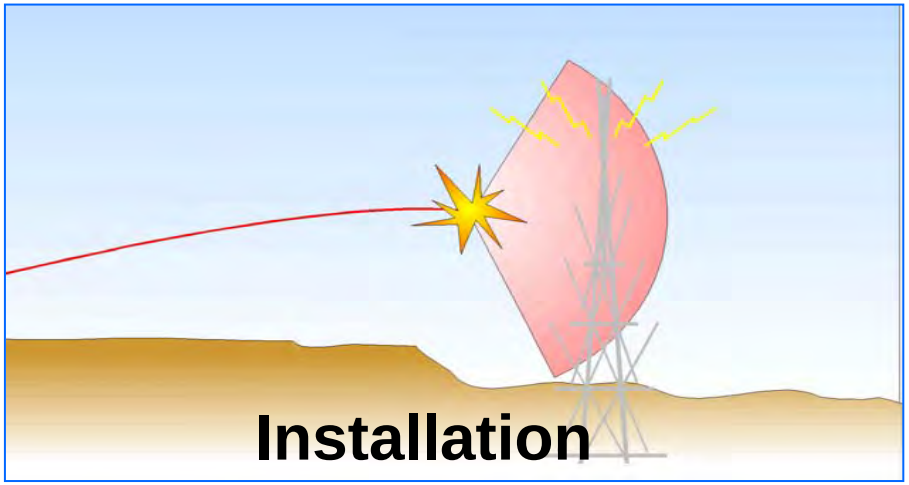
Possible Applications

Operation Versatility of the 40mm x 53 ABM



Target behind opening



Installation

Point burst against Opening or Installation

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Technical Data - ABM

HE Round Parameter

• Round Length	112mm max.
• Round Mass	350 g
• Projectile Mass	248 g
• Fuze Design	Programmable Base Fuze
• Arming Distance	18 to 40 m
• Muzzle Velocity	242 m/s

Warhead

• Direction of fragments	Front and Side
• Payload	Tungsten Balls
• Number of balls	> 330

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Technical Data - ABM Training

Flash & Bang Round Parameter

• Round Length	112mm max.
• Round Mass	350 g
• Projectile Mass	248 g
• Fuze Design	Programmable Base Fuze
• Arming Distance	18 to 40 m
• Muzzle Velocity	242 m/s

Warhead

• Sound Level	145 db

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Technical Data - FCS

System Parameters

• **Dimensions**	**265 (L) x 160 (W) x 160 (H)mm**
• **Weight**	**< 4.0 kg with batteries**
• **Sighting**	
- **Day sight**	**15º @ 3x magnification**
- **Night sight**	**Integrated GE II+I^2**
• **Laser (Eye Safe)**	
- **Range**	**up to 2.5km(max.)**
- **Ranging accuracy**	**± 1m**
• **Battery**	
- **Power**	**12V DC nominal**
- **Life**	**> 6 hours (continuous operation at -40°C)**
• **Operating temperature**	**-40°C to +71°C**

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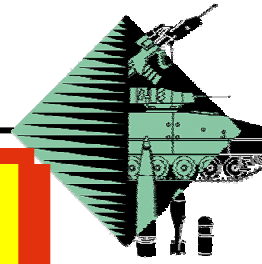
Live Firing Demonstration



40mm Air Bursting Munition System

Live Firing Demonstration

2nd October 2003

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Live Firing Demonstration

Target Set-up

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Video

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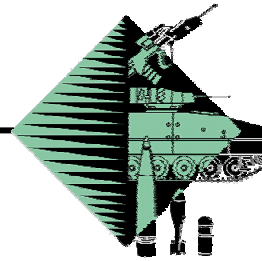

THANK YOU

Contact :

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Cheng Hok, Aw **awch@stengg.com**

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Miniature Day/Night Sight (MDNS) Development

MDNS Development

Presented to NDIA Small Arms Symposium

MDNS Agenda

- Mission Statement
- MDNS Goals
- Acquisition Strategy
- Subsystems
- Integration

MDNS Mission Statement

The SOPMOD Program Management Office will utilize the Miniature Day/Night Sight (MDNS) Development Program to focus on phased replacements to current SOPMOD Block I items and the acquisition of new Block II items to reflect the latest innovations in optical sighting technology. Items procured through the MDNS Development program will address shortcomings in currently fielded equipment and seek to field smaller, more rugged equipment suitable for a variety of weapons platforms.

MDNS Goals

- Update Aging Technology on Current SOPMOD Items
- Address Possible Improvements in Current SOPMOD Kit Items
- Miniaturize and Ruggedize SOPMOD
- Integrated System Approach
- Encourage Innovation through Competition
- RDT&E + Modified NDI: Best of Both Worlds
- Meet Objective Fielding Requirements for SOPMOD Kits

Acquisition Strategy

Acquisition Strategy

- Phase I – Evaluation of Tech Proposal
  - Vendors That Meet KPP's Proceed to Phase II
- Phase II – Oral Presentation/Demonstration
  - OET, TET, & CMET Conduct Adjectival Ratings
  - IDIQ Contracts Awarded to One or More Vendors
- Phase III – Developmental Testing
  - Assure Technical Compliance to Specification
- Phase IV Operational Testing
  - User Assessment
  - Prelude to Future Production Delivery Orders

Subsystems

Miniature Day/Night Sight (MDNS) Development
SUBSYSTEMS

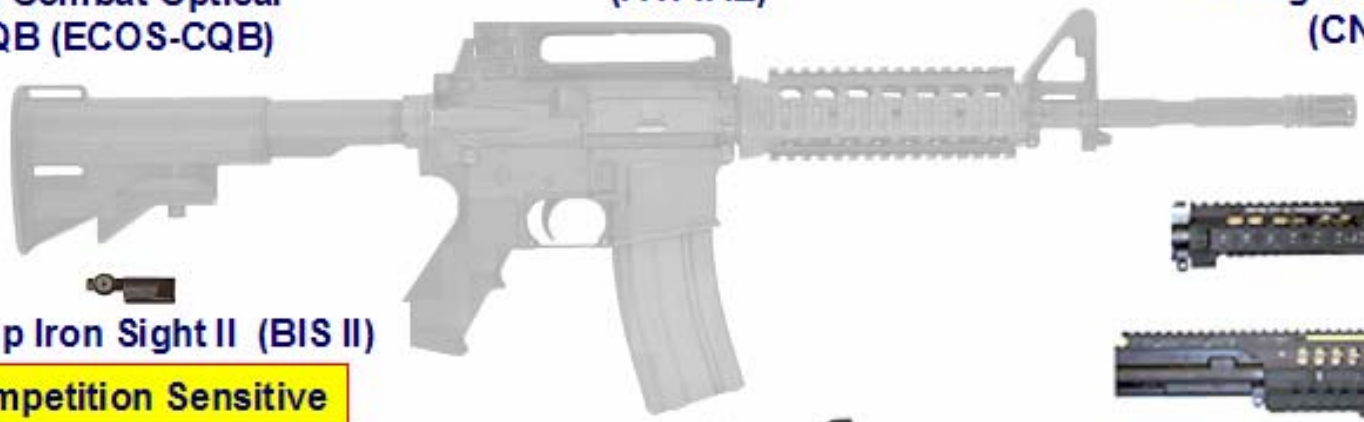
Enhanced Combat Optical Sight - Carbine (ECOS-C)

Clip-on Night Vision Device – Thermal (CNVD-T)

Advanced Target Pointer/ Illuminator/Aiming Laser (ATPIAL)

Clip-on Night Vision Device – Image Intensification (CNVD-I²)

Enhanced Combat Optical Sight - CQB (ECOS-CQB)



Backup Iron Sight II (BIS II)

Competition Sensitive

Rail Interface System II (RIS II)

Visible Bright Light III (VBL III)

Competition Sensitive

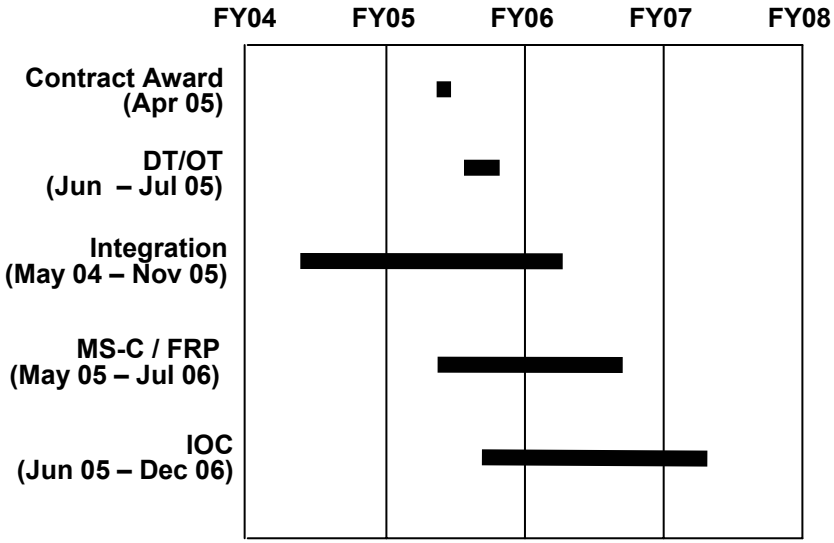
Mini Night Vision Sight (PIP)

Rail Interface System II (RIS II)
OVERVIEW

Description

- **Floating Rail Concept**
- **Floating Grenade Launcher Capability**
- **Improved Shooting Accuracy**
- **3 Contracts Awarded on 25 March 2005**
  - **N00164-05-D-4863 (A.R.M.S., $16.7M)**
  - **N00164-05-D-4864 (Daniel Defense, $16.7M)**
  - **N00164-05-D-4865 (Knight's Armament, $16.7M)**
- **Final Down-Select Upon Completion of DT/OT**

Schedule



Backup Iron Sight II (BIS II)
OVERVIEW

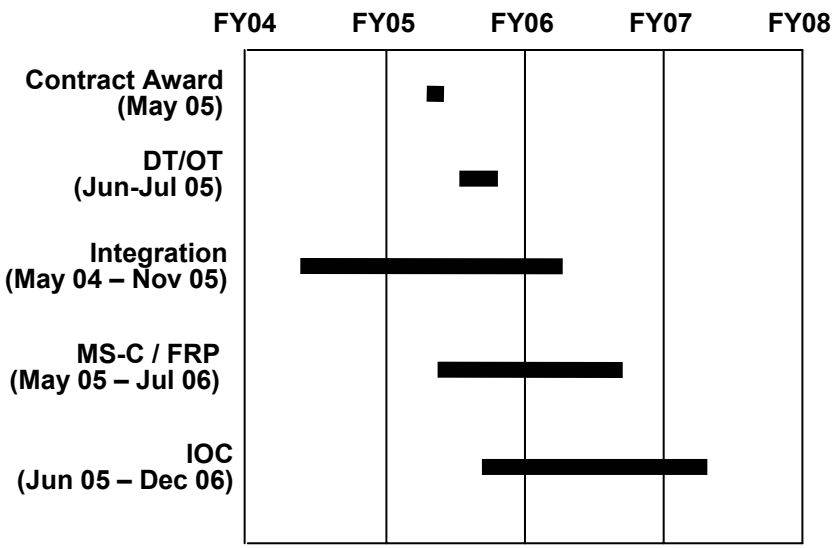
CONCEPT IMAGE

NSN: TBD

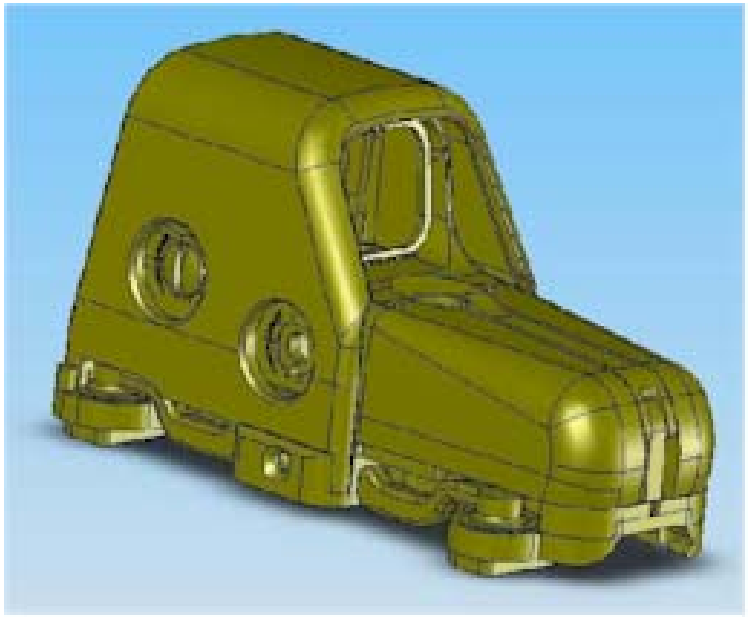
Description

- **Program Status: GREEN**
- **Improved Aperture Flexibility**
- **Improved Set Position Features**
- **Source Selection In-Process**

Schedule



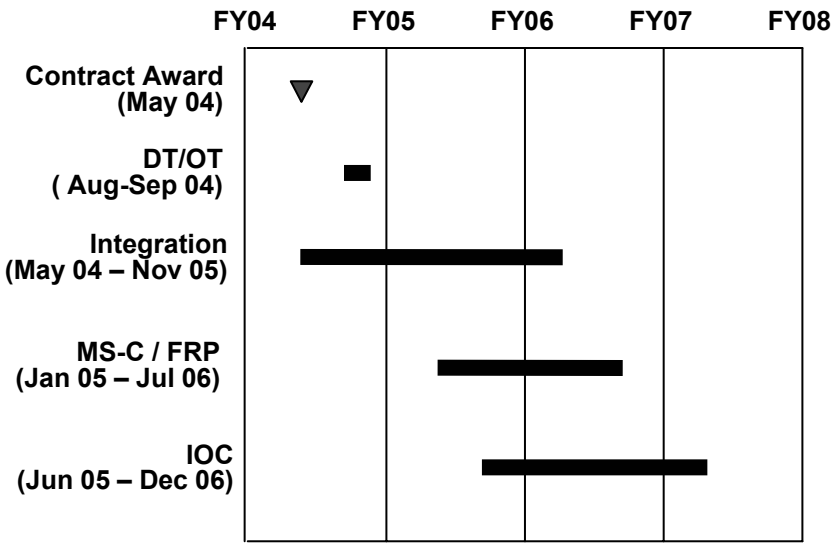
Close Quarter Battle Enhanced Combat Optical Sight (ECOS-CQB) OVERVIEW



Description

- **Night Vision Compatible**
- **Increased Optical Field of View**
- **Holographic Technology**
- **Contract N00164-04-D-4832 Awarded to EOTech ($16.67M)**
- **ECP Approved by PMO to incorporate 13 Configuration Changes**

Schedule

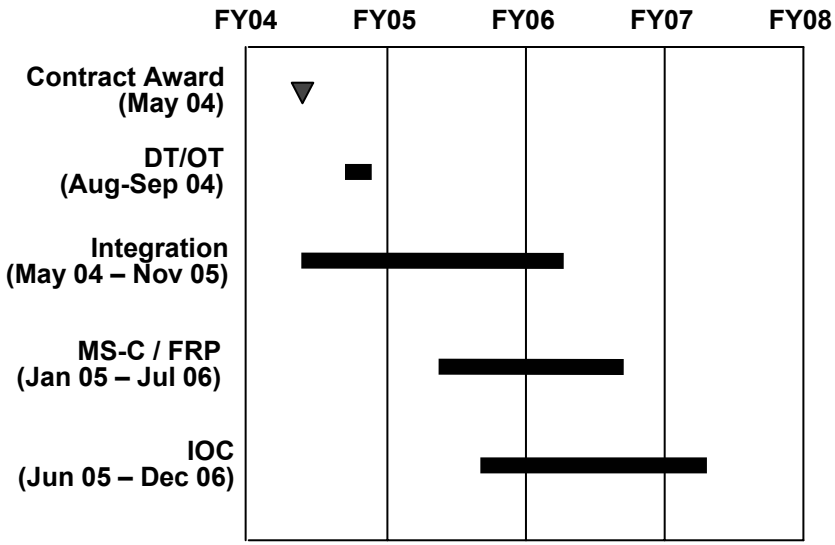


Enhanced Combat Optical Sight - Carbine (ECOS-C) Option #1 OVERVIEW

Description

- **4X Magnification**
- **Integral CQB Capability**
- **Improved Reticle Illumination**
- **Spiral Development Potential**
- **Contract N00164-04-D-4834 Awarded to Trijicon ($16.67M)**
- **ECP In Process (7 Potential Configuration Changes)**

Schedule

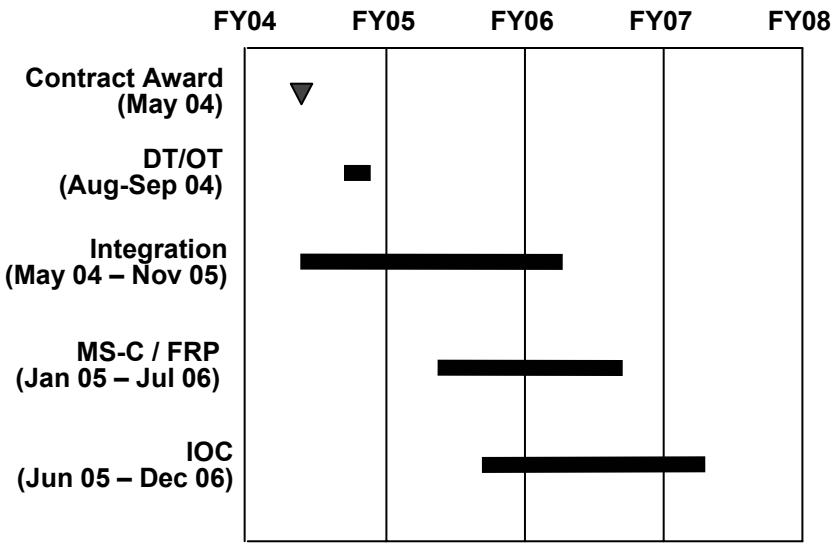


Enhanced Combat Optical Sight - Carbine (ECOS-C) Option #2 OVERVIEW

Description

- 1X - 4X Switchable Magnification
- Improved Reticle Illumination
- Spiral Development Potential
- Contract N00164-04-D-4833 Awarded to Elcan Optical Technologies ($16.67M)
- ECP Approved by PMO (15 Configuration Changes)

