



**120 MM XM325 OBJECTIVE NON-LINE-OF-SIGHT
MORTAR CANNON TECHNOLOGY (ON-MT) PROGRAM**

**BRIEFING FOR THE GUNS & MISSILES SYMPOSIUM -
23 APRIL 2007**

Providing America Advanced Armaments for Peace and War



DAVID C. SMITH, P.E.

"Innovative Armament Solutions for Today and Tomorrow"

ARDEC



ON-MT MORTAR CANNON OVERVIEW



- BACKGROUND: IN 2001, ARDEC TECHNOLOGY BASE DEVELOPED A PROGRAM TO DEMONSTRATE KEY 120 MM BREECH LOADED MORTAR TECHNOLOGIES, INCLUDING A CANNON, AUTOLOADER, FIRE CONTROL AND THE INTEGRATION OF THESE ITEMS. FOCUS HERE IS CANNON.
- SEPARATE BRIEFING ON INTEGRATION
 - SYSTEM INTEGRATION SESSION, THOMAS DEVOE
- GOALS & OBJECTIVES: DEVELOP A LIGHTWEIGHT 120MM MORTAR CANNON FOR USE ON A 20 TON VEHICLE
 - WEIGHT: < 800 POUNDS
 - BREECH LOADED
 - RETAIN MORTAR ROUND AT ALL ELEVATIONS
 - HIGH RATE OF FIRE
 - NO ALTERATION TO EXISTING AMMUNITION
 - NO EXPENDABLE DEVICES (STUBCASE, CLIPS, ETC)
 - IGNITION TRAIN RELIABLE & SAFE



ON-MT MORTAR CANNON FEATURES



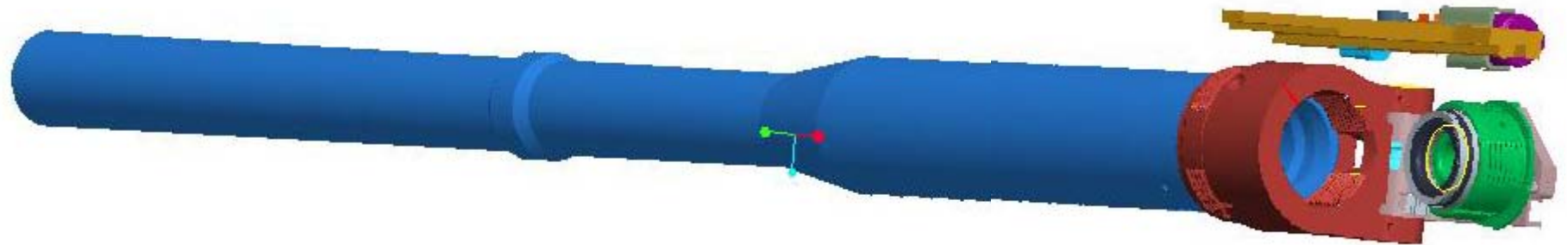
- CANNON DESIGN FEATURES:
 - SCREW BLOCK BREECH – LIGHTWEIGHT + RELIABLE
 - MORTAR TUBE THICKER & LONGER THAN 120 MM M121
 - HIGH RATE OF SUSTAINED FIRE (SIMILAR TO DROP FIRE)
 - LONGER TRAVEL FOR INCREASED RANGE
 - INCREASED STIFFNESS FOR DIRECT FIRE
 - ROUND RETENTION FEATURES
 - CARTRIDGE FALL BACK FEATURES
 - UNIQUE IGNITION SUB-SYSTEM
 - COUNTER RECOIL BREECH OPENING VIA CAM PLATE
- CANNON RECEIVED TYPE DESIGNATION XM325 IN 2004



