

Program Overview



Munitions Executive Summit 9 February 2006

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Agenda

Mortars and Artillery Ammo



- Excalibur
- Precision Guided Mortar Munition (PGMM)
- Precision Guidance Kit (PGK)
- Mortar Fire Control System (MFCS)
- Production Status/Backlog
- Cost Reduction Efforts
- Impacts of BRAC
- Summary



Civil War – Ammunition



3.67-inch Sawyer Canister



10-pounder Parrott Canister



12-pounder Howitzer



3.8-inch James Hot Shot



Dahlgren



12-pounder James Canister Base



Absterdam



2.9-inch Quilted Grape



Armstrong



Brooke



12-pounder Stand of Grape



Broun



Archer



Selma



Read-Parrott



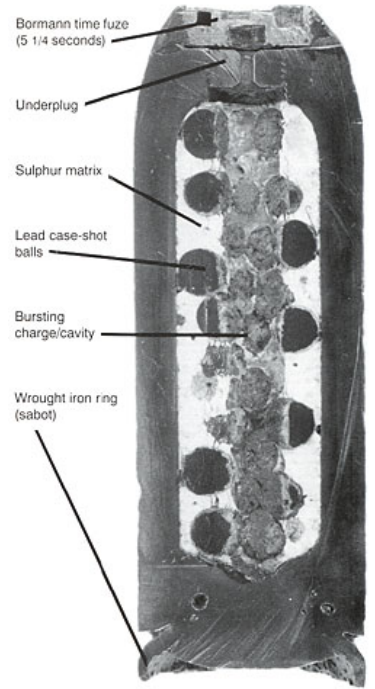
Schenkl



Tennessee Sabot



6-pounder Smoothbore Canister