Schedule

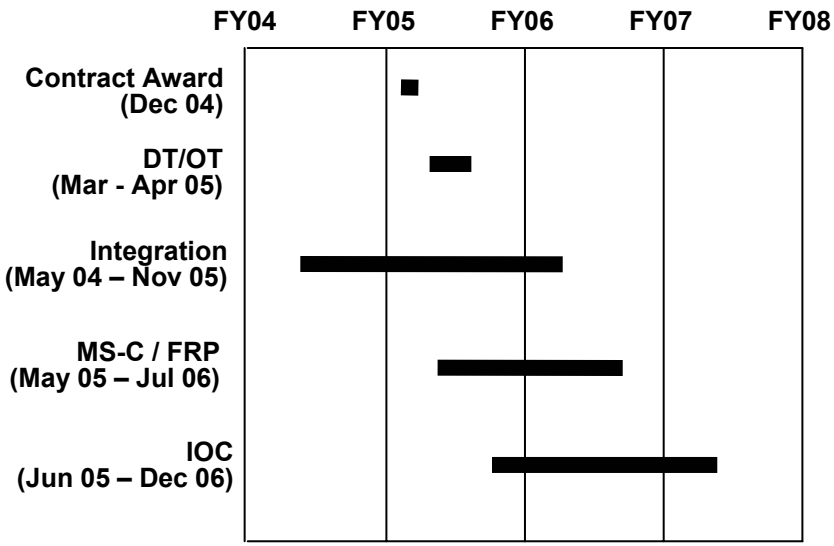


Advanced Target Pointer/Illuminator/Aiming Laser (ATPIAL) OVERVIEW

Description

- **Combined Visible/Infrared Pointing & Illuminating Lasers**
- **Size and Weight Reductions**
- **Enhanced Performance over SOPMOD Baseline**
- **Contract Awarded to Insight Technology ($49.9M)**
- **ECP In Process (7 Potential Configuration Changes)**

Schedule



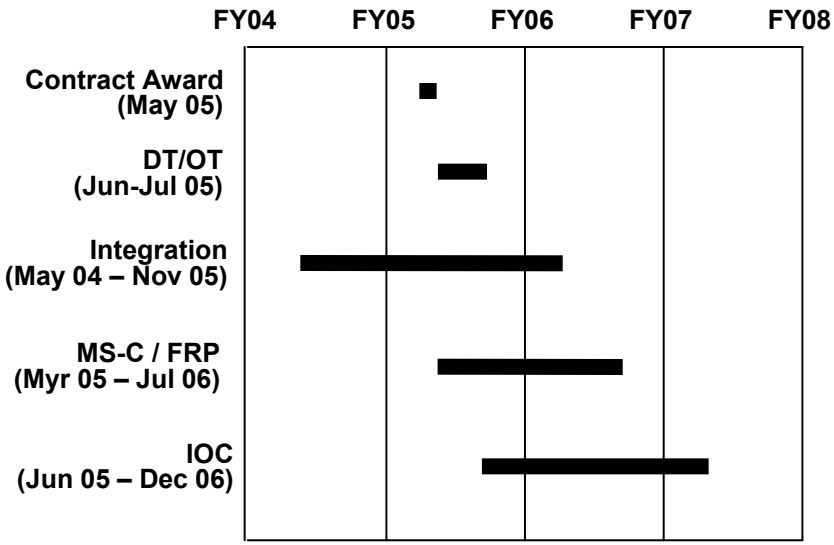
Visible Bright Light III (VBL III)
OVERVIEW

CONCEPT IMAGE
NSN: TBD

Description

- **Increased Luminosity**
- **Size and Weight Reduction**
- **Improved Durability**
- **Source Selection in Final Negotiation**

Schedule



Miniature Night Vision Sight II (MNVS II) OVERVIEW

Description

- **Gen III OMNI V Auto-Gated Filmless Image Tube**
- **2.25X Magnification**
- **Improved Daylight Operation**
- **Incorporate Miniature Red Dot Sight for CQB**
- **Ruggedized**
- **Incorporate Standard Quick Detach Throw Lever**
- **Contract N00164-04-D-4803 Awarded to Litton ($49.9M)**

Schedule

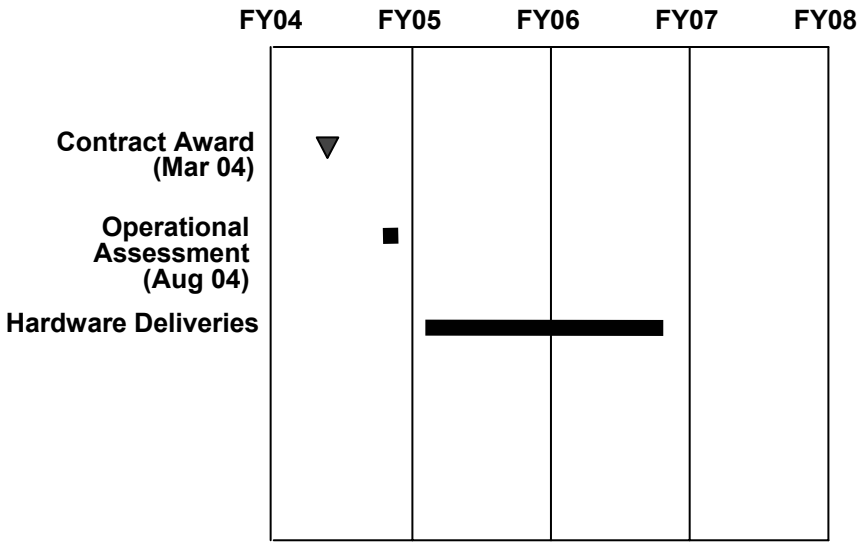
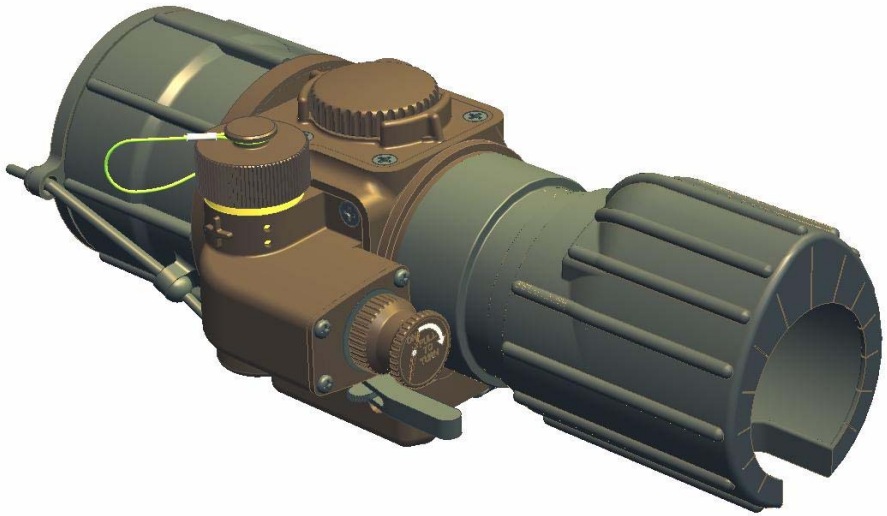


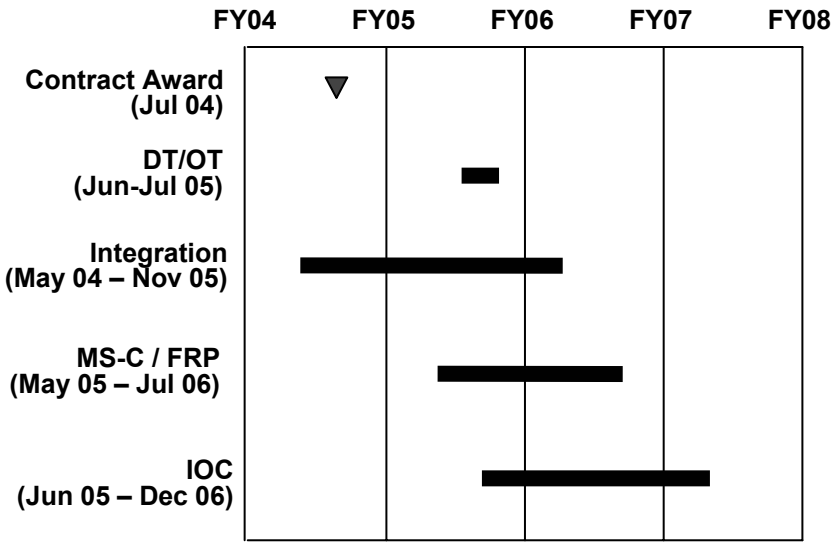
Image-Intensified Clip-On Night Vision Device (CNVD-I²) OVERVIEW



Description

- **Original ORD 5 Block II**
- **Gen III OMNI V Auto-Gated Image Tube**
- **Potential Sensor Fusion Spiral Development**
- **Lightweight**
- **Improved Zero Retention for Day Scopes**
- **Contract N00164-04-D-4839 Awarded to Litton ($25M)**

Schedule

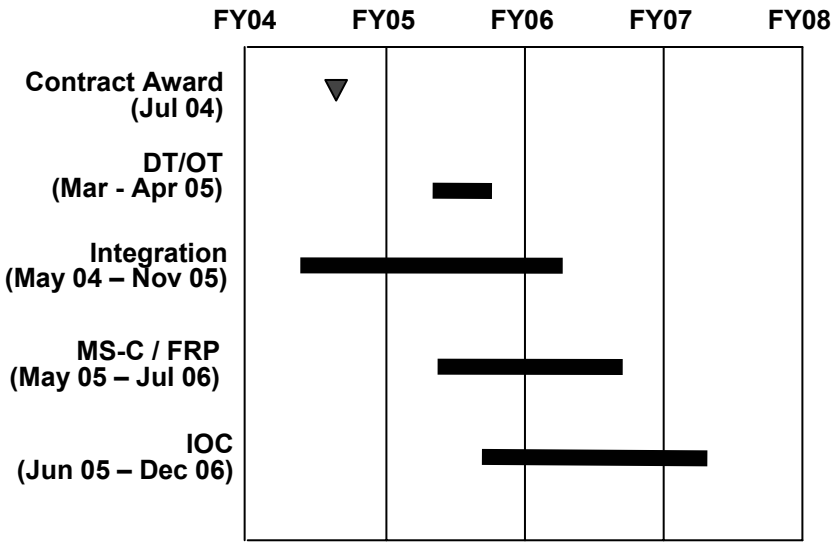


Clip-On Night Vision Device Thermal (CNVD-T) OVERVIEW

Description

- **New Capability**
- **Significant Size/Weight Reduction**
- **Improved Target Detection Capability**
- **For Use as CNVD or Stand-Alone**
- **Contract N00164-04-D-4840 Awarded to Insight Technology ($25M)**
- **10 Possible ECP items Identified**

Schedule



Integration

Miniature Day/Night Sight (MDNS) Integration

Integration efforts to involve:

- Interoperability of Components
- Standardization (Knobs, Switches, Reticles, Intermounts, Batteries, Height Above Comb, etc.)
- Emergency Sighting
- System Snag Hazard Reduction
- Engineering Change Proposals
- Contractor Cooperation/Coordination

Integration Testing Scheduled for Nov 2005

NSWC Crane

"Harnessing the Power of Technology for the Warfighter"

Presentation presented by:

Barry Gatewood, MDNS Project Manager
Code 4081, Building 3291, ATTN: SOPMOD
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Commercial Fax: (812) 854-1044

Crane Navy
Special Weapons for Special Operators

U.S. Special Operations Command
SOPMOD

NSWC Crane

BACKUP SLIDE

Crane Navy
Special Weapons for Special Operators

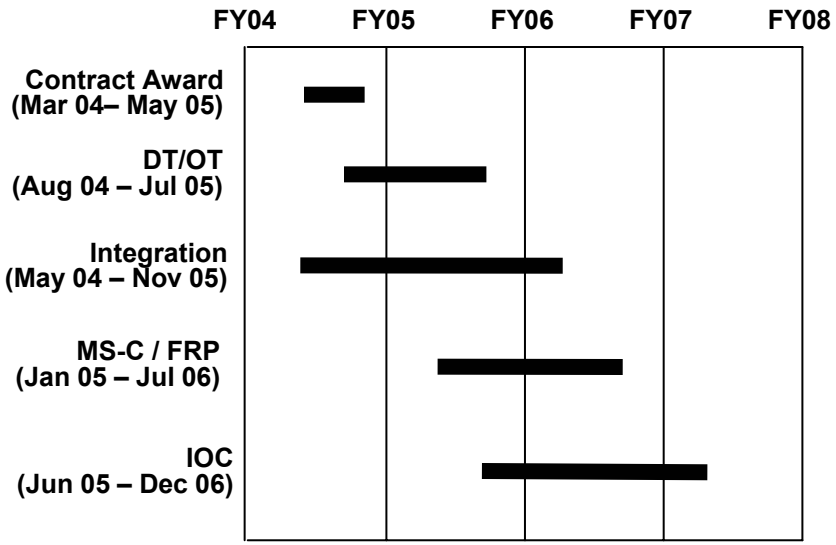
U.S. Special Operations Command
SOPMOD

Miniature Day/Night Sight (MDNS) OVERVIEW

Description

- **Capability / technology upgrade to all SOPMOD day / night sighting subsystems for phased-replacement**
- **Improved weight, ruggedness, and zero retention**

Schedule



NAVSEA
WARFARE CENTERS
CRANE

MK93 SMOKE DETERRENCE SYSTEM

Dawn Hoffa

812-854-4790

Dawn.Hoffa@navy.mil

Approved for Public Release; Distribution Unlimited

MK93 Smoke Deterrence System

- **Need for Smoke Deterrence System?**
- US Special Operations Command, Riverine
- US Marine Corps, Riverine
- Less than lethal response

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MK93 Smoke Deterrence System

- **Need for Weapons Mounted System?**
- Hard mounted fixtures move with the craft
- Hard mounted fixtures can't be turned
- Weapons mounted can provide both deterrent and lethal coverage

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MK93 Smoke Deterrence System

- **What is the purpose of this system?**
- Provide Smoke Deterrence for Numerous Applications
  - Hot Extractions
  - Provide cover from hostile aggressors
  - Provide precise placement of smoke placement
  - Provide rapid response
  - Provide lethal response from a covered position

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MK93 Smoke Deterrence System

- **What is the MK93 Smoke System?**
- Standard MK93 Universal Gun Mount
- M6 66mm Smoke Grenade Discharger
- M82 or M76 Smoke Grenades
- Discharger Interface Bracket
- Discharger Harness and Switches

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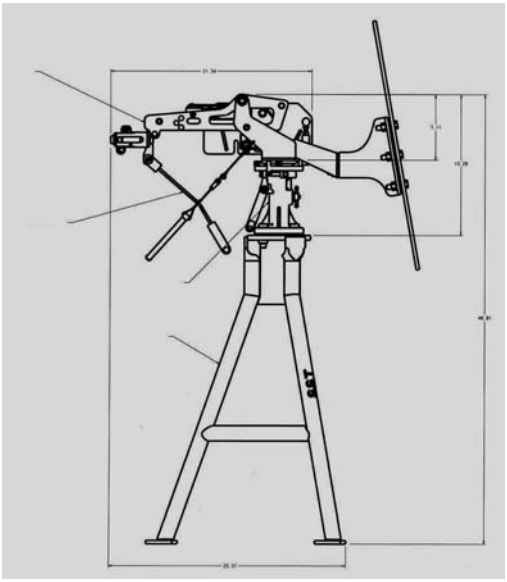
MK93 Smoke Deterrence System

- **MK93 Universal Weapon Mount**
- Interfaces with multiple weapons:
  - M2HB .50 Caliber Machine Gun
  - MK19 40mm Grenade Machine Gun
  - M240 7.62mm Machine Gun
  - M249 5.56mm Machine Gun
- Commonly found throughout the Armed Forces



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MK93 Smoke Deterrence System

- **M6 Smoke Grenade Discharger**
- Deploys all Q-STAG 401 Grenades
  - M82 Practice Grenades
  - M79 Non-IR Penetrating
- Weighs 8.5 Pounds

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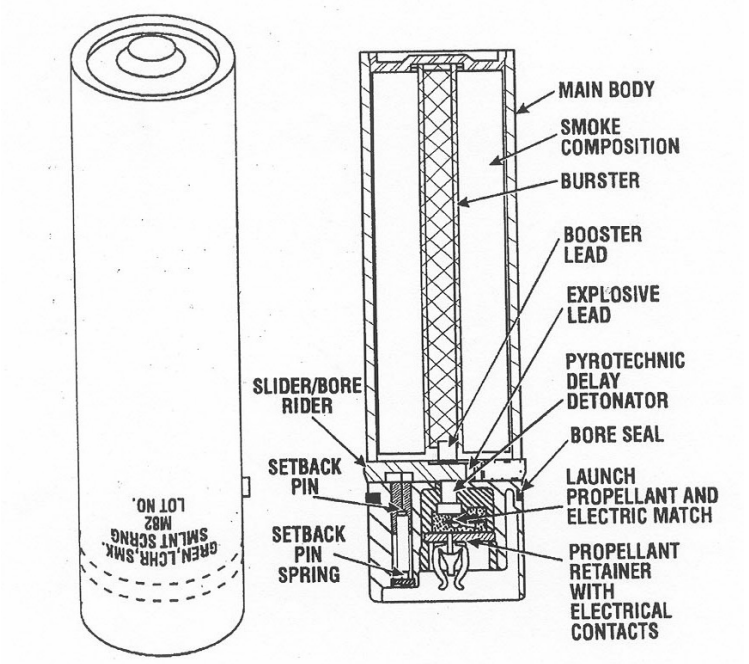
MK93 Smoke Deterrence System

- **Smoke Grenades**
  - M82 Practice Grenades
  - M76 NON IR penetrating



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MK93 Smoke Deterrence System

- **Discharger Interface Bracket**
- Designed to interface M6 Discharger to MK93 Weapon Mount.
  - No modifications required to MK93.
  - Bracket moves in train and elevation, allowing the gunner to aim where the grenades deploy.
  - Safety tested to double recoil for 2000 shots.
  - Live fire tested and design concurred by user evaluation

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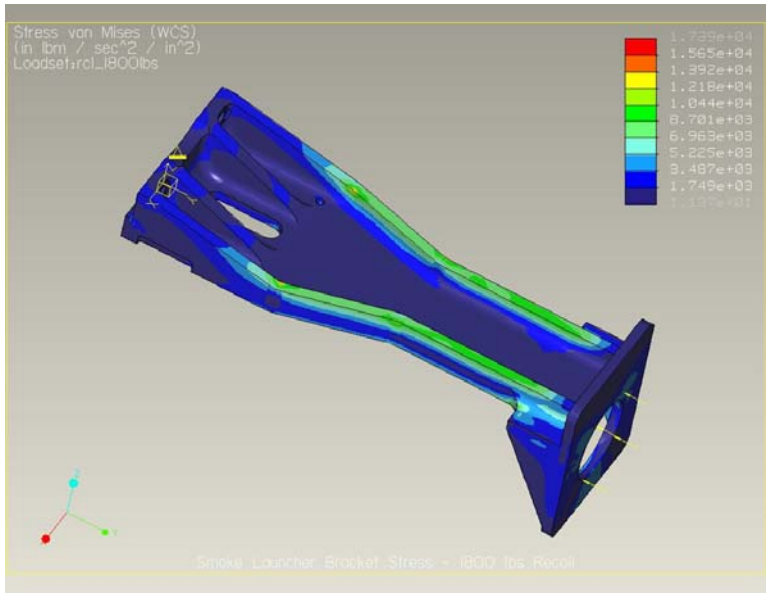
MK93 Smoke Deterrence System

- **Discharger Interface Bracket**
  - Engineering testing



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WARFARE CENTERS
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MK93 Smoke Deterrence System

PROTOTYPE TEST

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MK93 Smoke Deterrence System

- **Harness and Switches**
- Firing switches designed to interface with all of the MK93 weapons.
  - Switches bolt on to the weapons.
  - Harness and Switches are EMI safety certified.
  - 24Vdc power

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MK93 Smoke Deterrence System

SMOKE IN ACTION

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MK93 Smoke Deterrence System

- **Ancillary Equipment**
- AN/PAS 13 for FLIR viewing and Smoke Penetration

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MK93 Smoke Deterrence System

- **Ancillary Equipment**
- AN/PVS21 with MHUD
  - Augment the head up viewing thru PAS21

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MK93 Smoke Deterrence System

- **Summary**
- Interface Discharger to MK93 with no modifications
- Interface with current FLIR sights and NVEO goggles
- Full range of motion for deploying smoke deterrence
- 35 pounds total weight per MK93 system
- Estimated $2000 per kit.