ON-MT MORTAR CANNON FEATURES



CAM PLATE &
ELECTRIC ACTUATOR



SCREW BLOCK
BREECH

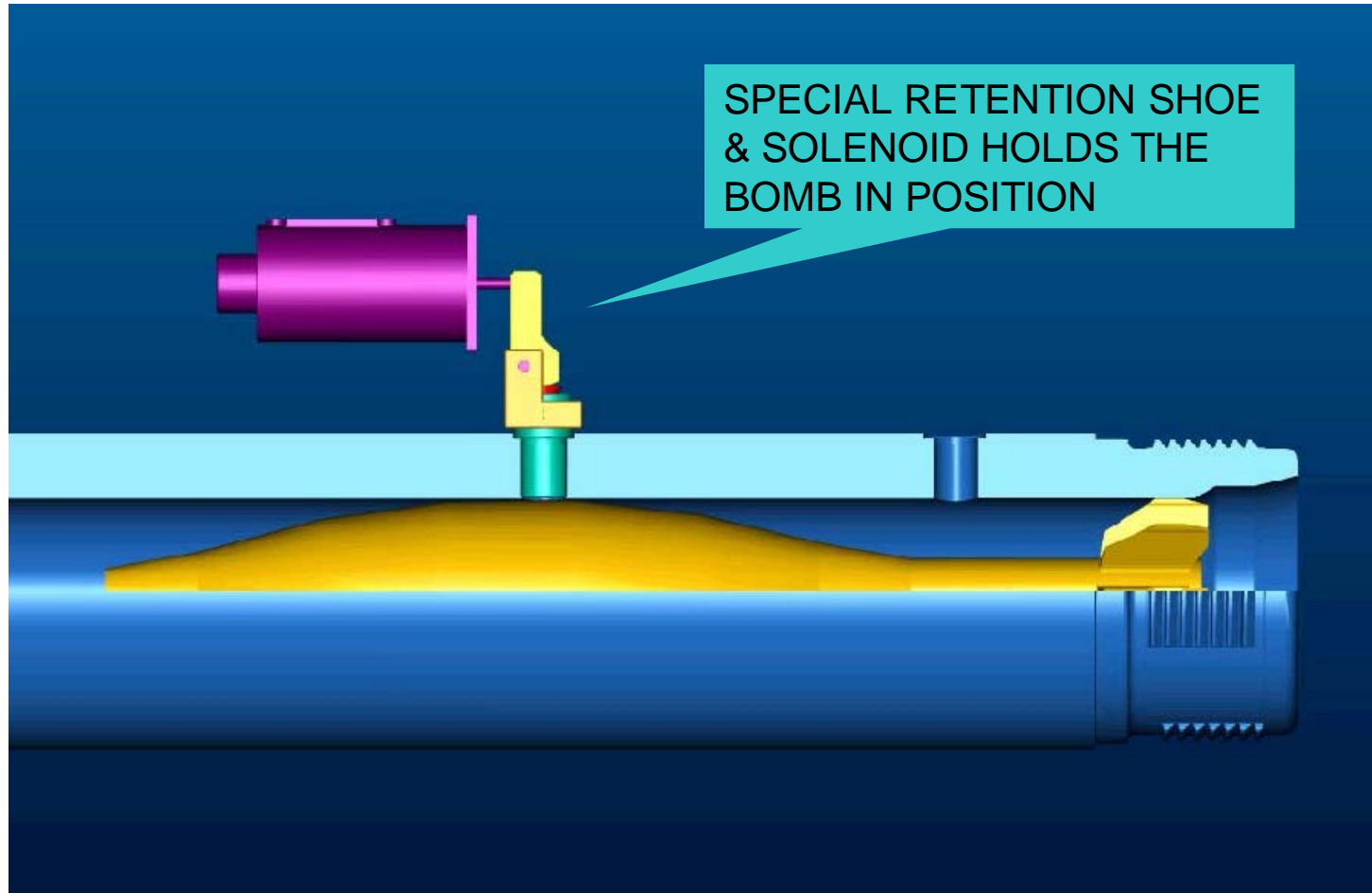
DEBANGE OBTURATOR
(SPINDLE NOT SHOWN)