Dyer

EXCALIBUR

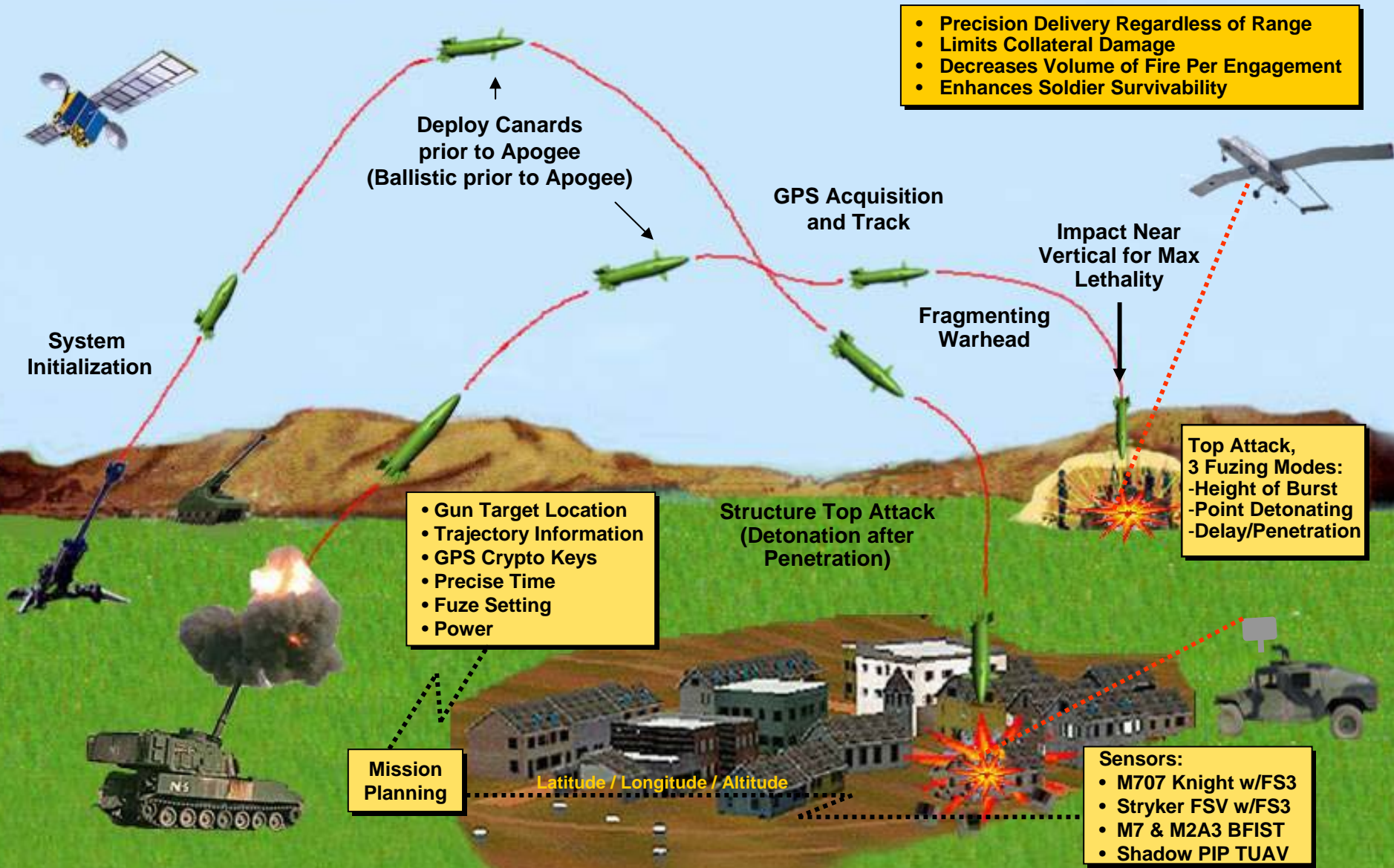


XM982





Operational Concept



- Precision Delivery Regardless of Range
- Limits Collateral Damage
- Decreases Volume of Fire Per Engagement
- Enhances Soldier Survivability

Deploy Canards
prior to Apogee
(Ballistic prior to Apogee)

GPS Acquisition
and Track

Impact Near
Vertical for Max
Lethality

Fragmenting
Warhead

- Gun Target Location
- Trajectory Information
- GPS Crypto Keys
- Precise Time
- Fuze Setting
- Power

Structure Top Attack
(Detonation after
Penetration)

- Top Attack,
3 Fuzing Modes:
- Height of Burst
 - Point Detonating
 - Delay/Penetration

Mission
Planning

Latitude / Longitude / Altitude

- Sensors:
- M707 Knight w/FS3
 - Stryker FSV w/FS3
 - M7 & M2A3 BFIST
 - Shadow PIP TUAV