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RDE Command

Product Improvement 40mm Ammunition NDIA

19 May 2005

Art Pizza – Chief, 40mm Ammunition Engineering

Melissa Wanner – 40mm Low Velocity

OBJECTIVE

- Provide overview of the standard cartridges
- Provide Key Issues for each commodity
- Provide strategy for moving forward
- Provide future plans for improvements

General Trends in 40mm

Increased Demands

- Production numbers are increasing - Training demands are increasing
- Some items in production have not been procured recently
- Combat and training rounds are both in short supply
- Award of systems contract to AMTEC and DSE

Product Improvements

- Most rounds were designed in the late 1970's and 1980's
- Technology driven modeling and simulation enables better designs today
- Increased demands drive the need for improvements in produceability
- Cost savings are key based on large quantities produced
- Cost, Schedule, and Performance

40mm Ammunition Family

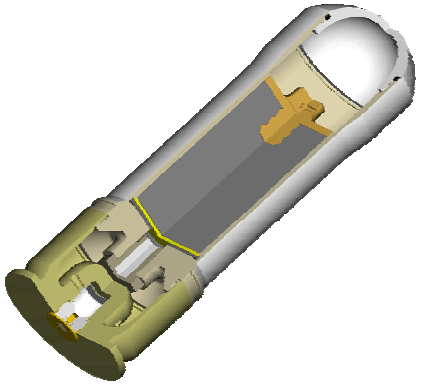
- **High Velocity (For MK19 Mod3 GMG/MK47)**
  - **M430A1 High Explosive Dual Purpose (HEDP) - B542**
  - **M1001 Canister Cartridge – BA11**
  - **M918 Practice ("Flash-Bang") - B584**
  - **M385A1 Practice - B576**
  - **Mk281 Training Cartridge -**

- **Low Velocity (FOR M203/M79/*XM320*)**
  - **M433 High Explosive Dual Purpose (HEDP) - B546**
  - **M781 Practice ("Orange Dye") - B519**
  - **M583A1 White Star Parachute (Illumination) - B535**
  - **M661 Green Star Parachute (Illumination/Signal) - B504**
  - **M585 White Star Cluster (Illumination/Signal) – B536**
  - **XM992 IR illuminant – BA03**
  - **XM1060 Thermobarric – BA19**

40mm Ammunition Family (cont.)

- **Less than Lethal Ammunition**
  - **M1006 Sponge grenade – BA06**
  - **M1029 Crowd Dispersal Cartridge – BA13**
  - **XM1057 - TBD**

STRATEGY FOR IMPROVEMENT



- **Establish Baseline Performance**
  - **Warheads (M433, M430)**
  - **Interior and Exterior ballistics**
  - **Manufacturing and Environmental**
- **Program Recommendations and Planning**
  - **Engineering Study, Product Improvement**
  - **VECP, VEP, ECP**
- **Other Avenues**
  - **CRADA agreements with Systems Contractors**
  - **R & D programs**
  - **Foreign Comparison Testing**

UNCLASSIFIED

ESIP: Cartridge, 40mm M433 High Explosive Dual Purpose (HEDP)

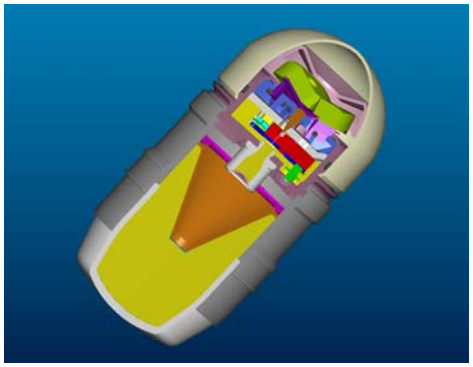
UNCLASSIFIED

System Description

MISSION: Provide anti-personnel and anti-armor (2.5" RHA @ 0 degrees) capabilities out to 400 meters maximum range.

USE: Shoulder fired from the M203 GL (attached to the M16A2 rifle system). Used by Tri-Services

Visuals



Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the M203 Grenade Launcher
- Muzzle Velocity – 76 mps
- Range – 400 meters (maximum)
- Minimum Fuze Arming Distance – xx meters
- Maximum Anti-armor penetration – 2.5" RHA @ 0 degrees

HISTORICAL INFORMATION:

- TC-STD - 1968

Current Status

- Ballistic Match/ Baseline testing on-going.
- Warhead Improvement project on-going.
- PIP to improve aeroballistics and projectile body design based on ARL spark range data and modeling.
- PIP to improve warhead based on baseline data

UNCLASSIFIED

ESIP: Cartridge, 40mm M781 Practice

UNCLASSIFIED

System Description

MISSION: Provide an effective training simulator to the combat ammunition (M433) for use with the 40mm M203 GL (attached to the M16A2 rifle system).

USE: Shoulder fired from the M203 GL to provide visual signature upon impact. Used by Tri-Services

Visuals

Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the M203 Grenade Launcher
- Muzzle Velocity – 76 mps
- Maximum Range - 400 meters
- Visual signature upon impact

HISTORICAL INFORMATION:

- TC-STD - 1972

Current Status

- M781E1 Day/Night not funded
- Low Velocity Mann Barrel testing –on going
  (to record case mouth and mid-case pressures)
- Ballistic Match / Baseline Study - Ongoing
- Qualify Alternate Propellant - Ongoing
- Qualify Alternate Curing Agent - put on hold
(possible alternate being tested also increased in price)
- PIP to reduce cost

UNCLASSIFIED

ESIP: Cartridge, 40mm M583A1 White Star Parachute

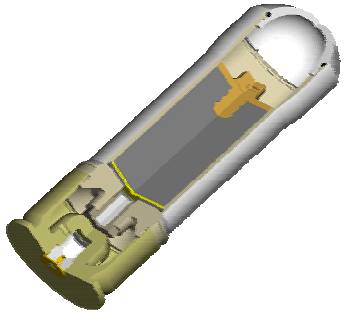
UNCLASSIFIED

System Description

MISSION: Provide an effective illumination and signaling cartridge for support of ground troops to be used in conjunction with the M203 grenade launcher (attached to the M16A2 rifle system)

USE: Shoulder fired from the M203 GL for illumination of target area or signaling. Used by Tri-Services

Visual



Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the M203 Grenade Launcher
- Muzzle Velocity - 250 fps
- Maximum Altitude - 700 feet at 90 degree weapon elevation
- Minimum output - 70,000 candlepower
- Minimum burn time - 35 seconds

HISTORICAL INFORMATION:

- TC-STD - 1972

Current Status

- 3 sources are now online for support of production (MEI, PSI, Valentec)
- PIP to reduce cost, increase burn time, improve cartridge case

UNCLASSIFIED

Cartridge, 40mm XM992 Infrared Illuminant – BA03

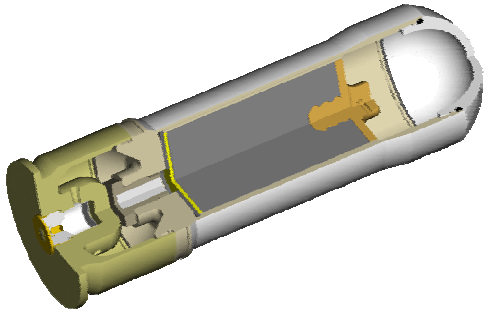
UNCLASSIFIED

System Description

- 40mm Ctg fired from the M203 Grenade Launcher
- Similar in design to M583A1 White Star Parachute Ctg
- Provides IR illumination in the infrared passband
- Produces minimum visual signature outside of the infrared passband

The currently fielded 40mm star illuminant cartridge (M583A1) produces sufficient visible light that not only illuminates enemy targets, but may also illuminate friendly positions. The 40mm IR illuminant cartridge is similar in design and functional performance to the above except for the illuminant candle composition.

Visual



Responsible PM: PM-SW

Technical

- Weight: .49 lb.
- Total Length: 5.272”
- Projectile Length: 4.399”
- Candle Burn time: 30 secs min
- Muzzle Velocity: 76 m/s
- Average Altitude @ 90 degree QE: 600 feet
- I/R Passband: 600-900 nm
- Max visible candlepower output: <350
- NSN: 1310-01-422-2048 *
- Packout: M2A1 Metal cans (22 rounds)

** **Item yet to be procured***

Potential Future Improvements

- Reduce visible light output
- Increase burst height, thus improving useable IR visibility

P.O.C: Remi Chian, AMSRD-AAR-AEM-I, DSN 880-3867
<rchian@pica.army.mil>

XM992 IR Parachute

UNCLASSIFIED

ESIP: Cartridge, 40mm M661 Green Star Parachute

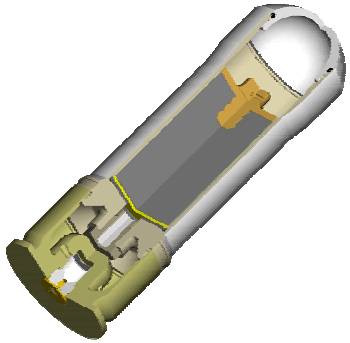
UNCLASSIFIED

System Description

MISSION: Provide an effective illumination and signaling cartridge for support of ground troops to be used in conjunction with the M203 grenade launcher (attached to the M16A2 rifle system)

USE: Shoulder fired from the M203 GL for illumination of target area or signaling. Used by Tri-Services

Visual



Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the M203 Grenade Launcher
- Muzzle Velocity - 250 fps
- Maximum Altitude - 700 feet at 90 degree weapon elevation
- Minimum output - 35,000 candlepower
- Minimum burn time - 35 seconds

HISTORICAL INFORMATION:

- TC-STD - 1972

Current Status

- Converting TDP to 3D

UNCLASSIFIED

ESIP: Cartridge, 40mm M585 White Star Cluster

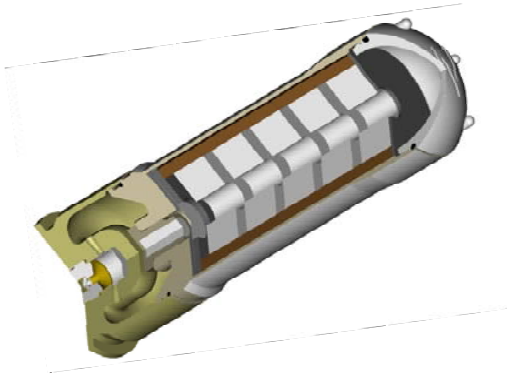
UNCLASSIFIED

System Description

MISSION: Provide an effective illumination and signaling cartridge for support of ground troops to be used in conjunction with the M203 grenade launcher (attached to the M16A2 rifle system)

USE: Shoulder fired from the M203 GL for illumination of target area or signaling. Used by Tri-Services

Funding



Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the M203 Grenade Launcher
- Muzzle Velocity - 250 fps
- Maximum Altitude - 700 feet at 90 degree weapon elevation
- Minimum output - 30,000 candlepower
- Minimum burn time - 5 seconds

HISTORICAL INFORMATION:

- TC-STD - 1972

Current Status

- Convert TDP to 3D

UNCLASSIFIED

ESIP: Cartridge, 40mm M430A1 High Explosive Dual Purpose (HEDP)

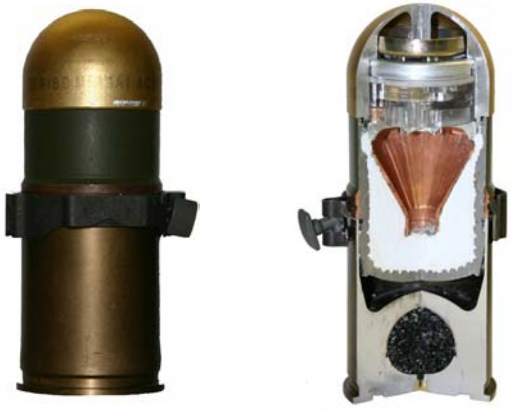
UNCLASSIFIED

System Description

MISSION: To defeat enemy personnel and lightly armored vehicles.

USE: Fired from the Mk19 Mod3 GMG. Used by Tri-Services

Visual



Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Muzzle Velocity - 240 mps
- Range – 1200m Effective, 2200m Maximum
- Minimum Fuze Arming Distance – 18 meters
- Maximum Anti-armor penetration – 3” RHA @ 0 degrees

HISTORICAL INFORMATION:

- TC-STD – A in Sept 92

Issues

- Baseline performance at ARL and Warheads
- PIP based on outcome of the Aeroballistics and warhead baseline

RDE Command

NWA 6012819

UNCLASSIFIED

ESIP: Cartridge, 40mm M918 Target Practice

UNCLASSIFIED

System Description

MISSION: Provide an effective training simulator to the combat ammunition (M430A1) for use with the 40mm MK19 Mod 3 GMG by producing an audio and visual signature upon impact.

USE: Fired from the Mk19 Mod3 GMG. Used by Army and Navy

Visuals

Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Compatibility with the MK19 Mod 3 Grenade Machine Gun
- Muzzle Velocity - 240 mps
- Action Time - < 4 ms
- Range – 1200m Effective, 2200m Maximum
- Minimum Fuze Arming Distance – 18 meters
- Visual and Audio signature at effective range

HISTORICAL INFORMATION:

- TC-STD – A in December 1985

Issues

- Baseline test at ARL
- PIP to match aerobalistically to M430
- PIP to reduce cost
- PIP for Single Chamber Cartridge Case

ESIP: Cartridge, 40mm M385A1 Practice

System Description

MISSION: Provide an effective/safe means for proof Testing the MK19 Mod 3 Grenade Machine Gun

USE: Fired from the MK19 Mod 3 GMG. Limited use for training on "clean ranges" (no impact signature – solid aluminum projectile.)

Programmatic

Responsible PM: PM-MAS

Technical

CRITICAL REQUIREMENTS:

- Muzzle Velocity - 240 mps
- Range – 2200 m Maximum

HISTORICAL INFORMATION:

- TC-STD – A in June 64

Issues

- M918/M385A1 mixed belt testing.
- PIP to make injection molded body one piece. Reduce cost

RDE Command

NWA 6011677

UNCLASSIFIED

ESIP: Cartridge, 40mm M1001 Canister Cartridge

UNCLASSIFIED

System Description

MISSION: Anti-Personnel and Capable of penetrating PASGT vests

USE: Fired from the Mk19 Mod3 GMG.

Visuals

Responsible PM: PM-SW

Technical

- Weight: - Projectile 245 g
- • - Cartridge 333 g
- Total Cartridge Length: 112 mm
- Muzzle Velocity: ~240 m/s
- Action Time <4 ms
- Peak Chamber Pressure 95 MPa
- NSN: 1310-01-464-4117
- Packout: PA120 Metal can (32 rounds)
- 107 Flechettes

HISTORICAL INFORMATION:
TC-STD – A in April 01

Issues

- Make a true performance Spec.
- Baseline Flechette performance

LETHAL
SUBDUE
TRAIN
UTILITY
INNOVATE
40MM GRENADES

L3 communications Brashear

NDIA:
International Infantry & Joint Services Small Arms Systems Annual Symposium, Exhibition, and Firing Demonstration

Small Arms Fire Control Systems for the Individual Soldier

Pete Plocki
XM29 Technical Director
L-3 Communications Brashear
19 May 2005

Supporting the WARRIOR

Fire Control Definition

The art of arranging a weapon's effect and a target to meet in the same space at the same time.

DETECT TARGET

AIM & FIRE LASER

ELEVATE - AIM & FIRE WEAPON

Fire Control
The Problem

Most soldiers did not have fire control and were forced to rely upon their eyes, their cognitive skills and their manual dexterity.