ON-MT MORTAR CANNON MORTAR BOMB RETENTION SHOE



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FS15149

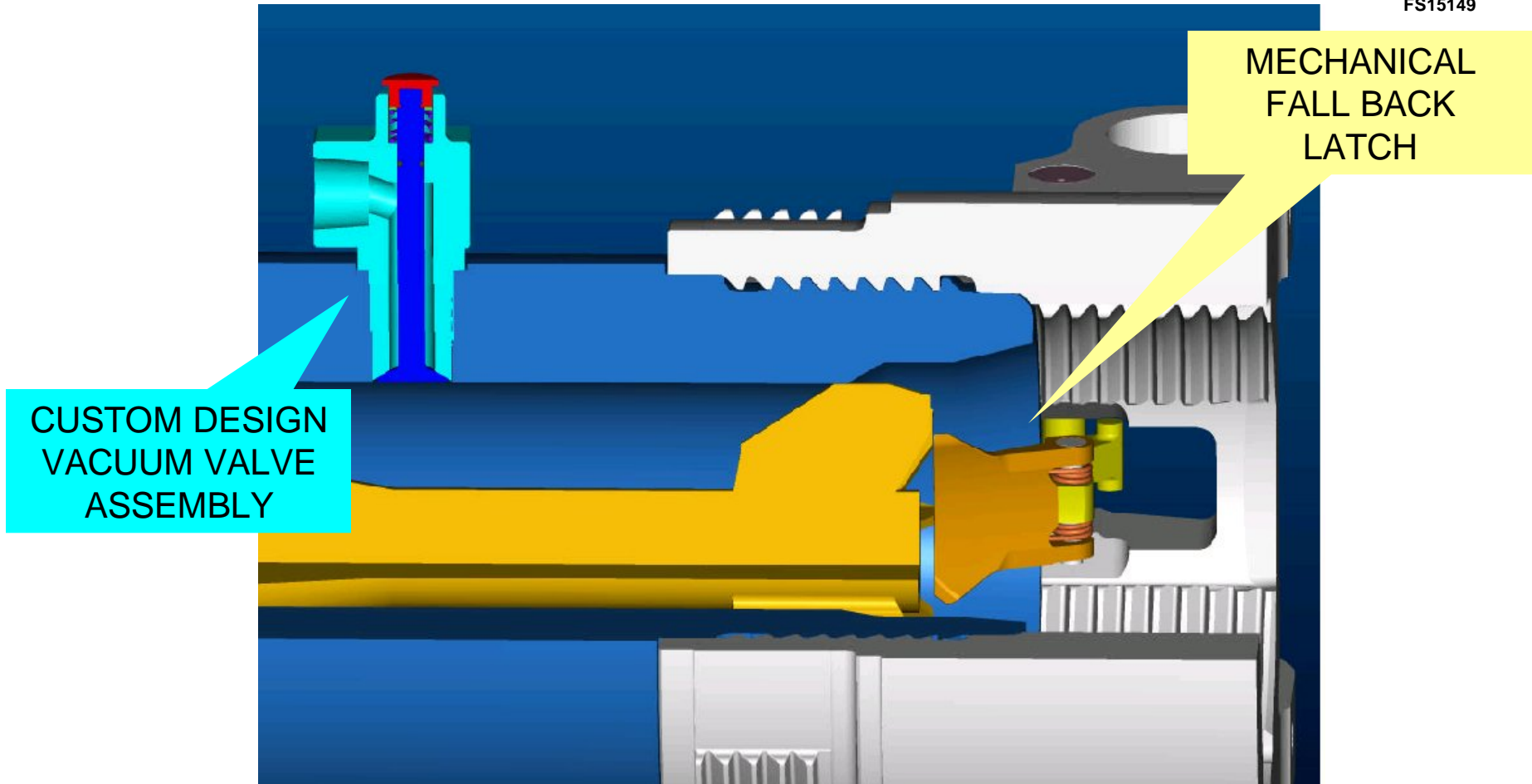




ON-MT MORTAR CANNON VACUUM - BOMB POSITIONING DEVICES