Testing Results





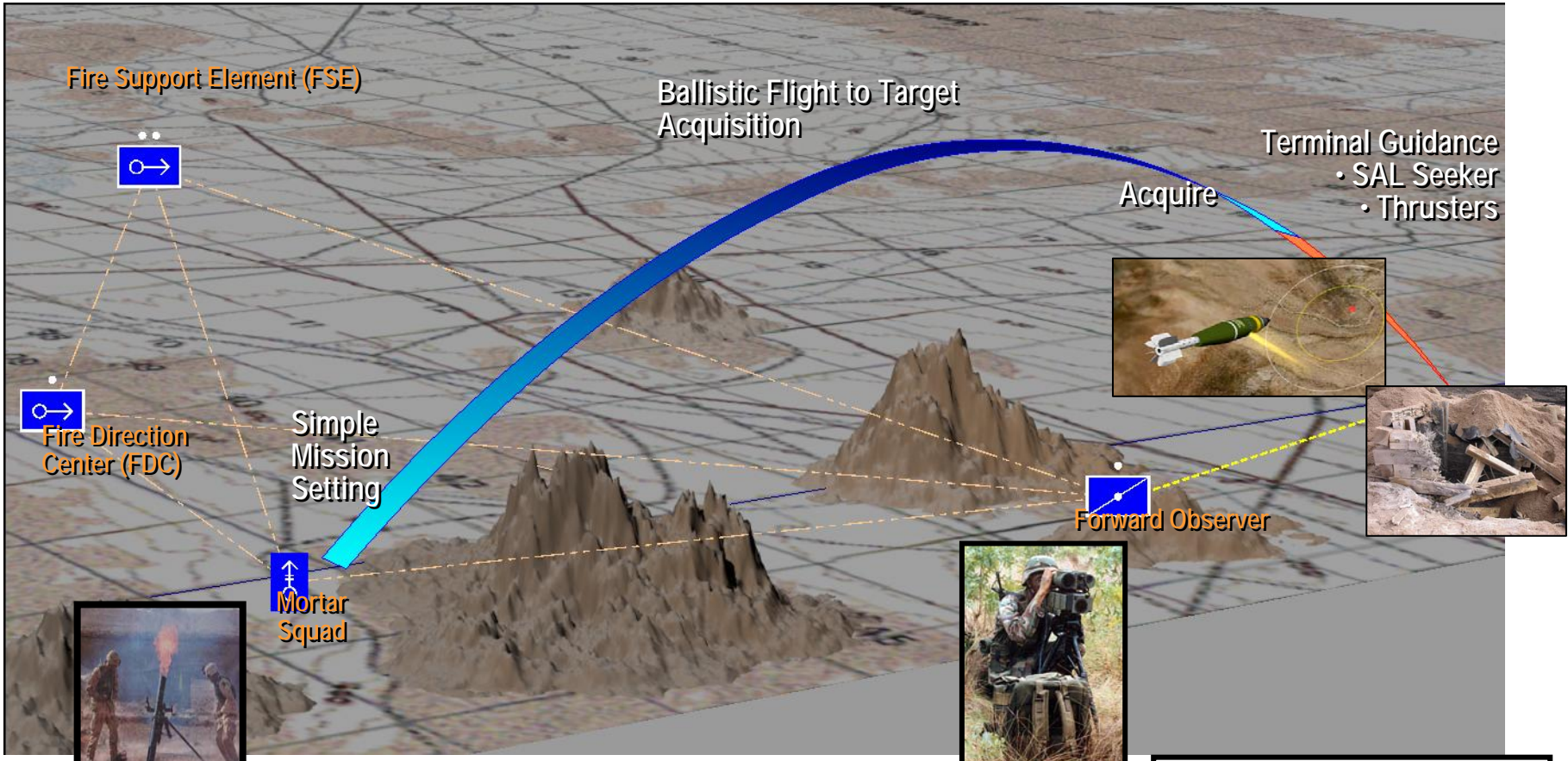
Precision Guided Mortar Munition

PGMM





PGMM Operational Concept



**Leverages Existing Fire Support Systems
Reduces Collateral Damage**

**Masonry Structures
Earth and Timber Bunkers
Light Armor Vehicles**

Precision Munitions Increase Warfighter Effectiveness



Precision Guidance Kit (PGK) For Artillery Projectiles

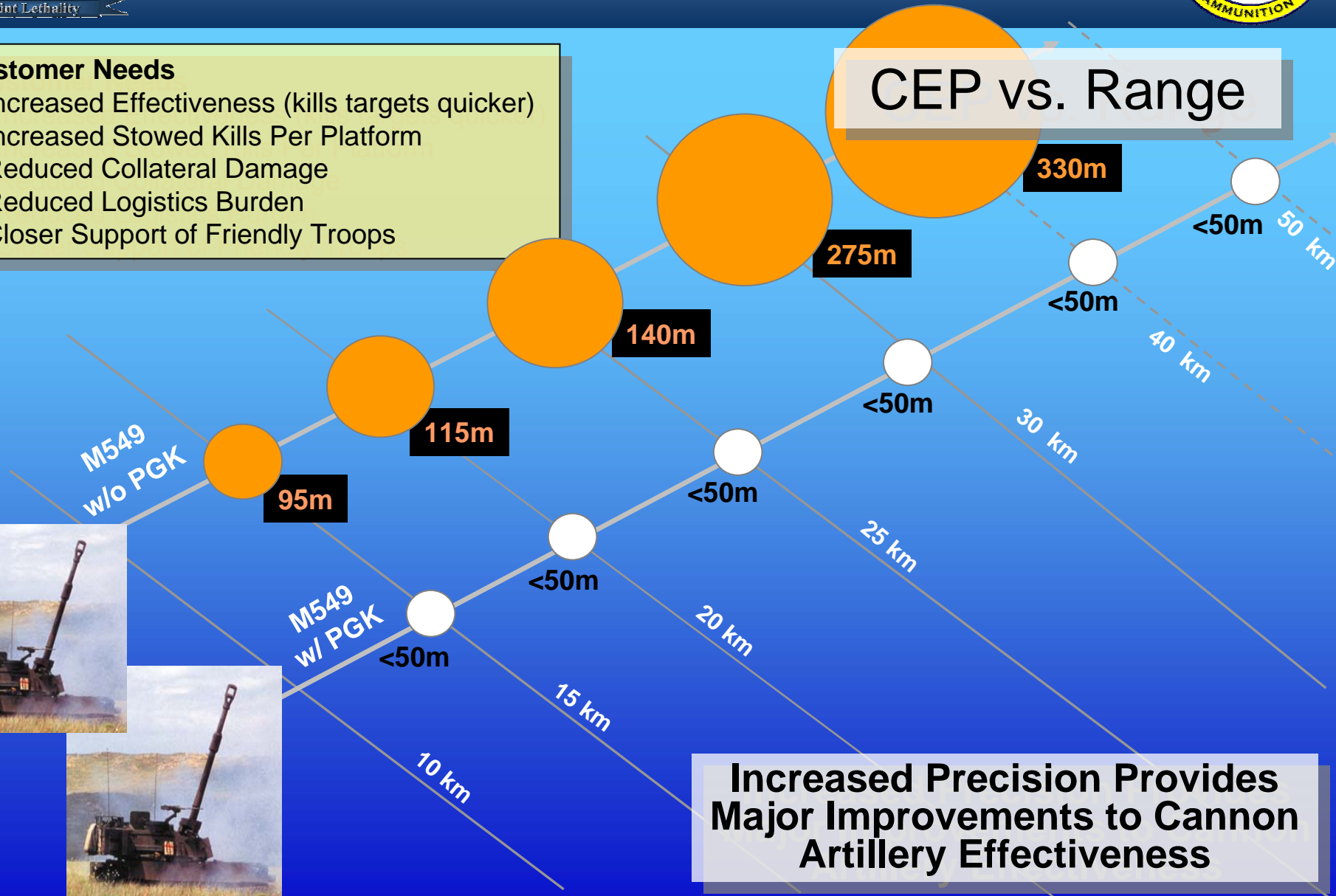




The Need

- Customer Needs**
- Increased Effectiveness (kills targets quicker)
 - Increased Stowed Kills Per Platform
 - Reduced Collateral Damage
 - Reduced Logistics Burden
 - Closer Support of Friendly Troops

CEP vs. Range



Increased Precision Provides Major Improvements to Cannon Artillery Effectiveness



PGK Acquisition Strategy



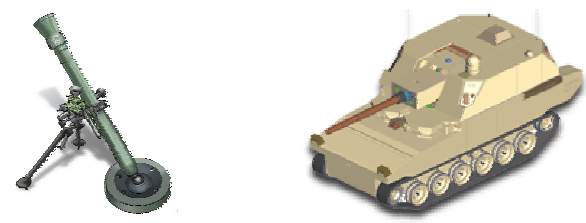
- PGK is FY06 Army Technology Development (TD) effort
- PGK is a course correcting fuze capability that improves projectile accuracy of the current stockpile of 155mm and 105mm artillery ammunition
- Our strategy is an incremental approach to improve projectile delivery accuracies:
 - ✓ Increment 1 - less than 50 meters CEP (155mm HE)
 - ✓ Increment 2 - less than 30 meters (all 155mm)
 - ✓ Increment 3 - less than 30 meters (Includes 105mm)
- Multiple PGK TD contract awards are planned for April 2006 for a system prototype demonstration / shoot-off in an operational environment in October 2006



Mortar Fire Control System



LHMBC





Mortars in OIF and OEF

Mortars were reliable, responsive and lethal

“MFCS allows for greater accuracy than we’ve ever had and that equates to immediately suppressing and destroying the enemy” Maj Karcher 1CD



“A Marine Major from a supported unit literally hugged every crew member that had MFCS and was supporting him. When requesting mortar fire support, that Major specifically wanted the mortar crews that had MFCS. They stated the target reports on all MFCS hits were “Dead On”!”

“60mm provided excellent IR illumination while used in the hand held mode.”



“D+4 the enemy could not move without a mortar round landing on his head.”

“ 120mm – Good system for pounding targets up in the mountains and at long distances. Provides good range for base security.”