"Iron Sights"

- Time consuming manual adjustments
- Range "guesstimation"
- No input for dynamic environmental conditions
- Do not provide reliable "first burst hits"

Fire Control

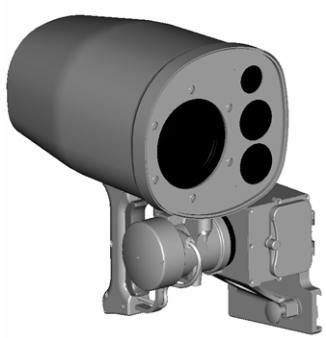
The Solution

Supporting the WARRIOR

XM116

The Small Arms Fire Control System II that can be adapted to many types of weapons and weapon stations, including, but not limited to:

- **MK 19 40mm Grenade Machine Gun**
- **M2 50cal Machine Gun**
- **H&K Grenade Machine Gun**
- **Remotely Operated Weapon Stations**



Mounted on MK 19

Supporting the WARRIOR

XM116
How it Works

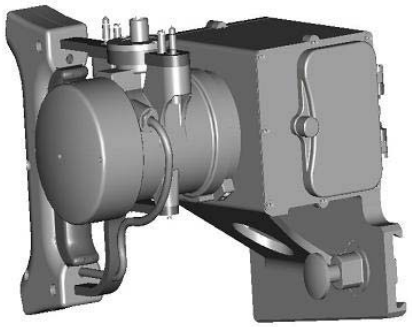
The XM116 provides:

- Night Vision (using uncooled thermal imaging, *not* Image Intensification)
- "Dawn to Dusk" high resolution day TV
- Eyesafe (1.54μ) Laser Rangefinding to 5 km
- Ballistic Solution (displayed as a corrected aim point) for up to 10 weapons/ammo types
- Pressure/Temperature/Cant Sensing
- Integrated Digital Compass

and consists of three modules:

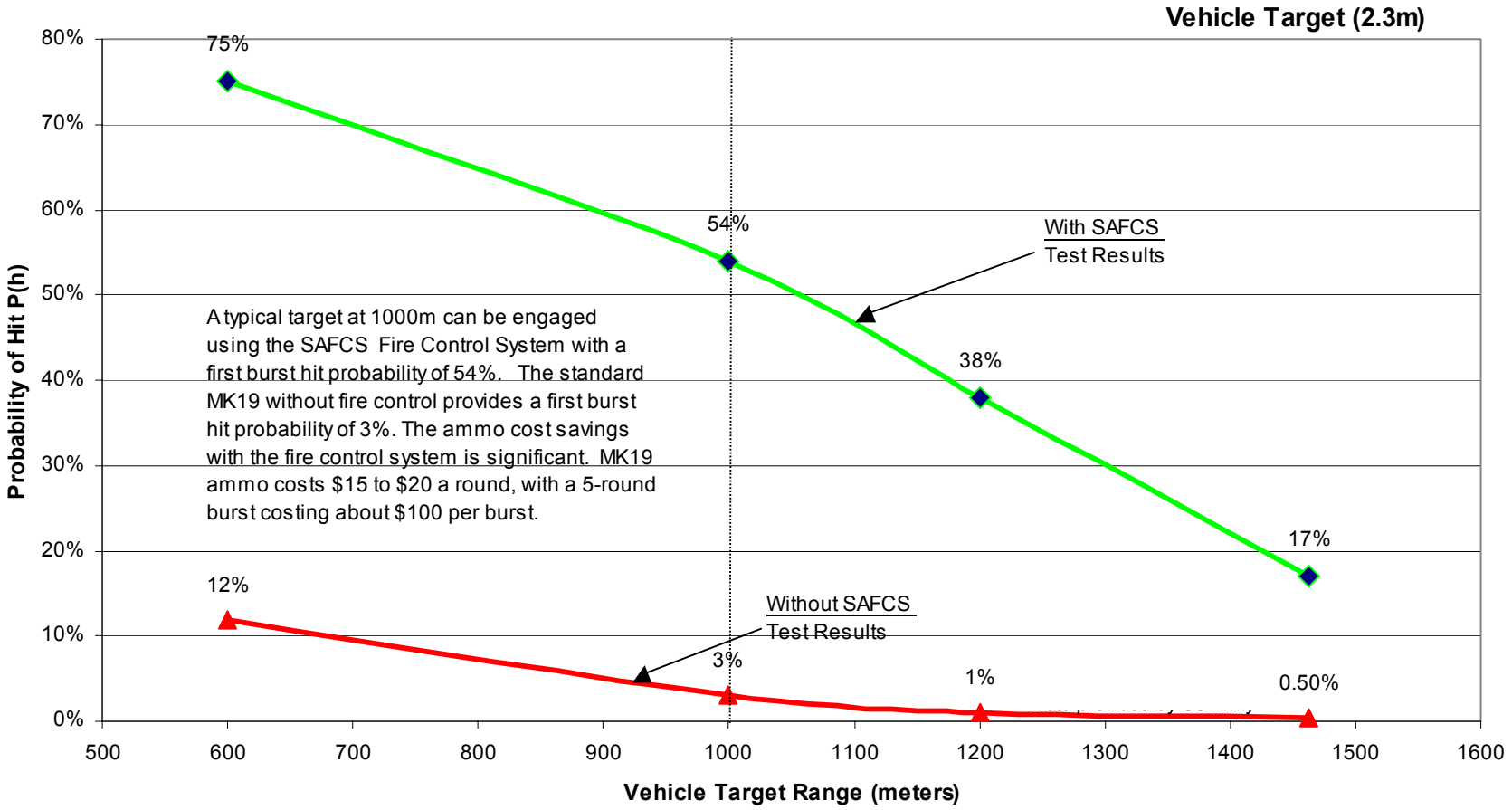
Electro-Optic Module

Helmet Mounted Display


Positioner Module

Supporting the WARRIOR

MK 19 First Burst Hit Probability With SAFCS II and Without SAFCS II



L3 communications Brashear

XM 104
Individual Weapon Fire Control

Supporting the WARRIOR

XM 104 mounted on XM 25

System Design

- Developed for the XM 29 (formerly OICW)
- SOA uncooled thermal capability, but maximized for 500 meters, allowing a design with smaller optics.
- Direct View Optics with high-brightness red overlay
- Pressure, temperature, incline, cant, and azimuth sensing
- Full ballistic solution and adjusted aimpoint display
- Fuze setting for airbursting munitions
- Extensive power management for long battery life
- Total Fire Control weight < 2.5 lbs.

System Status

- Initial Five units delivered to PEO Soldier
- Presently undergoing Milestone B Testing
- Currently employed in Future Force Warrior development efforts

Concept of Operation

Supporting the WARRIOR

Soldier detects target – typically visual. Views with DVO or thermal imager magnified sight

Aligns reticle on target - activates built-in eye-safe laser rangefinder – accurately determines target range, heading, and elevation

Ballistic solution automatically computed. Adjusted aimpoint presented. Soldier places adjusted aimpoint on target and pulls trigger

Fire Control programs range data into round. Round flies downrange, detonating above target at precise range required to incapacitate an enemy in defilade

XM25 – HEAB Testing Video Clip

Supporting the WARRIOR

Summary

- **Fire Control Benefits**
  - Day & Night Target ID
  - Controlled Fire reduces the possibility of friendly/noncombatant casualties
  - Less ammo used – not walking the rounds onto the target
  - Provides remote control capability
  - Provides Airburst for the individual soldier

Fire Control Significantly Increases the War fighters Lethality and Survivability

L3 communications Brashear

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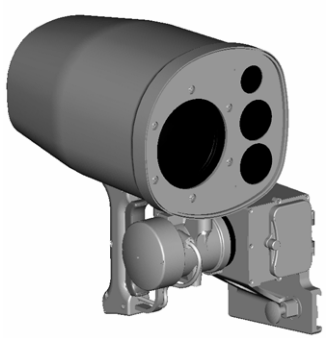

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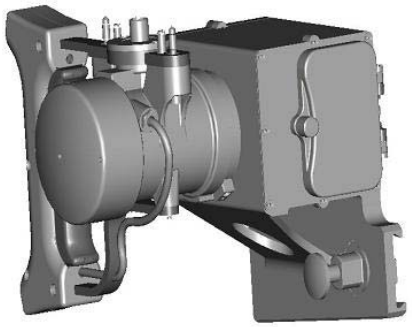
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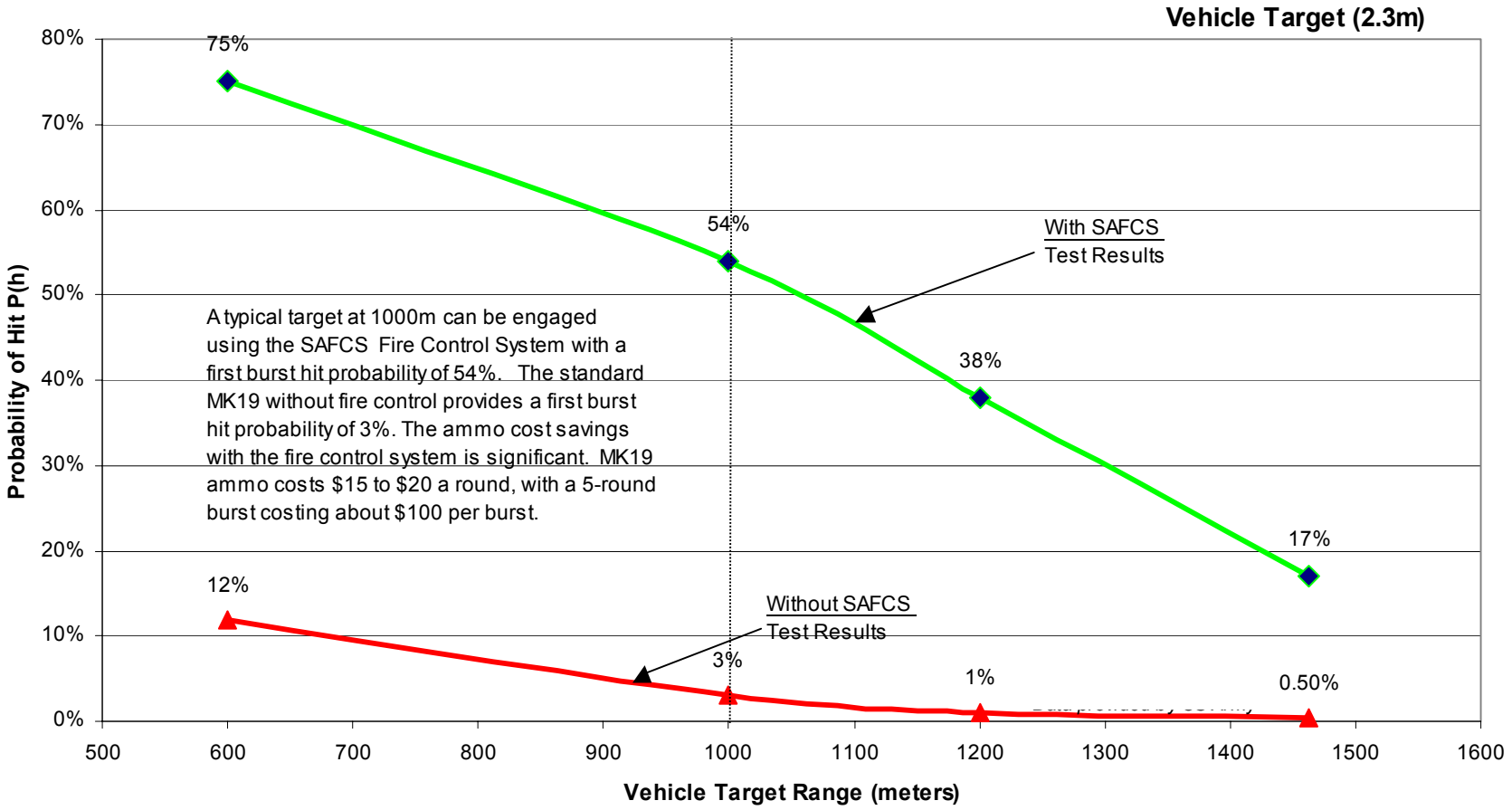

L3 communications Brashear

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NDIA

nternational Infantry & Joint Services Small Arms Systems
Annual Symposium, Exhibition & Firing Demonstration

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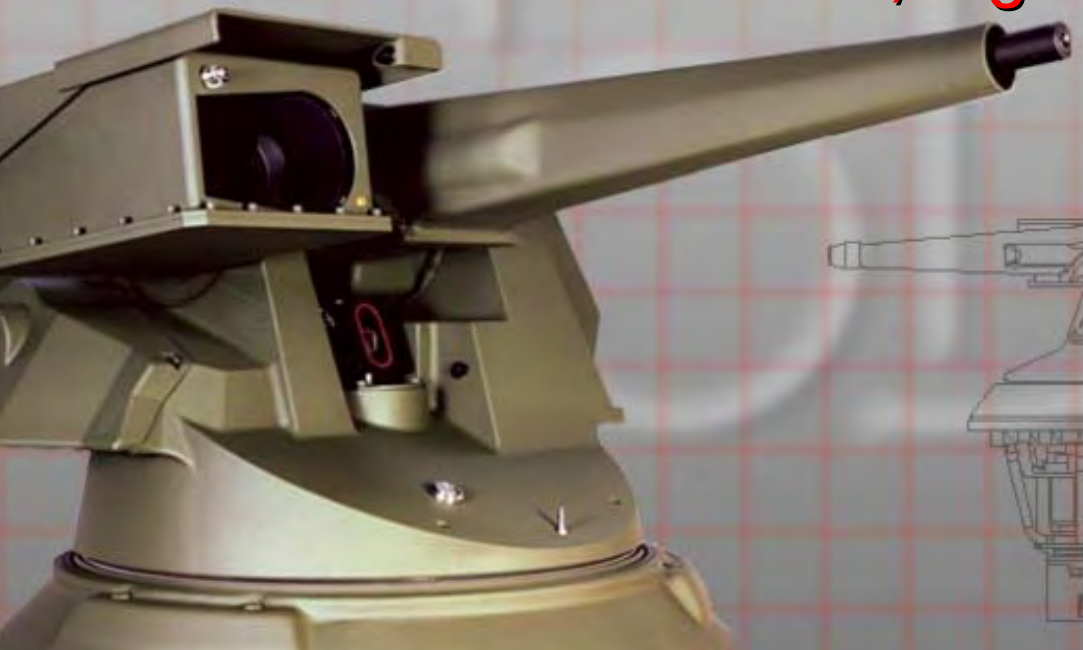
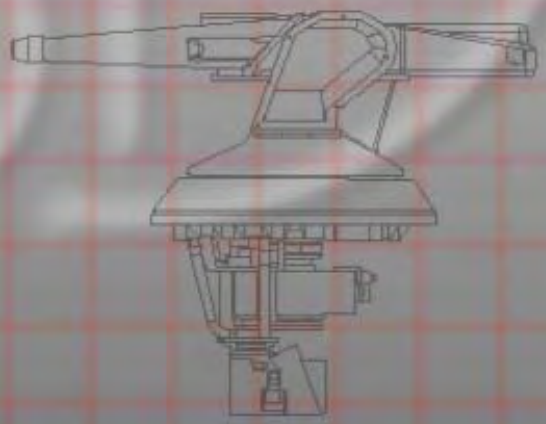
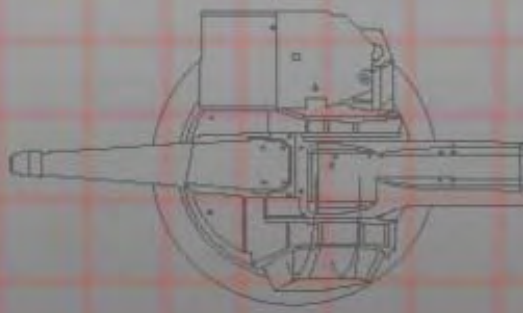
The Oto Melara HITROLE® 7,62 – 12,7 – 40 mm
Remote Overhead, Light Electrical Turret







PRESENTATION

THE COMPANY

HITROLE® family 7.62 – 12.7 – 40mm

COMPANY

FINMECCANICA

AEROSPACE

ENERGY

DEFENCE

INFORMATION TECHNOLOGY

TRANSPORTATION

Oto Melara, a company of Finmeccanic operates within the Group in the field o armament for defence.

Revenues	8,6*
Portfolio of orders	22,3*
New Orders	9,1*
Employees	47,000

* Billion €

COMPANY

OTO PLANTS

LA SPEZIA

BRESCIA

INCORPORATED:

OTO MELARA IBERICA — **VALENCIA – SPAGNA**
OTO MELARA NORTH AMERICA — **WASHINGTON DC - USA**

COMPANY

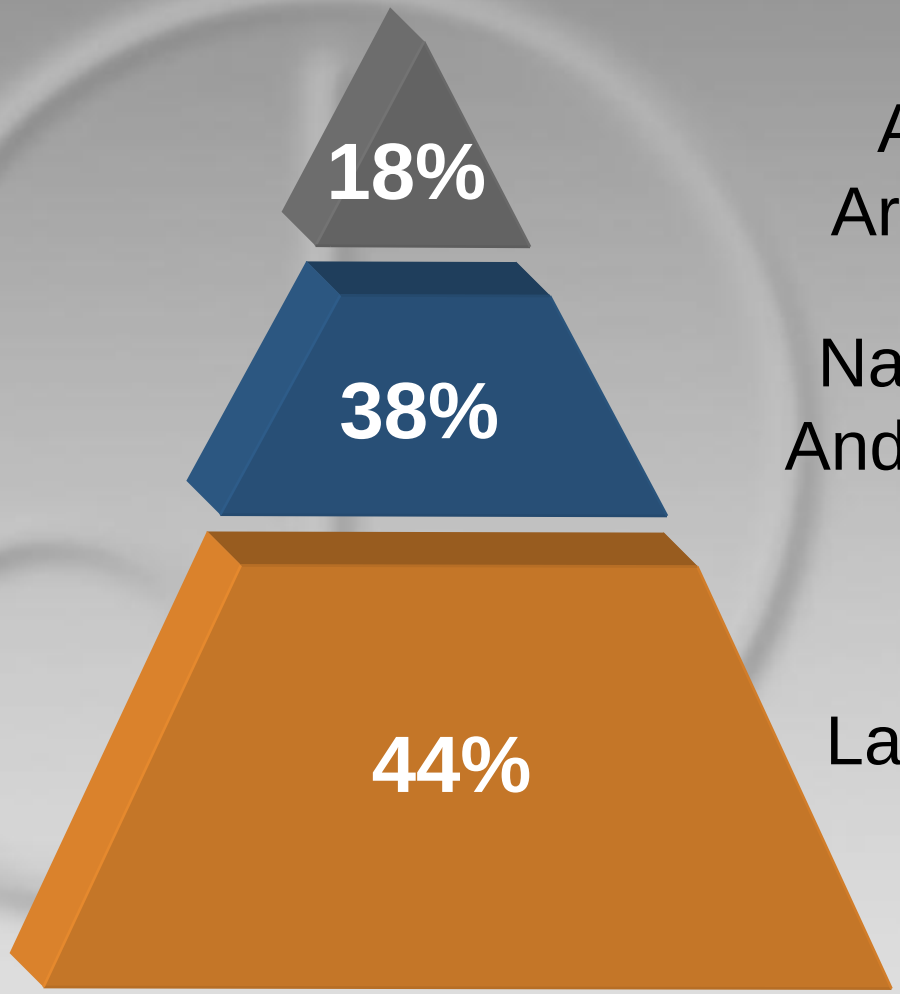
MAIN FIGURES

Turnover	345,00*
R & D	7%
Portfolio of orders	1,172*
Personnel	1,344

* Million €

COMPANY

SALES SHARING



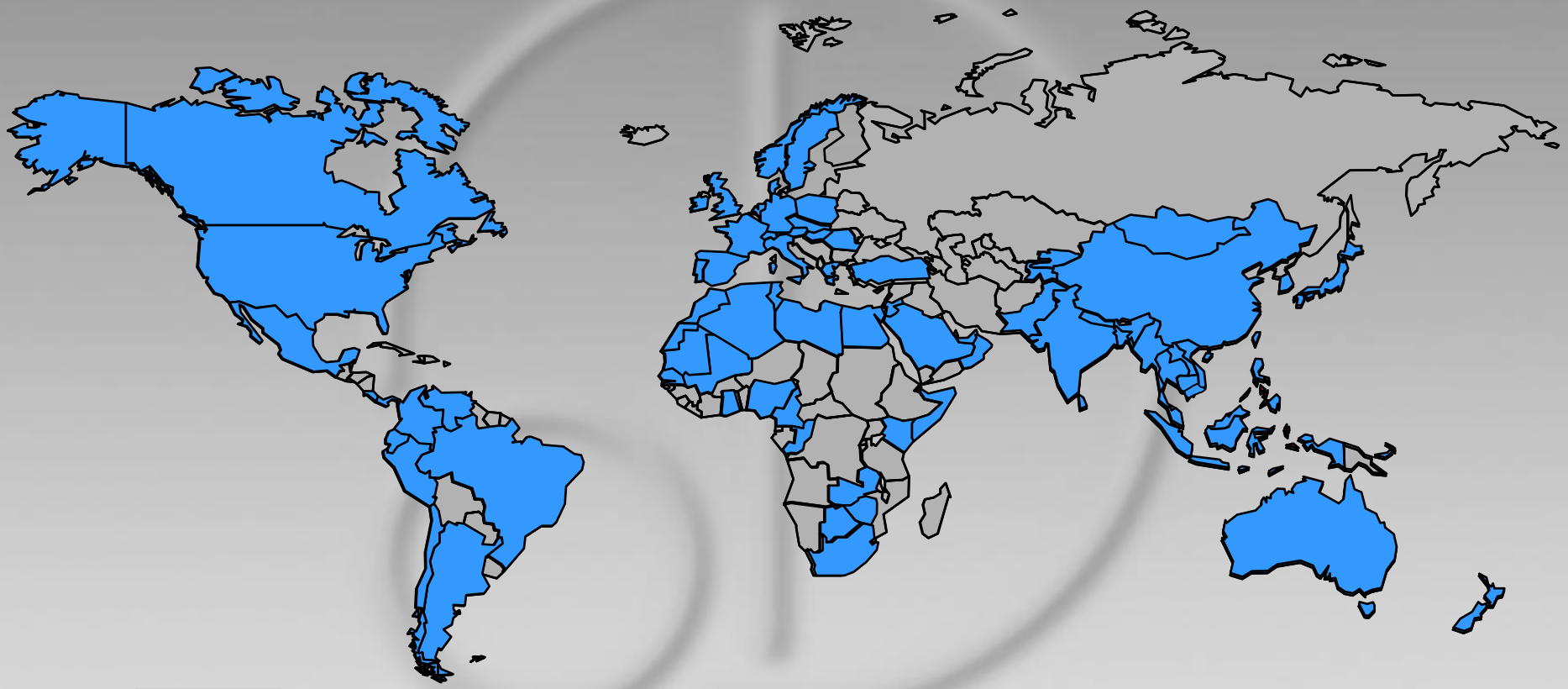
Airborne Armaments

Naval Systems And Ammunition

Land Systems

COMPANY

CUSTOMERS

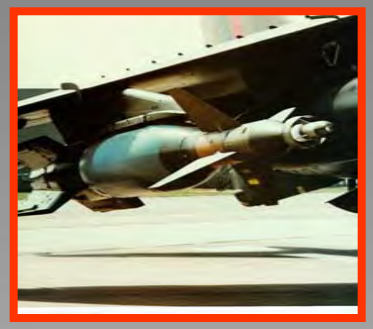


oto melara

COMPANY

AIRBORNE ARMAMENTS

- **TM 197 B turret**



- **GBU-12D/B & 16H/B PW II**
- **JDAM systems**
- **Laser Guided Paveway**
  GPS/Laser Guided Paveway

COMPANY

NAVAL STSTEMS

- 12.7 mm

- 25 mm

- 30 mm

- 40 mm

- 76/62 C

- 76/62 SR

- 127/54 C

- 127/54 LW

COMPANY

LAND SYSTEMS VEHICLES

- **Ariete M.B.T.**

- **DARDO Family**

- **CENTAURO Family**

- **PUMA Family**

COMPANY

LAND SYSTEMS TURRETS

- **HITFIST®**
  - 25 mm
  - 30 mm
  - 60 mm

- **HITROLE®**
  - 7.62 mm
  - 12.7 mm
  - 40 mm

- **HITFACT®**
  - 105 mm
  - 120 mm

The Oto Melara range of Turret Weapon Systems fulfils the widest range of operative requirements of a very modern Army

from Light Armoured Vehicles

HITROLE® family

to medium weight IFVs

HITFIST® family

To heavy weight Combat Vehicles

HITFACT® family

PRESENTATION

THE COMPANY

HITROLE® family 7.62 – 12.7 – 40 mm

oto melara

A FINMECCANICA COMP

HITROLE®

12.7 mm

HITROLE® 12.7mm

ADVANCED REQUIREMENTS

- **Survivability** — *Under Armor operated*
  Remotely operated
- **Accuracy** — *Stabilization*
  Servo systems
  IL TV, IR
- **Flexibility** — *7,62mm; 12,7mm; 40mm*
- **Versatility** — *Light Weight*
  Interfaces
  Basketless

HITROLE® 12.7mm

OPEN ARCHITECTURE

SIGHT

MG 12,7

IR TV

SGL

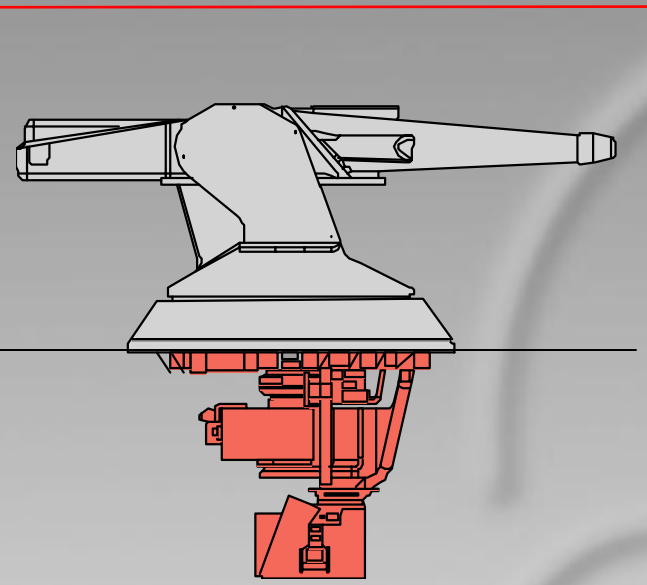
2nd CC

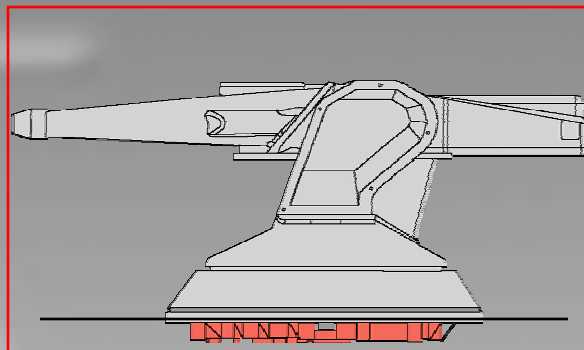
MMI

ETE

HITROLE® 12.7mm

SURVIVABILITY





From inside the vehicle

•Recocking •Reloading •Observation •Aiming •Firing

HITROLE® 12.7mm

ACCURACY

- Operator stationary
- 1x 3x channels day optic
- Night Vision System (IL TV, IR Option)
- Gun vs. Vehicle designation

- Electric Servos & Stabil.
- Elevation -13 +50°
- Training nX360°
- Internal Target Designat *(option)*

HITROLE® 12.7mm

EFFECTIVENESS

- Reloading time < 1min
- Servo performance :
  - Training - speed 60°/s
    - accel. 50°/s²
  - Elevation - speed 25°/s
    - accel. 50°/s²
- Autonomous Stabilization with built-in gyros
- Digital Servos
- Brush less Motors
- CAN-BUS link

HITROLE® 12.7mm

WEAPONS

GUN 12,7 mm MG (FN Herstal, others)
or
7,62 mm MG

alternatively

AGL 40 mm (MK 19 GD, others)

- 12.7mm cannon

- 40mm AGL

Easy weapon change on the field

HITROLE® 12.7mm

TV CAMERA

Type	3 – 5 µ
Azimuth view	nx360°
Zenith view	-15° +50°
Field of view	3° and 9°

HITROLE® Configuration

Options

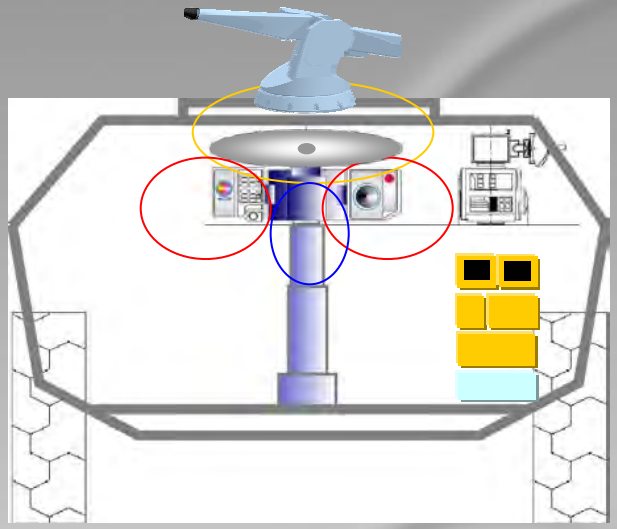
LAND SYSTEM

NAVAL SYSTEM

LAND SYSTEM

HITROLE® 12.7mm

GROWTH POTENTIAL



- Stabilised & mast platform
- Set of Sensors
- Sensors elaborator
- Remote Command & Control

RSTA + HITROLE

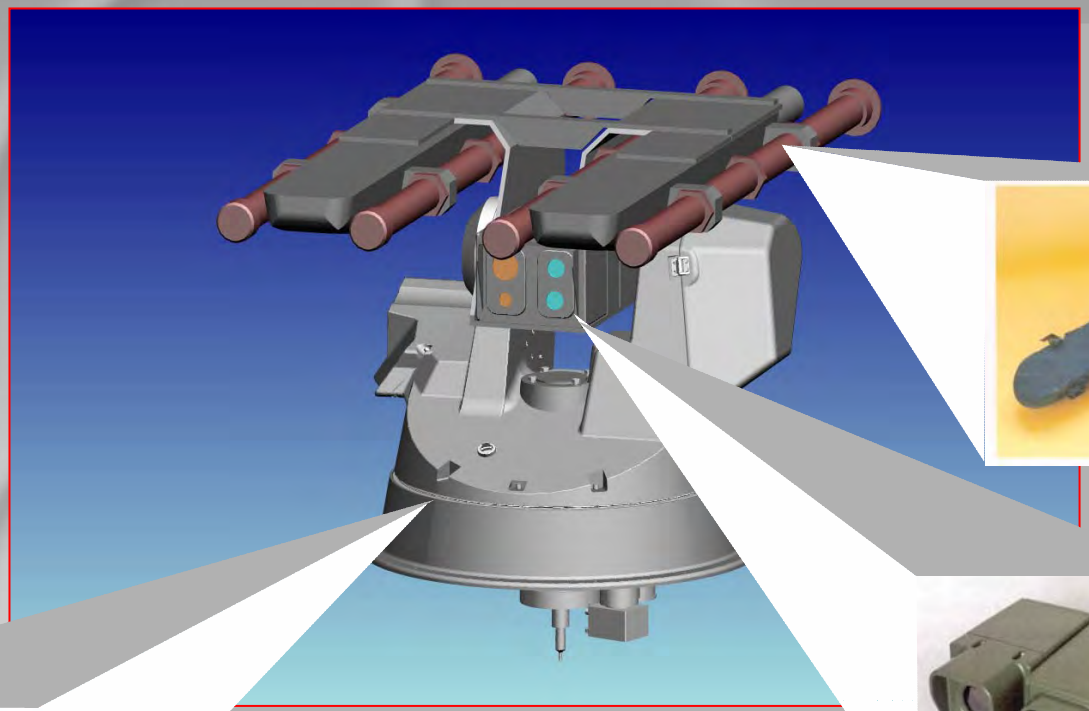
On board & on ground composition of sensors

- Radar TMI (Target Moving Indicator)
- Platform
- Optics
- IR
- Laser

HITROLE® 12.7mm

GROWTH POTENTIAL

Remote command & control



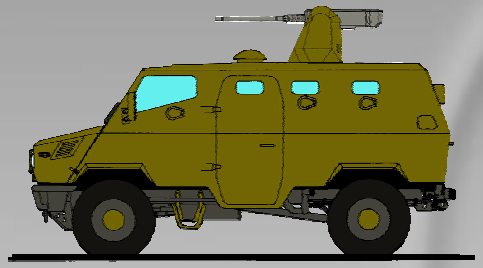
Stinger

Optical sensors

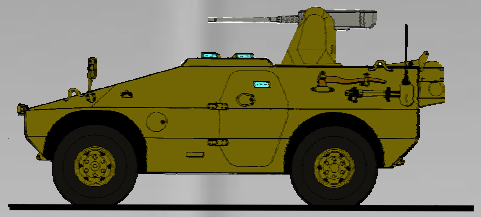
HITROLE® Turret

HITROLE® 12.7mm

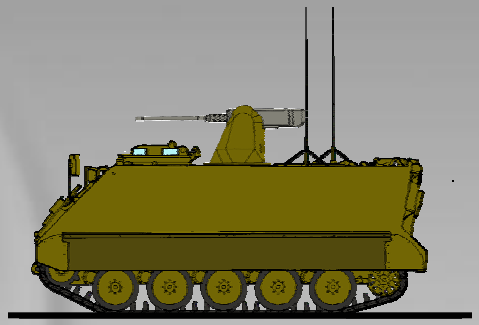
ROLES



Logistic



Recce Scout



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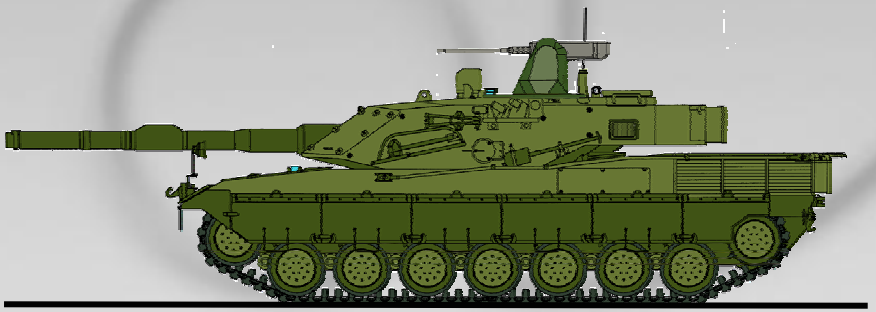

M B T

HITROLE® 12.7mm

PUMA 6x6

HITROLE® 12.7mm

HMMWV

HITROLE® 12.7mm

M113

HITROLE® 12.7mm

AMV PATRIA

A Secure profile

Defence is our History

Leadership is our Goal

Customers are our Strength

The Marketplace is our Challenge

Oto Melara. A new look, the usual and expected excellence

1905 2005
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A FINMECCANICA COMP

FINMECCANICA

The Modular Combat Shotgun

19 May 2005

Ed Schoppman

Remington Military Products Division

Military Shotgun History

- Due to the manner in which they are configured, currently issued military shotguns cannot effectively meet all combat applications. This is a by-product of historical doctrine.
- Cold War use of the shotgun was limited mostly to:
  - **Guard Duty/Security Detail**
  - **Military Police Use**
  - **Some limited SOF use as dedicated breaching tools**

Lessons Learned/Needs Identified

- Both SOF and Conventional units have been tasked with more elaborate missions than in the past, particularly in UO scenarios.
- OEF/OIF AARs have identified numerous “new” applications for military shotguns.
- Depending on the situation, a properly configured shotgun may be preferred over the use of currently issued rifles or pistols.
  - **A single 3” load of 00 buckshot contains ***FIFTEEN*** .33 caliber projectiles and has the same mass as ***THIRTEEN*** M855 bullets.**
  - **A single 1-3/8 oz. 12 gauge slug has the same mass as nearly ***TEN*** M855 bullets.**

Lessons Learned/Needs Identified

- The ideal shotgun must reliably cycle ALL shotshell ammunition across the military spectrum:
  - **Low powered NL loads (rubber pellet, bean bag, rubber baton, etc)**
  - **Breaching ammunition**
  - **Magnum buckshot and slugs**
- Autoloaders are simply not up to the task, particularly in sandy or debris-filled environments. Manual action designs are therefore preferred.

Lessons Learned/Needs Identified

- Recent AARs stress the use of the shotgun for the following purposes:
  - Ballistic Breaching Tool
  - Vehicle Security/Aircrew Surv. Weapon
  - CQB/Entry Weapon
  - High Cap. Conventional Weapon
- The weapon should be configured with whatever the characteristics are that match the tactical need. Most commonly cited are changes to the magazine capacity, sighting system, barrel length, and buttstock or pistol grip options.