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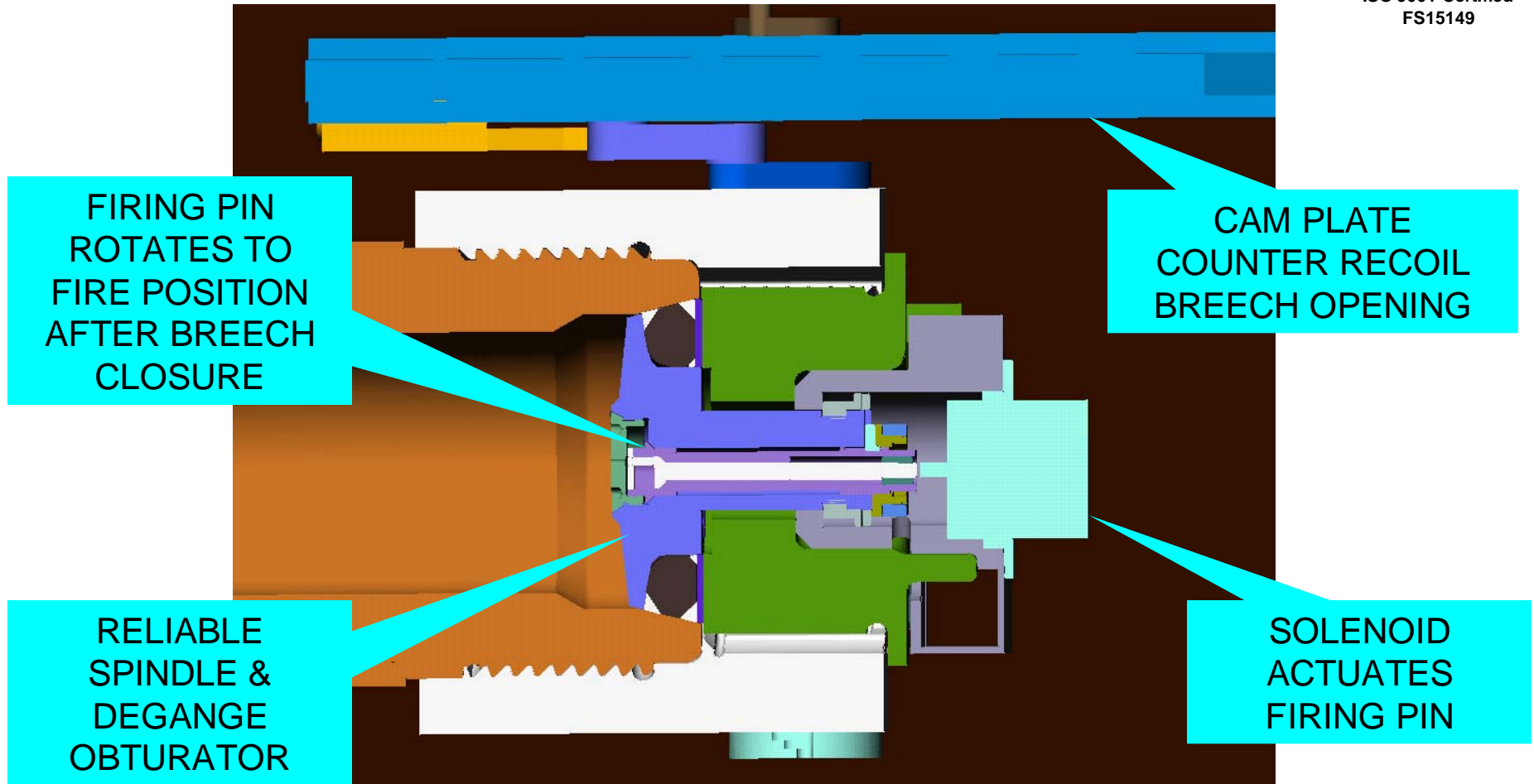




ON-MT MORTAR CANNON IGNITION SYSTEM



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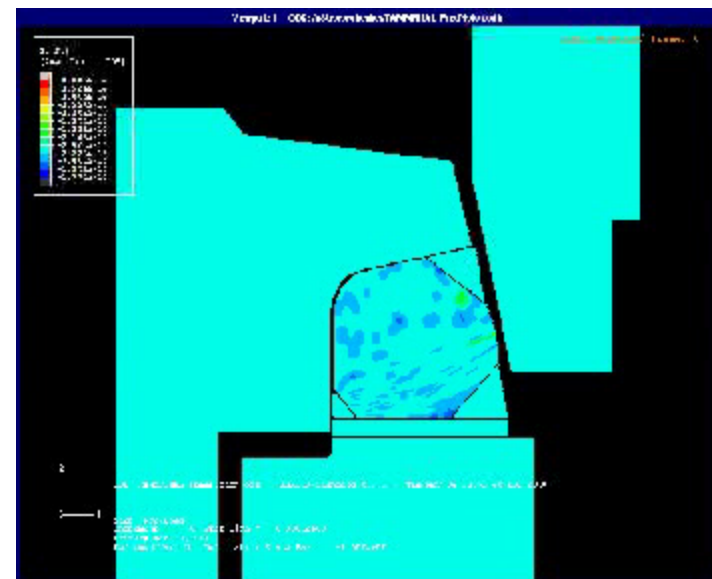