“MFCS made the difference in every single mission. They dropped 854 rounds using MFCS and every round hit the target!”

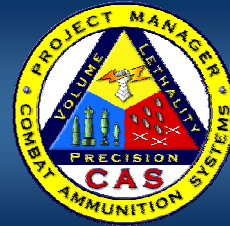
“Mortars were very versatile on the battlefield. They were able to reach enemy forces in defilade and within fortifications.”

“All enemy KIA came from the 120mm mortar...”

Comments from 1st MAR DIV AAR, 3rd IN DIV, and 1st CAV DIV, 101st ABN DIV, the 75th Ranger Regt and the 10th Mountain Division



120mm Mortar Actual CLFCC VL Illumination Usage



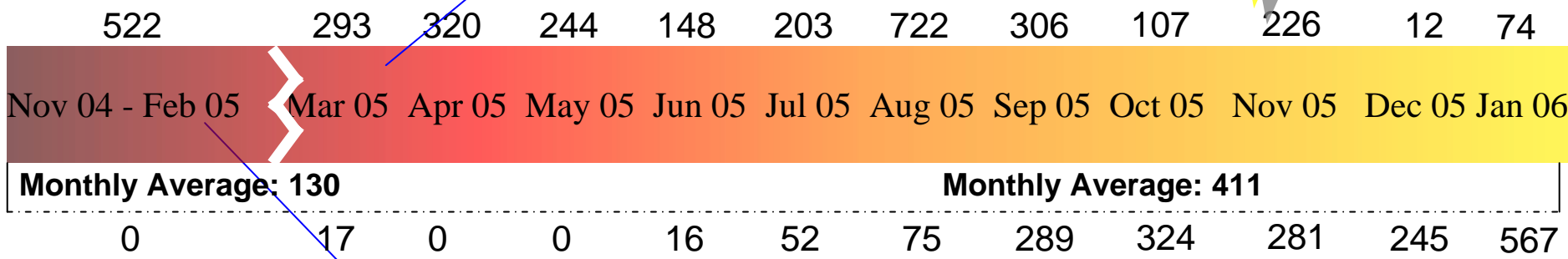
Quantity per Month

**M930
C625**



Constrained Supply Rate Lifted 1 Mar 05

Requirements met through April 2009



**M930E1
CA39**

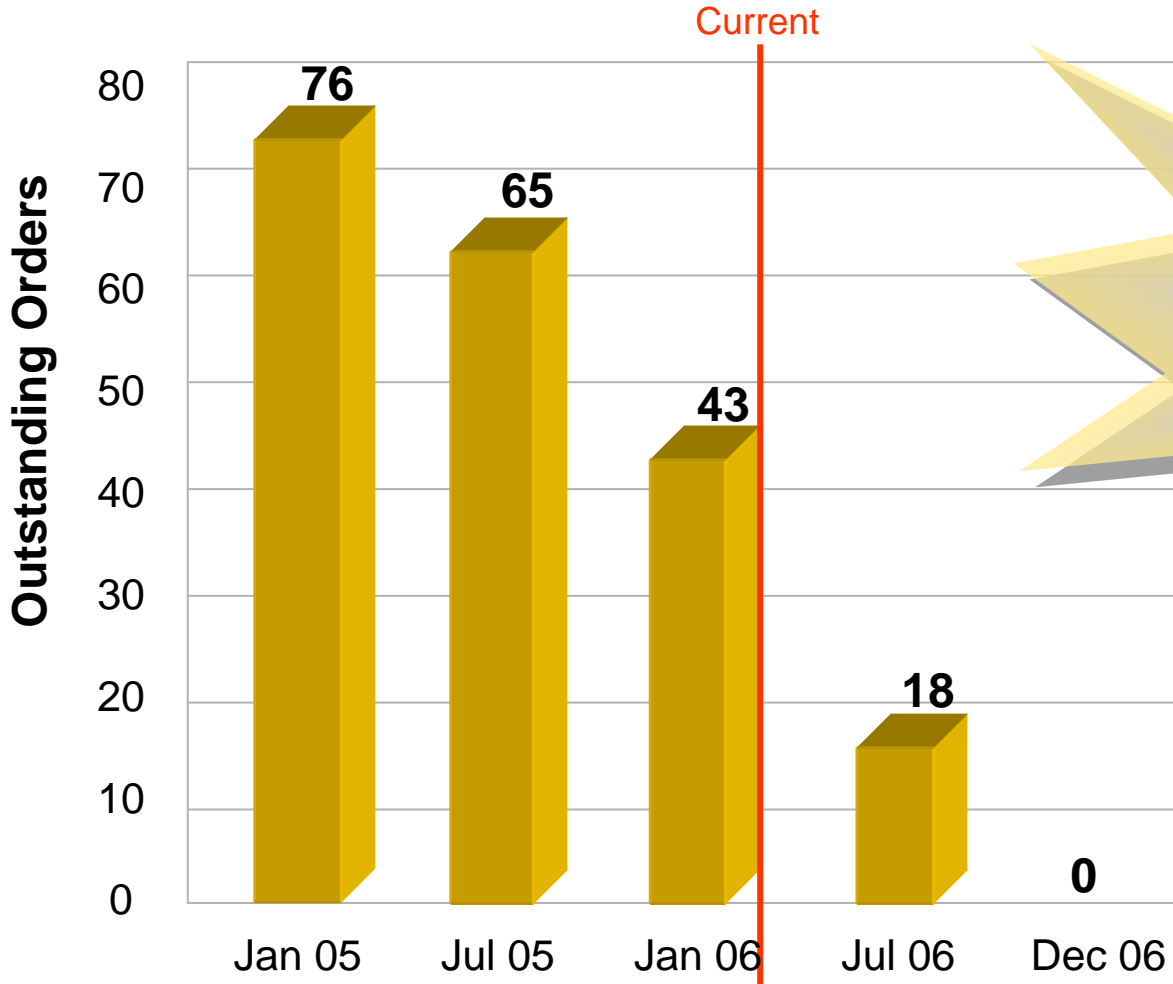
Urgent Materiel Release/ 1st Delivery to Theater 22 Feb 05