Needs Identified

Breaching Tool

- Stand alone breaching shotgun or accessory mounted (accessory shotgun concept in combat is reportedly of debatable value, e.g. degradation of the performance of both weapons)
- Integral hand stop
- Short barrel length (10” barrel) preferred
- Single point sling attachment
- Pistol grip
- 3+1 capacity (2.75” or 3” shells)

Needs Identified

Vehicle Security/Aircrew Survivability Weapon

- Short (10” barrel) preferred
- Stock with pistol grip preferred, similar ergonomics to M16/M4
- OAL should allow weapon to be maneuvered inside vehicles or stored efficiently in aircraft
- Ability to attach ancillary sighting devices

Needs Identified

CQB/Entry Weapon

- **CQB shotgun can mitigate:**
  - **Overpenetration of CF projectiles which can lead to collateral damage**
  - **The perceived need to engage enemy combatants with multiple shots from 5.56 weapons**
- **14” barrel preferred with simple sighting device, in addition to the capability to attach ancillary sighting devices**
- **Stock with pistol grip**
- **Higher capacity (5+1) preferred**
- **Interchangeable choke tubes desired**
- **Tactical sling attachments**

Needs Identified

High-Capacity Conventional Weapon

- **Can tailor the load to meet the threat (CQB distance, long range, lethal vs. non-lethal)**
- **Longer barrel with adjustable sighting system enables aimed, longer range shots with slugs**
- **Capability to attach ancillary sighting devices**
- **Higher (6+1) capacity**
- **Stock with pistol grip**
- **Interchangeable choke tubes desired**
- **Tactical sling attachments**

The Modular Combat Shotgun Solution

- ***Problem*** – In the past fulfilling all of these requirements would result in multiple differently-configured shotguns dedicated to specific tactical scenarios.
- This is an inefficient use of procurement $ and a drain on the PLL/logistics system.

- ***Solution*** – A ***MODULAR*** combat shotgun system that fulfills all requirements in a single weapons package. Above all else this system must be:
  - ***Reliable*** **(Key component of system Lethality)**
  - ***Durable*** **(Long track record of a proven strong design)**
  - ***Operator Friendly*** **with proven ergonomics and high user assessment ratings**

The Modular Combat Shotgun Solution

- ***THE GOAL*** = Provide a NDI shotgun weapons system that meets all of the needs identified in a single package.
- The Modular Combat Shotgun must have the capability to be configured or reconfigured at the operator level –
  - **WITHOUT the use of tools.**
  - **WITHOUT loose parts that can be lost or damaged.**
  - **To quickly and easily match the flexibility required of the modern battlefield.**

MCS Activity

- US Air Force Security Forces (Over 4,000 units to date, assigned NSN, T.O. written)
- USSOCOM (Over 300 units to date)
- USASOC (Under consideration)
- US Marine Corps (Under consideration)
- 1st Cavalry Division (MNS written, NCLA samples in theatre)
- 2nd Infantry Division (MNS written)
- 3rd Infantry Division (MNS written, NCLA samples in theatre)
- 4th Infantry Division (MNS written, NCLA samples in theatre)
- 101st Airborne Division (MNS written)
- US Army Marksmanship Unit (Purchased several units)

Conclusions

- Adopt a true COTS platform that has already-established military acceptance and logistics structure.
- Focus on the Operator's real needs:
  - **Full Operator-level System modularity**
  - **Multiple Stand-Alone capabilities**
  - **Durability and Reliability**
- De-Focus on "other" requirements of limited value:
  - **Attaching the shotgun as an accessory to a rifle**
  - **Detachable box magazines**
  - **Stand-offs**
- The MCS concept has been accepted and is gathering momentum and it may be in the interest of all the service branches to adopt a common system.

Lightweight Remotely Operated Weapon Systems

Presented to:

NDIA International Infantry & Joint Services Small Arms System Annual Symposium

Session VIII: Weapons and Ammunition

19 May 2005

Anthony J. Sebasto
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973-724-6198

Bottom Line Up Front

- **A given…..Remotely Operated Weapon Systems dramatically enhance lethality and increase soldier survivability; Combat proven!**
- **Proliferation of remotely operated weapon systems for manned/unmanned platforms undoubtedly dependent on size, performance, and cost design trades.**
  - **One-size doesn't always fit all!!**
  - **70-80% solution to a current requirement likely 100% solution for much broader customer base (fosters "Economy of scale production")**
- **Remotely operated systems generally result in degradation in situational awareness; Technology insertion required to "buy back" capability**
- **ARDEC developing two lightweight remotely operated weapon systems to demonstrate "What's possible?" to the warfighters**
  - **Picatinny Lightweight Remote Weapon Station (PLRWS)**
  - **Special Weapon Observation Reconnaissance Direct-Action System (SWORDS)**

How small, light, and affordable can you make it and still deliver acceptable firepower????

Picatinny Lightweight Remote Weapon Station (PLRWS)

Objectives:

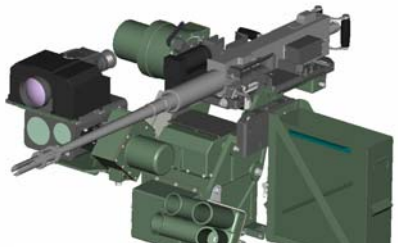
- Demonstrate lightweight cost effective system that can be affordably proliferated across spectrum of manned/unmanned platforms designed for weapons most available to units

Remote Weapon Station Design Drivers

- Weapon & Ammunition Quantities; weight/inertia/recoil forces
- Sub-system weight and inertia (sight, structure, stabilization sensors)
- Slew rates, accuracy and stabilization performance
- Sub-system armor
- Sensors: Sight package; Day/Night, Acoustics, 360^{o} Camera
- Continuous 360^{o} azimuth slew; slip ring requirements
- Vehicle Integration; sub-system mounting, power, operator station, cable routing

Existing Remote Weapon Stations
Some Examples

Kongsburg RWS



Recon Optical CROWS

Kollmorgen CLAWS

GD/RAFAEL Mini-Typhoon

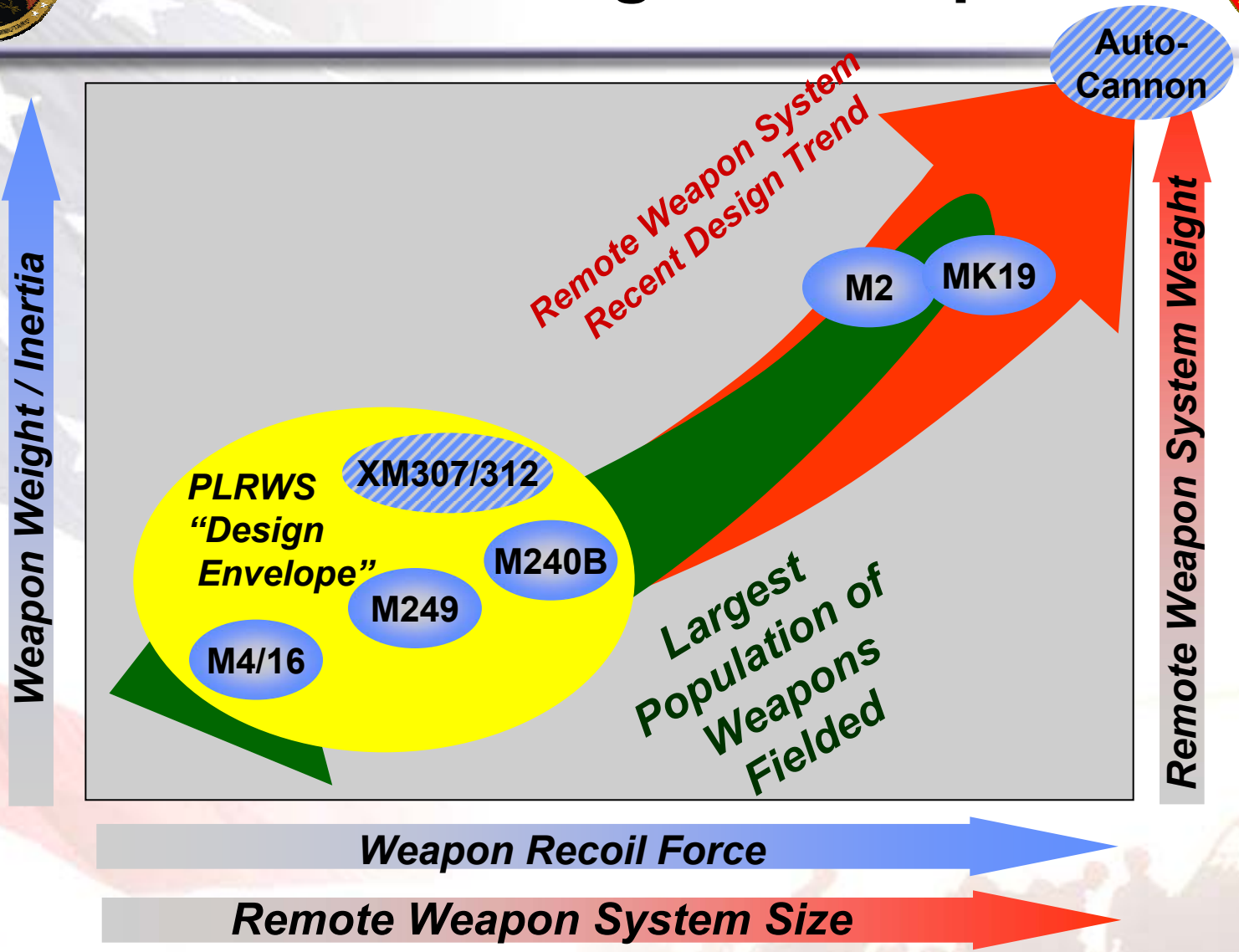
Others

- ROSAM
- HITROLE
- ????

RAFAEL RCWS

- Many great systems developed and fielded
- Most designed (structure & stabilization) for both 0.50 cal & 40mm Grenade Machinegun capability in addition to 5.56/7.62-class machineguns
- System weights generally fall between 200-500lbs w/o gun & ammo

PLRWS "Design Envelope"



Opportunity exists for a "light-class" remote weapon station

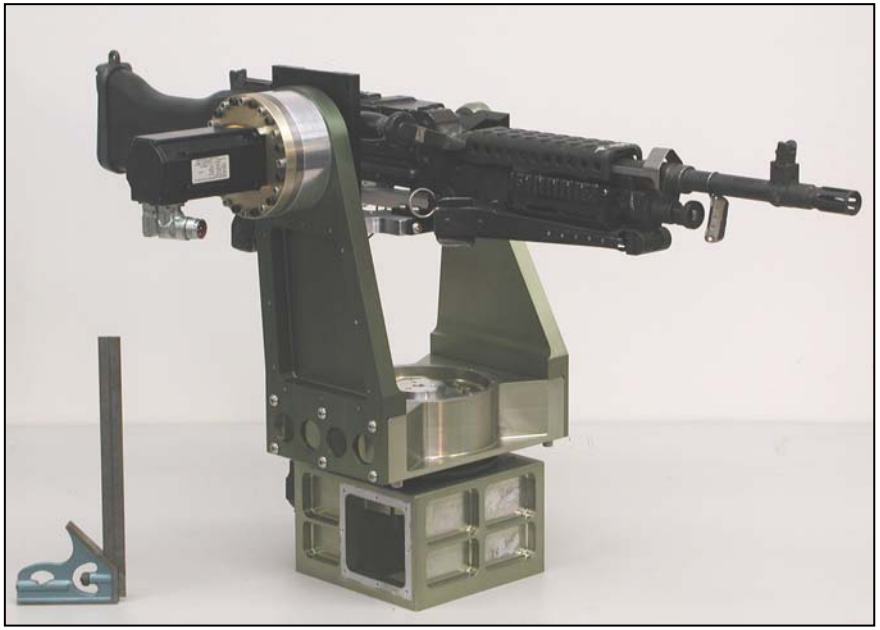
PLRWS

Program Description

- **Customer:** PM-Soldier Weapon & Rapid Equipping Force
- **Funding:** ~$1.7M
- **Weapons:** M240/M249 (& Future XM307/312)
- **Applications:**
  - HMMWVs
  - Trucks
  - Emplaced Weapon Sites
  - Unmanned Ground Vehicles
- **System Capabilities (Goals):**
  - Weight: <150 lbs above the roof
    (incl: gun & 200 rounds)
  - Slew rates: 90 deg/sec in Az and El
  - 2-Axis Stabilization
  - Continuous 360^0 rotation
  - Elevation Range $+45^o$ to -15^o
  - Integrated Crew Station

PLRWS
Status/Plans

- System Development:
  - Fabrication 90% complete
  - Integration 60% complete
- Weight/Slew rate goals achieved
- Structural firing test Apr 05
  - Structure sound
  - Tight weapon position held



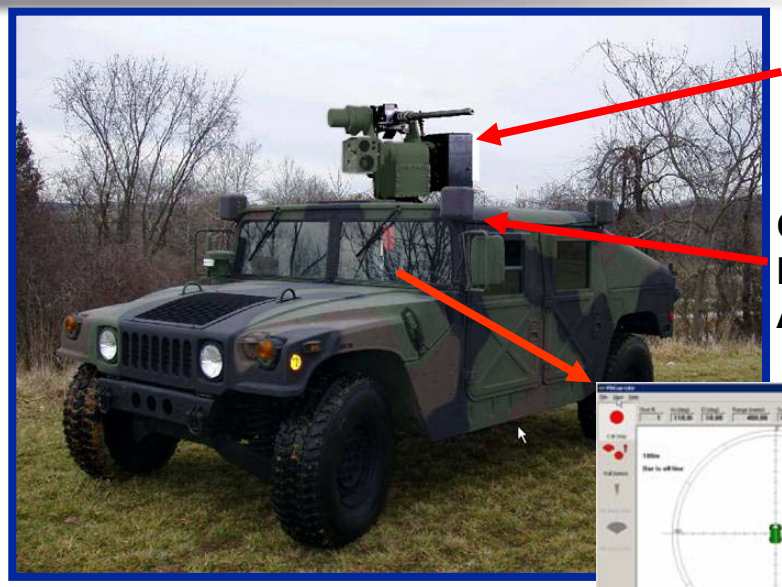
- Integration of XM116 Small Arms Fire Control System (SAFCS II) with stabilization software and control unit Jul/Aug 05
- Hardstand/Vehicle testing Aug/Sept 05
- Support customer demonstration requests Sept – Feb 06
- Insert technology enhancments as available

Remote Weapon Acoustic Counter Sniper

Example of "Tech Push" for Early User Demo

• **Objective:** Demonstrate an integrated low-cost acoustic sensor to provide a slew-to-cue capability against snipers while on-the-move.

- **Description:**
  - Integrate with Common Remotely Operated Weapon System (CROWS)
  - Full 360° hemispherical coverage for acoustic detection of gunfire and location of shooter
  - Mobile Subsystem and INS for on-the- move updates
  - Automatic or Manual Weapon Positioning via touch screen on GUI
- **Customer:** PM-Soldier Weapons (PM-SW) and AMC-FAST (USARPAC)



- **Status:**
  - CROWS/Acoustic system interface complete; Integration underway
  - 6-week test program planned May/Jun with live-fire against remotely operated HMMWV
  - User evaluators from USARPAC
  - ARDEC and with PM-SW working path ahead for evaluations in Iraq

Provides situational awareness for most critical threats....Shooters!

Special Weapon Observation Reconnaissance Direct-Action System (SWORDS)

SWORDS

Program Description

- **Objective:** Demonstrate integration of available firepower options on small, low-cost, remotely operated weapon system at extended ranges
- **Warfighter Payoffs:**
  - Remotely Operated Recon, Security, Sniper Asset
  - Increased weapons accuracy/control
  - Early opportunity for TTP development
- **Design Approach:**
  - Maximize use of proven components
  - Enable easy integration of existing fielded small arms
  - Early User feedback on design
  - Early Safety Confirmation testing
- **Joint ARDEC/OSD funding (~$2M)**
- **Transitions to Joint Project Office for Robotic Systems**

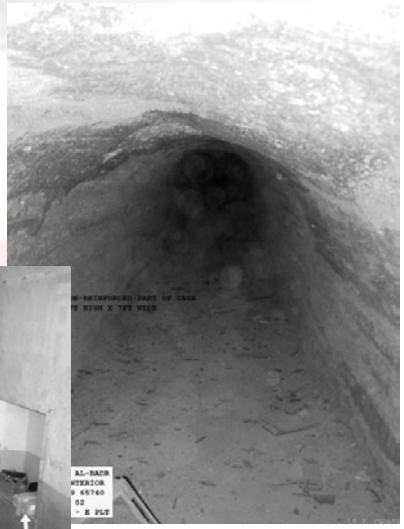
Foster-Miller
A QinetiQ Company

precision remotes

Helps keep soldiers out of harms way

Background

- Project initiated from a deployed EOD Unit's desire to clear cave entrances of potential threats (i.e. IEDs, enemy combatants)
- Two (2) concept demonstrators completed in ~1 month+
  - ARDEC EOD NCO "boot strap project"
  - Capitalized on existing EOD TALON Robot
    - Reinforced EOD robotic arm
  - Maximized use of existing armaments and/or ammo



Live Fire - Early Concepts

40mm Grenade Launcher

Mobile 40mm Grenade Launcher Prototype Tests

sponsored by TACOM

Range supported by ARDEC - Picatinny

testing perfromed by Foster-Miller

Live Fire - Early Concepts

M202 66mm Rocket Launcher

Early User Demonstrations

- Army's Stryker Brigade
  - FY03 at Ft. Lewis; Proof of Concept
  - FY04 in Kuwait; User evaluation
  - Yielded evolution of SWORDS configuration integrating small arms
- SOCOM in FY03/04
- VERY POSITIVE feedback on utility of concept

Early User Feedback Key to Validate Design Principles

System Description
Latest Configuration

- Integrates TRAP Mount on TALON
  - Accurate weapon pointing independent of chassis
  - ± 35° Az and ± 22.5° El
  - Integrates M249, M240B, M16, & 0.50 Cal Sniper Rifle w/o weapon modifications
- Unmanned RF control to 1KM (line-of-sight) via Operators Control Unit (OCU) for:
  - Mobility
  - Camera display options (view up to four images)
  - Weapon arm/safe/firing
- Five cameras/sights
  - Day/ Night drive cameras
  - Pan & tilt camera (situational awareness)
  - M145 w/Unitary Night Sight (Gen 3) for targeting
- Combat weight 180-190 lbs (w/o OCU)
- 3-6hr Lithium Ion Battery Life
- ~$200K/Sys (Target: ~$150K/Sys)

Live Fire & Mobility Demo

(segment from History Channel's "Mail Call")

Safety Confirmation Test Program

- Initiated early in development to support Urgent Material Release and flush out any anomalies
  - Two test iterations: Jun 04 & Jan 05
  - Included 100hrs reliability testing
- Testing currently halted; Program addressing test findings
- What's been demonstrated:
  - Stable firing platform for accurate single shot & burst performance
  - Better line-of-sight range command control performance than expected
  - Excellent video performance from cameras/sight upwards to 1km
- Remaining areas to be validated:
  - Weapon safety during communications loss/interruption & operator notification
  - Fire on the move disable feature
  - Lithium battery performance parameter refinement (controls) for safe operation, charging, and discharging
  - Sunlight readable LEDs on OCU

Design modifications required for operation in theater of war

Path Ahead

- Return to Safety Confirmation Testing (~Jun 05)
- Continue demonstration of capabilities to Users
- Continue preparation activities for Urgent Material Release
- Plan and seek resources for follow-on spiral improvements

Summary

- **Remotely operated weapon systems…. “one size” doesn’t necessarily fit all [applications]**
- **Biggest market opportunities will likely be met with the smallest and most affordable solutions delivering sufficient firepower**
- **PLRWS will demonstrate warfighter benefits of lightweight remote mounts for broader set of vehicle applications**
- **SWORDS provides a small, low-cost integrated mobile weapon platform demonstrating future technology <u>TODAY!!!</u>**

ARDEC/Picatinny…….