Overall Monthly Average Increased from 130 to 411



Reducing Production Backlog*



Production backlog has been reduced by 43% through Jan 06

All Back-Log Eliminated by 1 Dec 06

*FY04 & Prior



Training Ammo Cost Reduction Concepts



- Use more mortar FRPC (75/25 FRPC/HE Mix)
- Use 81mm insert for much of 120mm mortar training
 - ✓ 81mm HE, Smoke and Illum rounds significantly less costly
- Use stockpile inventory that's above the required level to partially meet training needs
- Staggering year by year of Mortar Illum and Smoke procurements to achieve larger and more economical production buys
- Efficiencies in ESIP and TDPs
- Focusing IM efforts on developing low cost melt pour IM explosive fill alternatives
- Using System contracting where cost effective

**Assessing Industry Base Impact for all
Cost Reduction Ideas**



PM CAS Technology Interests



- Our goal is to align S&T and IR&D initiatives with existing programs and future needs
 - ✓ Develop an Integrated technology strategy driven by need, and urgency
 - ✓ Pull IR&D and ATO's into the Acquisition Process sooner
 - ✓ Engage DARPA, ARDEC, & Industry to ensure technology is available to meet future program and operational requirements

The focus is to integrate technology efforts across Army organizations into a coherent strategy



Technology Gaps



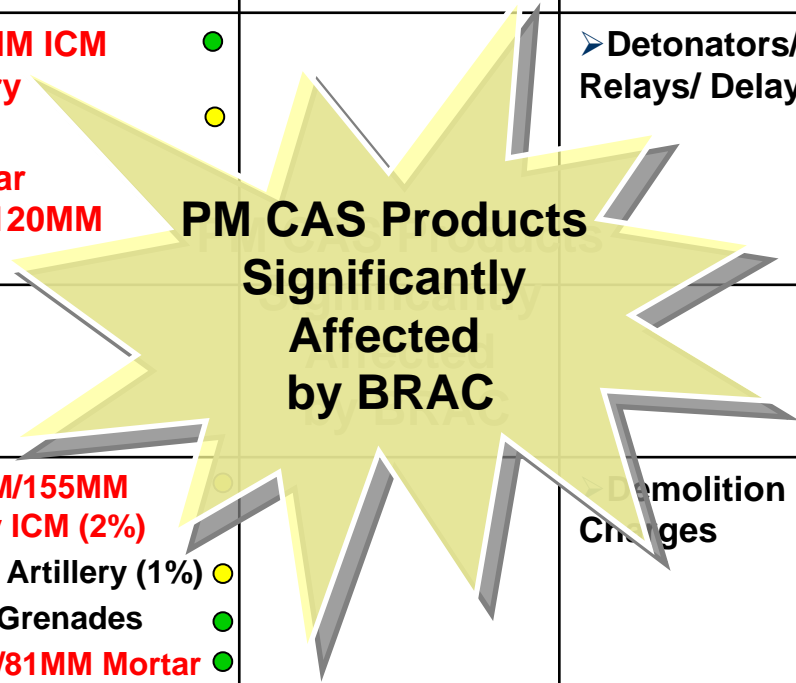
- Low Cost IM
- Scalable Non-Lethal (N-L) Effects
- Power Source Alternatives
- Proximity fuze technology which cannot be exploited
- Low Cost Precision for 105mm & 155mm Artillery Projectiles and 60mm & 81mm Mortars bombs
- Environmentally Friendly obscurants
- Scalable Lethal Effects
- Brilliant Sensors
- Lt Wt Projectile Technology
- Lt Wt Mortar Pointing Devices



BRAC & PM CAS Products



Relocate To:	Rock Island Arsenal	Iowa	Milan	McAlester	Crane
Close Riverbank	➤ Artillery Cartridge Case Metal Parts (16%) ●				
Kansas		➤ 105MM/155MM HE ●	➤ 155MM ICM Artillery ● ➤ Mortar 60/81/120MM ●		➤ Detonators/ Relays/ Delays ●
Mississippi	➤ 155MM ICM Artillery Metal Parts ●				
Lone Star		➤ Mines ● ➤ Detonators/ Relays/ Delays (5%) ●	➤ 105MM/155MM Artillery ICM (2%) ● ➤ MLRS Artillery (1%) ● ➤ Hand Grenades ● ➤ 60MM/81MM Mortar ● ➤ Primers ●		➤ Demolition Charges ●



Tech Challenge

- Significant
- Moderate
- Minimal



Summary

Mortars and Artillery Ammo



- Working to field Excalibur, PGMM, PGK and MFCS as Soon as Possible
- Low Cost Mortar and Artillery Guidance and Low Cost IM fills are needed most
- Working to eliminate Ammo Production Backlog
- Army Modularity Increases Mortar and Artillery Ammo Requirements
- Evaluating Ideas to Reduce Training Ammo Costs
 - ✓ Assessing Industrial Base Impacts
- Mortar and Artillery Planned Fuze Support Two US Sources
- Engaged in BRAC Process



Back Up





Gov't Teaming for Seamless BRAC Transition

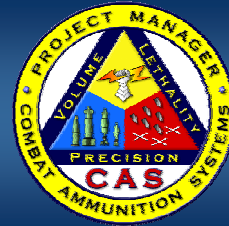


Government Team: PEO/PM(s), PEO-AMMO IBO, GOCO, GOGO, AMC, JM LCMC, ARDEC.

- PM CAS working with PEO-AMMO Industrial Base Office (IBO) to leverage current technologies to implement within organic base
- IBO Life Cycle Pilot Process (LCPP) pursues AMMO Pilot Processes in Gov't/Contractor facilities to assist in resolution of manufacturing issues.
- IBO/PM/JMC analyze NTIB current capabilities for
 - ✓ “Right sizing” to POM capacity requirements (AR700-90 guidance)
 - ✓ Modernize IB by identifying cost efficiencies/new technology
- Analyze/Coordinate numerous “Transition Issues”
 - ✓ Current & future AMMO production requirements
 - ✓ Coordination of Facility Use Contracts with production intent
 - ✓ Intellectual Property strategy relevant to GOCO's
 - ✓ Assimilation of mutually exclusive Gov't vs Contractor equipment
 - ✓ Identification of NTIB and non-NTIB capability outside of GOGO/GOCO
 - ✓ Coordinate Acquisition Strategies to support organic base and NTIB



Technology Gaps



❑ Dynamic Retargeting

Need: To increase effectiveness and reduce logistic footprint dynamic retargeting capability among the SFM is desired. Dynamic retargeting will permit a single round to address two or three separate targets.