Products, people, and processes enabling our ultimate customer, the soldier, to “take care of business” throughout the spectrum of conflict!

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CRANE

NDIA 2005 International Small Arms Symposium & Expo

S.C.A.R.

S.O.F. COMBAT ASSAULT RIFLE

OPERATOR ENVISIONED, TESTED, CHOSEN

Mr. Troy Smith

19 May 2005

U.S. Special Operations Command
SOF WEAPONS

NAVSEA
WARFARE CENTERS
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Why SCAR?

SCAR gives the SOF Operator a Weapon that is Specifically Designed for SOF By SOF

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Program Requirements

- SCAR JORD approved January 2004
- Provides a Family of Weapons with Ergonomic and Parts Commonality, thereby Enhancing Mission Effectiveness, Reducing Training Time and Logistics Down Time and Cost
- Modularity (Barrel and Caliber) Increases Operational Flexibility and Reduces number of Weapons required to meet the Operational Need
- Initial Weapons Family (5.56mm, 7.62mm, 40mm) with

Increased	Reliability
	System Service Life *90K System Service Life*
	Barrel Life *15-35K Barrel Life*
	Environmental Capabilities *Over-the-Beach*
Reduced	Signature
	Life Cycle Costs *60-90% Parts Compatibility*
	Training *100% Ergonomic Commonality*

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Program Highlights

SCAR-Light (5.56mm)

SCAR-Heavy (7.62mm)

- *Conducted in a Full and Open Competition*
- *Nine Industry participants (12 Proposals) in Go/No Go Process*
- *14 SOF Operators assessed Samples/7 SOF Operators acted as Voting Members on Source Selection Board*
- *Less than 10 Months from Solicitation Issue to Contract Award*
- *Contract awarded 5 November to FN Herstal*
- *Concurrent Development of SCAR L, SCAR H and EGLM*
- *True Teaming Triad between Operators, Government and FN*

Operator Envisioned, Tested, and Chosen

Harnessing the Power of Technology for the Warfighter

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SCAR Family

SCAR-Heavy (7.62mm)

Caliber: 5.56mm	Caliber: 7.62mm
Tailored for 5.56mm	Caliber Modularity
Weight: 7.2 lb	Weight: 8.1 lb
Magazine Capacity: 30rd	Magazine Capacity: 20rd

Common Features

- Operation: Short Stroke Piston
- 100% Ergonomic Compatibility
- Rate of Fire: 550rpm
- EGLM Compatible
- Barrel Modularity: CQC, STD, and SV
- Enhanced Folding Stock
- OTB Capable
- SOPMOD Compatible

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SCAR Strategies

- Operator Involvement
  - Operator involvement in Requirements Generation process, including Early Market Research with Industry
  - 14 Operators involved in Early User Assessment
  - 7 Operators on Source Selection panel

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SCAR Strategies

- Operator Involvement
  - Conducted Three “Joint” Design Reviews within 5 months with FN
    - Reviewed all “ECPs” from the initial DT and Early User Assessment
    - Incorporated many of the ECPs in preparation for next Phase of Testing

Zutendaal, Belgium, SCAR H

Zutendaal, Belgium, SCAR L

- Next Joint Design Review June 2005
- Operators involved with Contractor Testing at FN June-August 05

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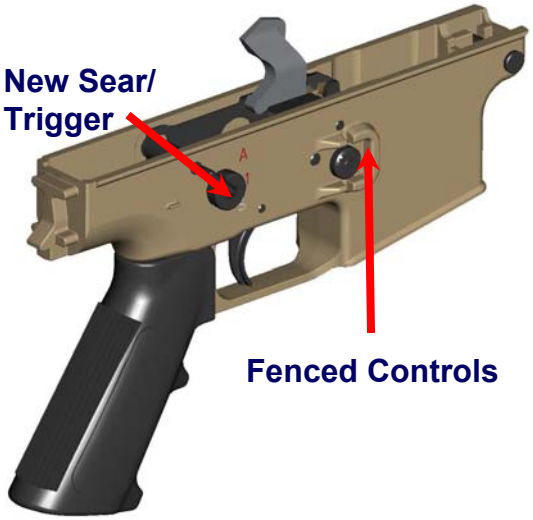
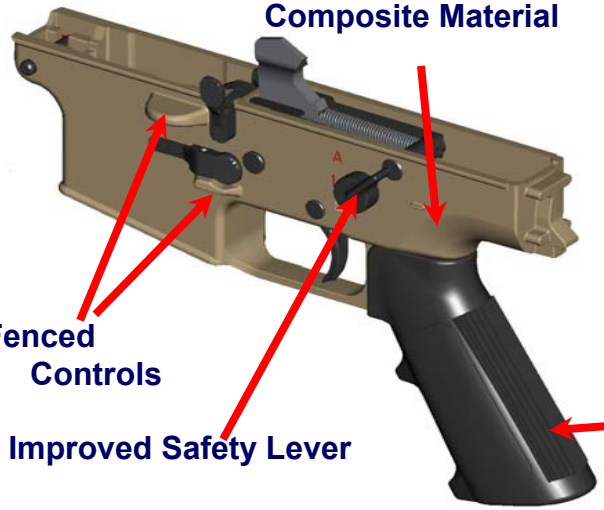
SCAR UPGRADES

Operator Tested For Improvement





Harnessing the Power of Technology for the Warfighter

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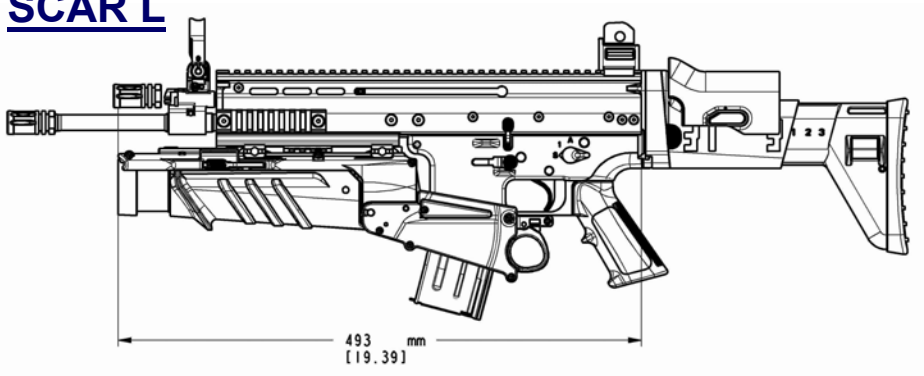
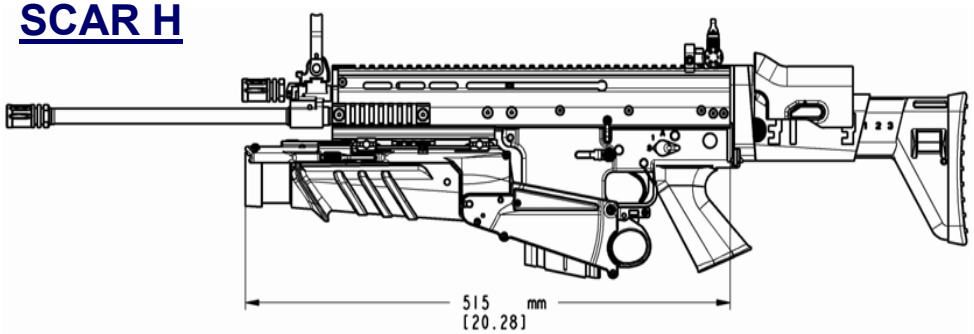
EGLM

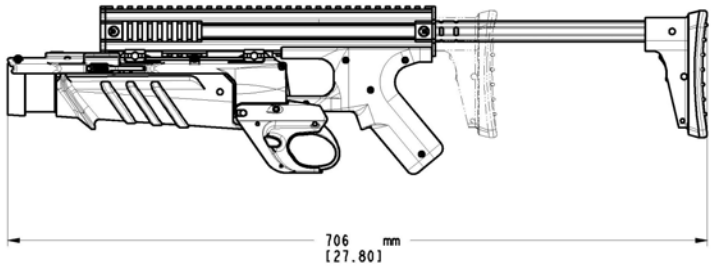
SCAR L



SCAR H

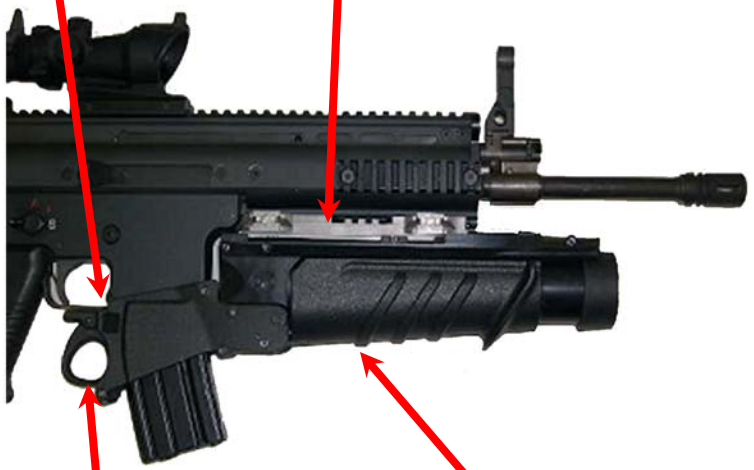


Stand Alone



Push Button Safety

Attaches at 6 o'clock Rail



Lock Breech

EGLM Trigger Mechanisms optimized per SCAR Configuration

Harnessing the Power of Technology for the Warfighter

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Possible Business Opportunities

- Training
  - Force on Force
  - Computer Based Training
  - Simulators
- Future Ammunition
  - Enhancements
  - New Calibers
- SCAR L, H and EGLM Test Units scheduled for delivery on 31 August 2005

SCAR Schedule

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2005		Design Review # 2		Design Review # 3		On-Site FN Testing		Delivery of Test Units		DT2	UA2	
2006	Milestone C	LRIP Production							Delivery of LRIPs			IOT&E
2007	IOT&E		FRP			SCAR L, H, & EGLM FUE						Increment 3

Harnessing the Power of Technology for the Warfighter

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Conclusion

USSOCOM is Leading the Next Evolutionary Step in Small Arms Development…at a Revolutionary Pace

- SCAR Program Fills a Need That Years of SOF Operator Experience Tells Us Still Exists
- A Multipurpose Weapon of Choice *With* Choices for Today's and Tomorrow's Battlefields
- SCAR Program Will Field the Best Possible Weapon System to the SOF Operator

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Unclassified

SOPMOD PROGRAM OVERVIEW

19 May 2005

PRESENTED BY:
MR. GUS TAYLOR
SOPMOD PROGRAM MANAGER

Unclassified

SOPMOD Program Overview

NDIA
NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

Presented to NDIA Small Arms Symposium

U.S. Special Operations Command
SOPMOD

Overview Agenda

- Mission
- Structure of the Program
- SOPMOD Block 1 Overview
- Increment 2 Overview
- SOPMOD Future
- Questions and Comments

Mission

The SOPMOD Program Management Office at NSWC Crane, IN, will provide standardized, versatile weapons accessories to meet needs across SOF mission scenarios. These accessories will increase operator survivability and lethality by enhanced weapon performance, target acquisition, ~~signature suppression,~~ and fire control. SOPMOD PMO will provide these accessories when they are operationally suitable, affordable, sustainable, and funded.

Capabilities Required:

- *Standardized versatile weapons accessories*
- *Modular- meets needs across SOF mission scenarios*
- *Increased operator survivability and lethality by enhanced target acquisition, signature suppression, and fire control*
- *Evolutionary Acquisition Subprograms:*
  - *Block I (Plus Platform Mods and Phased Replacements)*
  - *Block II (New and Combined Capabilities)*
  - *Block III (Emerging Capabilities)*

TASK ORGANIZATION

Fielding & Sustainment

SOF LCSM

ALGL PMO

RD&A & ISEA

SOF Small Arms Program Group

RD&A & ISEA

SOPMOD PMO

RD&A & ISEA

SOF Weapons PMO

SOPMOD Bosses

Quality

SOPMOD, as part of NSWC Crane, is ISO 9001 Certified

PERRY JOHNSON REGISTRARS, INC.

Certificate of Registration

Crane Division Naval Surface Warfare Center
300 Highway 361
Crane, IN 47522

ISO 9001:1994

Engineering, Logistics, Maintenance, Acquisition and Program Management of Products and Services that Support the Fleet in the Areas of Electronics, Electronic Warfare and Ordnance

Our Quality System is a set of formally documented activities that are carried out to ensure that we satisfy our customers' requirements.

Our Quality System is based on, and officially certified to, the requirements of ISO 9001-1994, an international standard for quality assurance in design, development, production, installation and servicing.

U.S. Special Operations Command SOPMOD

ISO 9001 NAVSEA Crane Surface Warfare Center Division

External Clients

NSWC Crane Supports "Paying Customers" outside of USSOCOM

Unclassified

Block 1

SOPMOD M4 Accessory Kit

Special Operations Peculiar Modification to the M4 Carbine

Block I Accessory Kit

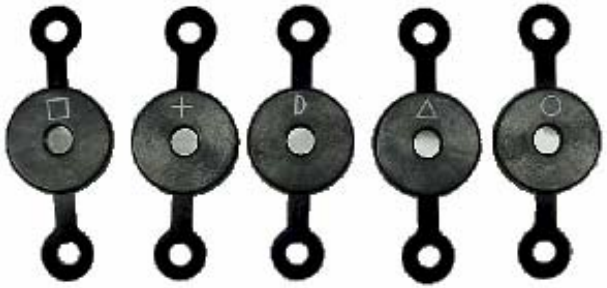
Poster Version 3 February 2005

Logistics Support: sofsustainment@navy.mil
Website: http://ssavie.socom.mil

SOPMOD Block 1 Modifications

PRIOR

ACOG 4x ANTI-REFLECTIVE DEVICE (ARD)



AN/PEQ 2 PATTERN GENERATORS

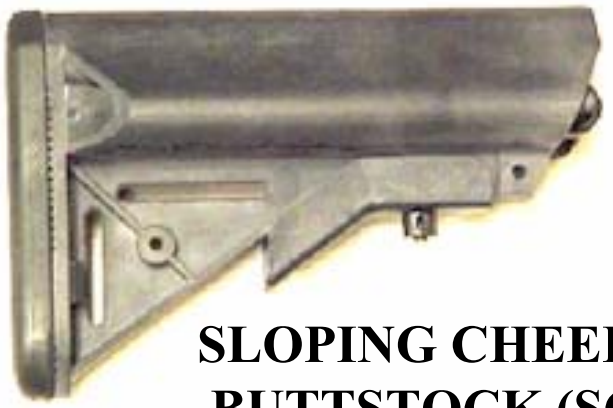
MNVS AN/PVS 17 THROW-LEVER MOUNTS

IMPROVED QD SUPPRESSOR ATTACHMENT

M4A1 Carbine Modifications

PRIOR

EXTRACTION PARTS SET #2

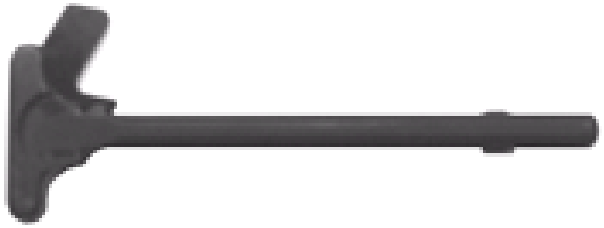


SLOPING CHEEKWELD BUTTSTOCK (SCB)

HIGH RELIABILTY MAGAZINES (HRM)

M4A1 Carbine Modifications

NEW



EXTENDED
CHARGING HANDLE

REDI-MAG

AMBIDEXTROUS
SELECTOR

NAVSPECWARCOM
SLING

SOPMOD Phased Replacements

PRIOR

ENHANCED COMBAT OPTICAL SIGHT - NAVY (ECOS-N)

REPLACES or SUPPLEMENTS

ACOG Reflex Sight (In WARCOM ONLY)

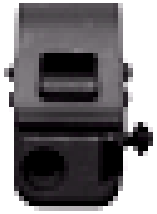
VISIBLE BRIGHT LIGHT II (VBL II)

REPLACES or SUPPLEMENTS

VISIBLE LIGHT ILLUMINATOR

SOPMOD Block 1

New Modifications



IMPROVED
M203 QD MOUNT

ACOG 4X MINIATURE
RED DOT (MRD) PIP

AN/PVS-17A UPGRADE KIT

SUREFIRE VBL II 6-VOLT
MINIATURIZATION KITS

New User Assessments

RED DOT MAGNIFIERS

GAS-DEFLECTING
CHARGING HANDLES

SCOUT LIGHT

SOPMOD Block 1
New Fielding Adds

Unclassified

SOFT CASES

ECOS-CQB
(Upgraded Holosight)

PEO-SP / SOPMOD Accomplishments

- Fielded $90M in War Equipment Since 9-11, 107,000 End Items in the Field
- Fielding $47M in New Equipment this Year, 58,000 End Items Inbound

Unclassified

MDNS

Enhanced Combat Optical Sight - Carbine (ECOS-C)

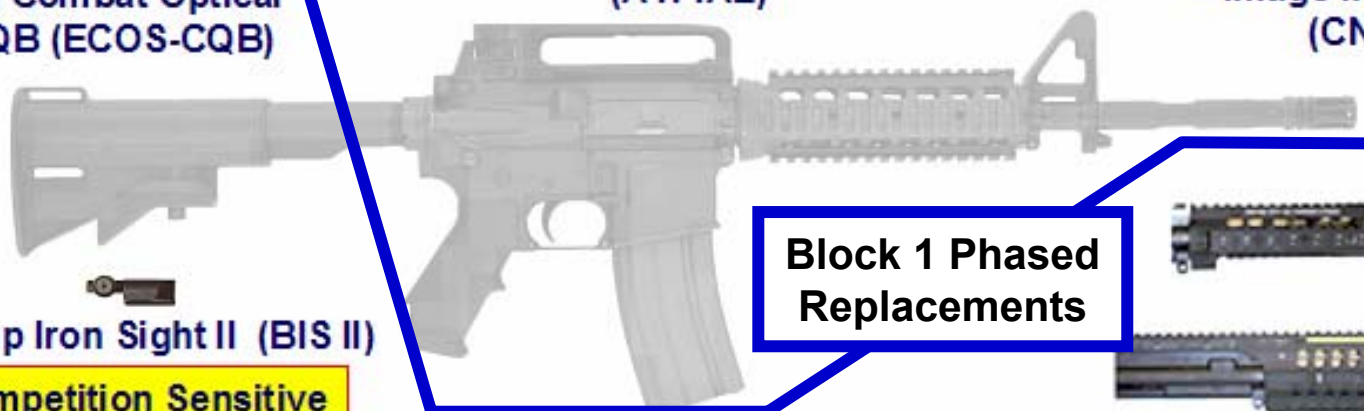
Clip-on Night Vision Device – Thermal (CNVD-T)

Block 2

Advanced Target Pointer/ Illuminator/Aiming Laser (ATPIAL)

Clip-on Night Vision Device – Image Intensification ($CNVD\text{-}I^2$)

Enhanced Combat Optical Sight - CQB (ECOS-CQB)



Backup Iron Sight II (BIS II)

Competition Sensitive

Block 1 Phased Replacements

Rail Interface System II (RIS II)

Visible Bright Light III (VBL III)

Competition Sensitive

Mini Night Vision Sight (PIP)

MDNS Client Weapons

SOPMOD ORD 5 - Core Small Arms (Threshold) ...Design For Use On:

M4A1 Carbine
M203 Grenade Launcher

ORD Annexes - Additional Weapons (Objective)
....Harden For Use On, and possibly develop versions for:

SCAR
CQBR (Mark 18)
MK46 LMG / M249 SAW Machineguns
MK48/ M240-N/M240/M240-B Machineguns
M14 and Mark 14 Enhanced Battle Rifle
AK-47/AK74 Series Assault Rifle
Mk-19 40mm Machinegun
M2-HB .50 Cal Machinegun
M72 LAAW
AT4-CS
MAAWS
MK11/SR 25 Sniper Rifle
MK12 Sniper Rifle
M-24 Sniper Rifle
300 WINMAG Sniper Rifle
50 SASR & M107 50 cal Sniper rifle

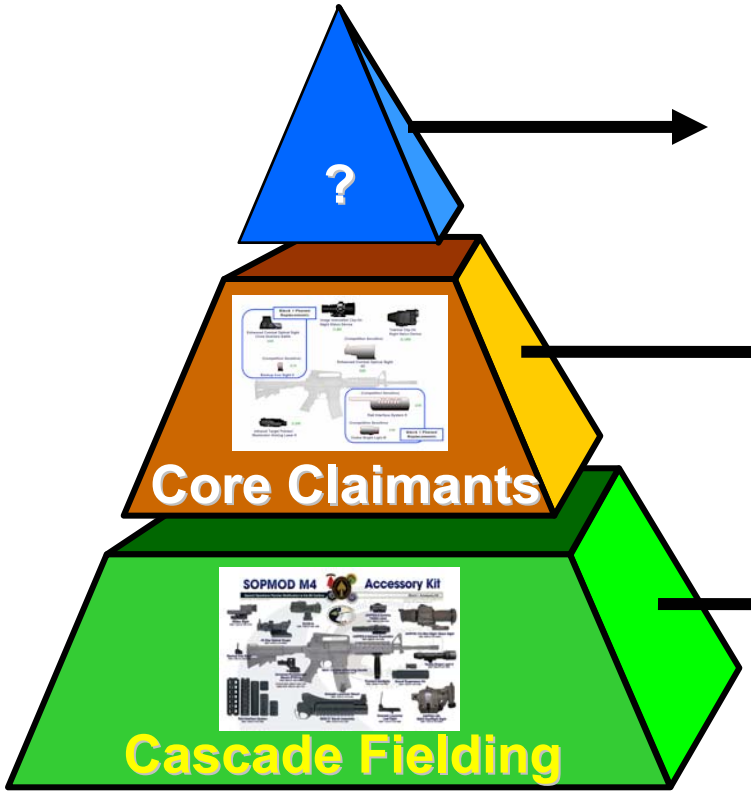
MDNS Weapons of Interest

Limited Interest – Generally Covered by UNS (AN/PVS 22), MUNS, DUNS

TOP MAP

SOPMOD Top Map Review

TOP MAP STRATEGY



Block III - Fielding 2007-?
Capstone of Emerging Technologies
Teamed with all Small Arms

Block II - Fielding 2005- 2010
System Integrated Capabilities
Teamed with All SOF Weapons

Block 1 - Fielded 1995-2005
COTS/NDI Capabilities
Teamed with M4A1 Carbine & M203

TOP MAP OVERVIEW

- Overview Top Map Shows Entire System at a Glance
- Five Detailed SOPMOD Accessories Top Maps Show Main Subsystem Categories
    1. Carbine Improvements
    2. Passive Day Aiming Systems
    3. Passive Night Aiming Systems
    4. Active Aiming Systems
    5. Weapons Shot Counters

Unclassified

USSOCOM INTEGRATED WEAPONS TOPMAP

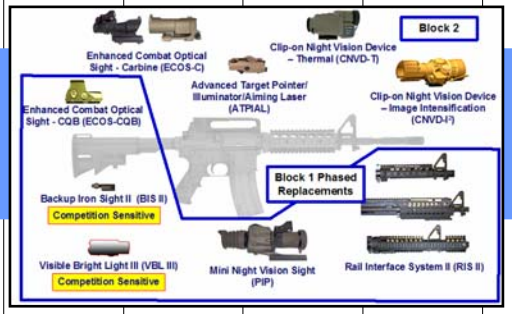
Existing Systems — Emerging Systems — Objective Systems

2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015

SOPMOD ACCESSORY KIT OVERVIEW

SOPMOD Increment #1 (1994-2007+)

SOPMOD 1
1994-2008+



SOPMOD 2:
MDNS & WSC
2004 -2012+

SOPMOD 3
2012-???

SOPMOD 1 & 2 Compatible With both M4A1 Carbine and SCAR

SOPMOD 2 Compatible With All SOF Weapons

Unclassified

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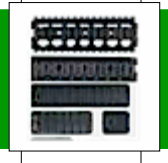
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

SOPMOD CARBINE IMPROVEMENTS

USSOCOM ORD Amendment 5, 29 October 1999

MDNS CDD approved 28 May 2004



RIS

RIS 2

Competition Ongoing

BIS

BIS 2

Competition Ongoing

CDR USSOCOM Directive May 1999

HRM (Alum)

HRM (Steel)
Managed By ARMY

Slings, Ambidextrous Safety, Stock, Cases, Small Parts, Etc.

System Life Ends When M4A1 Carbine Life Ends

Unclassified

USSOCOM INTEGRATED WEAPONS TOPMAP

Existing Systems — Emerging Systems — Objective Systems

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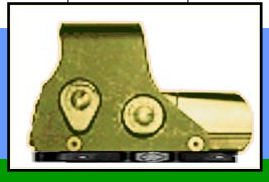
SOPMOD PASSIVE DAY SUB-SYSTEMS

USSOCOM ORD Amendment 5, 29 October 1999

MDNS CDD approved 28 May 2004

ACOG Reflex



ECOS-CQB

ECOS - N

ACOG 4x PIP

ACOG 4x

ECOS-C

Competition Ongoing

Unclassified

USSOCOM INTEGRATED WEAPONS TOPMAP

Existing Systems — Emerging Systems — Objective Systems

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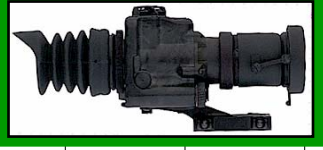
PASSIVE NIGHT AIMING SUB-SYSTEMS

USSOCOM ORD Amendment 5, 29 October 1999

MDNS CDD approved 28 May 2004

Weapon-Specific MNVS (e.g.. Crew Served)



MNVS AN/PVS-17A

AN/PVS-17A PIP

Universal Pocketscope Mount

Clip-on Night Vision Device – I2

CNVD Sensor Fusion

Clip-on Night Vision Device - Thermal

CNVD-Sensor Fusion Opportunity

CONCEPT IMAGE

Initial Objectives:

1. Improved Target Acquisition
2. Less than 2 Pounds
3. Less than $20K Per Copy

USSOCOM INTEGRATED WEAPONS TOPMAP

Existing Systems — Emerging Systems — Objective Systems

2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015

ACTIVE AIMING SUB-SYSTEMS

USSOCOM ORD Amendment 5, 29 October 1999

MDNS CDD approved 28 May 2004

Crew-Served Weapons Laser

ITPIAL Carbine AN/PEQ-2

CVL AN/PEQ-5

ATPIAL
Spirals: Green Light Laser and Wireless Controls

VBL 2 PIP

VLI

VBL 2

VBL 3

Competition Ongoing

Unclassified

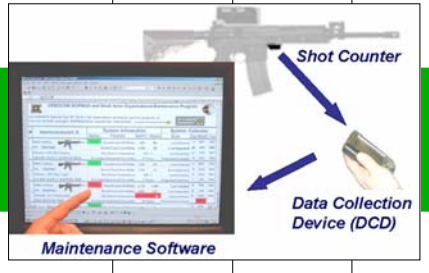
USSOCOM INTEGRATED WEAPONS TOPMAP

Existing Systems | Emerging Systems | Objective Systems

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

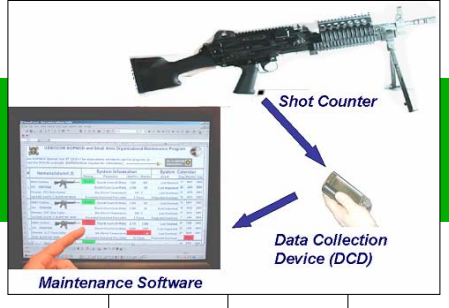
WEAPON SHOT COUNTERS

WSC CDD approved Dec 2004



WSC - Carbine

SOST Prototypes

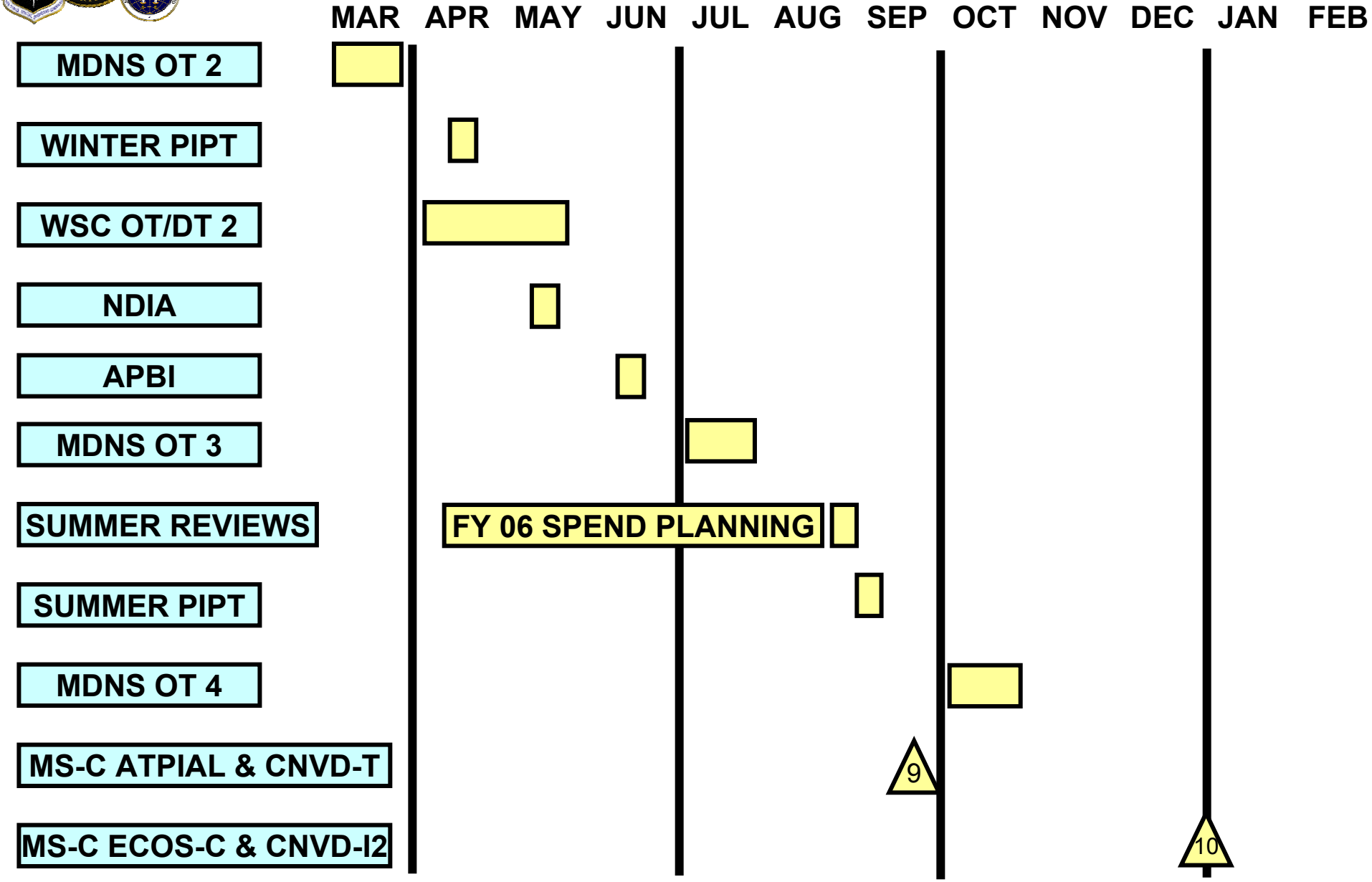


WSC - Machinegun

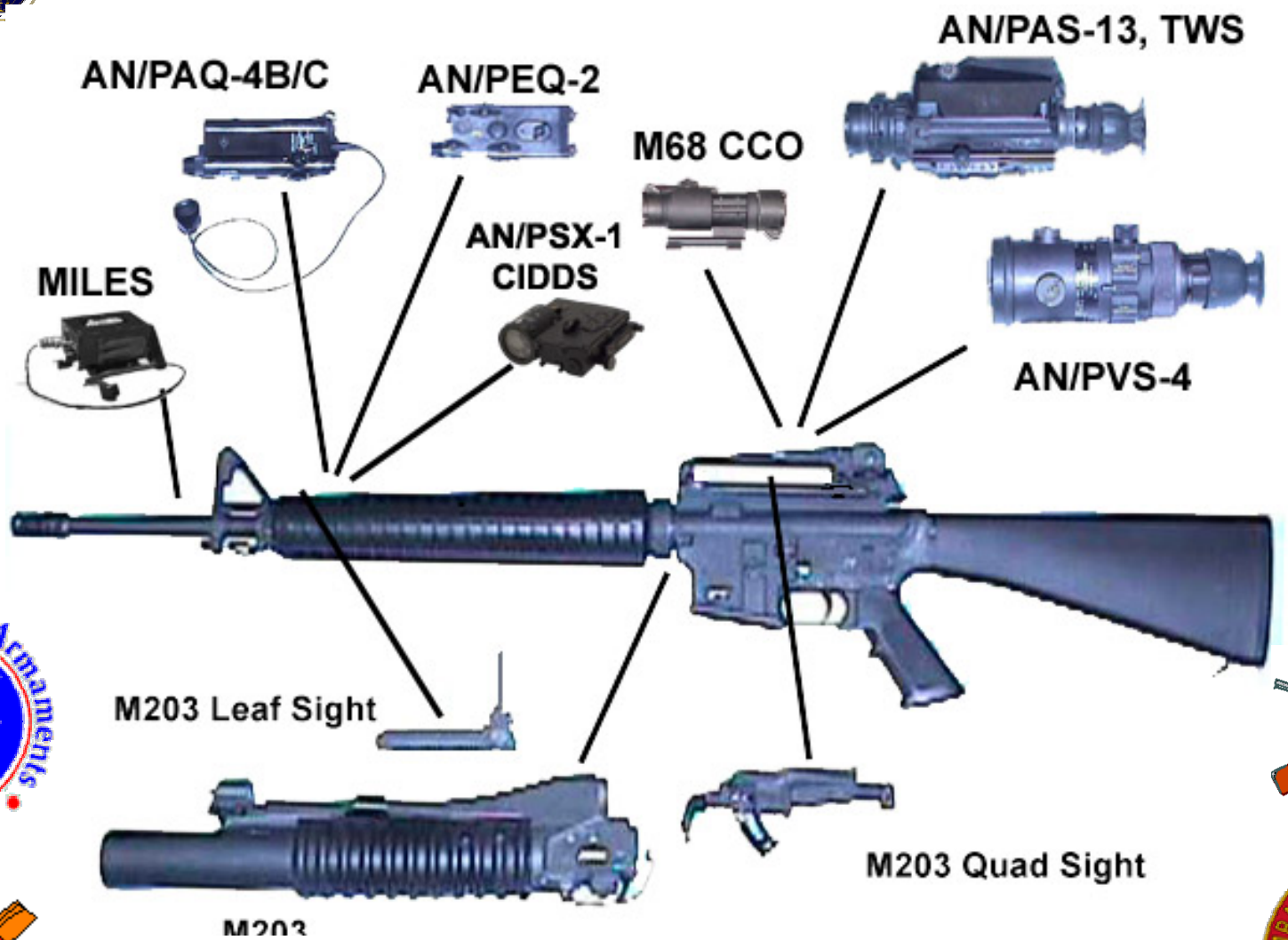
WSC – Future Weapons

Unclassified

SOPMOD 05-06 MACRO CALENDAR



Army Modular Weapon System (MWS)



Frequent Coordination

Comments / Questions ?
NAVSEA
CRANE
Surface Warfare Center Division
U.S. Special Operations Command
SOPMOD

NSWC Crane

"Harnessing the Power of Technology for the Warfighter"

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Crane Navy
Special Weapons for Special Operators

U.S. Special Operations Command
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