❑ Power Source Alternatives

Need: Future Munitions will require Power Sources with Higher Densities and Power in order support increased performance requirements (e.g. guidance, fuzing, penetration sensing).

❑ Scalable Non-Lethal (N-L) Effects

Need: N-L at all artillery ranges to suppress personnel, equipment and provide area denial.

❑ Proximity fuze technology which cannot be exploited

Need: A proximity sensing capability that does not lend itself to countermeasures or an approved tamper proof method to house the critical components.

❑ Low Cost Precision for 105mm & 155mm Artillery projectiles and 60mm & 81mm Mortars bombs

Need: A low cost extended range precision projectile

❑ An Artillery Battle Damage Assessment capability

Need: Having this capability reduces the number of rounds fired, frees unit for other fire missions or verifies need for additional strikes.



Technology Gaps (*cont.*)



❑ Brilliant Sensors

Need: Autonomously identify friend or foe with high reliability

❑ Target “Tagging”

Need: Tag a target with electro-optical signature from safe position for sensor to home in on: *Does not require a constant “lasing” in end game like traditional laser designators*

❑ Environmentally Friendly obscurants

Need: Environmentally friendly obscurants.

❑ Precisely attack moving targets with inexpensive sensors

Need: A low cost sensor for precision munitions to address moving targets.

❑ Very Long range guided artillery projectile for disrupting support elements

Need: A cost effective extended range 155mm projectile for addressing high value targets in all weather conditions.

❑ Scalable Lethal Effects

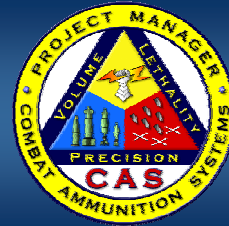
Need: A scalable lethal warhead to apply the right lethality to the target set and minimize collateral damage.

❑ Low Cost IM

Need: A low cost melt-pour IM alternative



Potential S&T Projects



Increase Range

Need: Much greater coverage area from indirect fire weapons

Increased Lethality

Air Burst DPICM

Need: Increased effectiveness and helps in reducing log footprint

Enhanced Lethality Explosives

Reduced Logistics

Need: Reduce Log footprint & Tail

Lt Wt Mortar Pointing Devices

Need: Increase accuracy and responsiveness

Muzzle Velocity variations Improvements

Need: Reduce propellant variations and tube wear improve accuracy

Lt Wt Projectile Technology

Need: reduce logistics and soldier weight burdens

Low Cost IM Alternatives

Need: Solutions that are comparable to current costs for large volume munitions

Lt Wt Mortar Components

Need: reduce logistics and soldier weight burdens



Common Mortar Components across calibers

Need: reduce logistics, training, and maintenance burdens



Army Modularity Mortars






Mortar		Before	After	% Change
60mm		630	734	17%
81mm		396	356	(-10%)
120mm	M1064 Mortar Carrier w/ M121 Carrier Mortar	656	462	(-30%)
	M1129 Stryker Mortar	216	252	16%
	M120 Towed Mortar	32	528	-
	Total 120mm Mortars	872	1242	42%



Army Modularity Artillery



		Before	After	% Change
105mm M119 M102 (ARNG)		540	656	22%
155mm M109A6 (Paladin) M109A5 (ARNG)		1002	646	(-36%)
155mm M777 LW M198		512	252	(-51%)



PM CAS Fuze Strategy



➤ Inventory

- ✓ Sufficient Artillery Fuze Stocks On Hand
- ✓ Recurring Mortar Training Demand
- ✓ Some Buys Required to Support IB

➤ Production

- ✓ Sufficient dollars in POM to Maintain at Least Two NTIB Competitive Producers in Electronic and Mechanical Fuzes
- ✓ Will Continue Competitive NTIB Awards by Commodity Line

➤ Development

- ✓ Accelerated development/fielding of PGK supports IB
- ✓ Precision munitions have small impact to IB due to quantity and integrated approach

➤ Technology

- ✓ Continue Support of Basic Technology Efforts (Power Sources/Prox/etc)
- ✓ Continue Technology Insertion Programs to address producibility; obsolescence and single point failure issues
- ✓ Evaluate Emerging Opportunities