ON-MT MORTAR CANNON COMPONENT ANALYSIS - SEAL



FINITE ELEMENT ANALYSIS OF DEBANGE SEAL
CONDUCTED TO ASSESS:

- ROBUST OPERATION WITH CLOSURE PRE-LOAD
- MIN & MAX MATERIAL CONDITIONS
- EFFECTS OF THERMAL EXPANSION (RATE-OF-FIRE)
- ADEQUATE SEAL ACROSS ALL ZONES

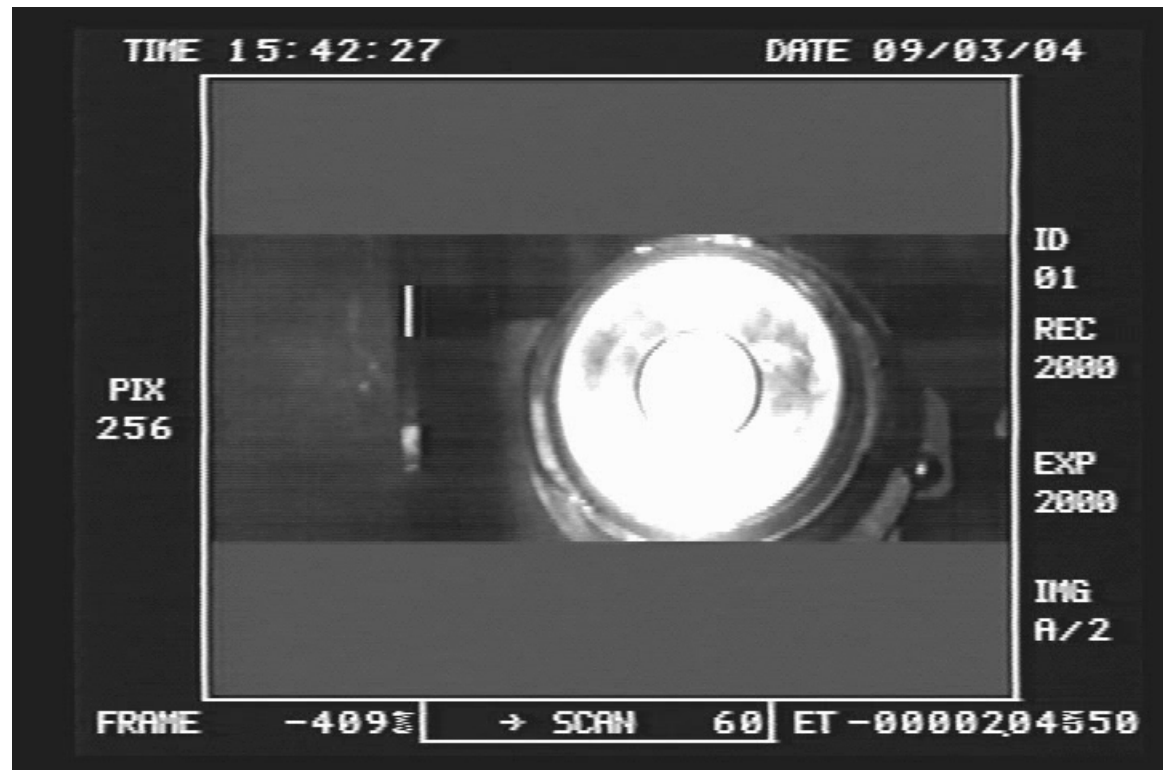




ON-MT MORTAR CANNON COMPONENT ANALYSIS - MECHANISM



- EXTENSIVE TESTING OF BREECH MECHANISM WAS CONDUCTED TO ASSESS RELIABILITY & FUNCTION:
 - ALL ELEVATIONS
 - WORN SPRINGS
 - POOR LUBRICATION
 - TEMPERATURE EXTREMES





ON-MT MORTAR CANNON DEVELOPMENT SCHEDULE



- Design – Benét Labs October 2003 May 2004
- Fabrication – Watervliet Arsenal & Benét Labs – May – August 2004
- Developmental Testing (Benét Firing Facility – Malta, NY):
 - Firing Test: 08 September - 18 November 2004
 - Total Shots Fired: 192
- Disassembly – Rework - Ship: November 2004 – December 2004



ON-MT MORTAR CANNON DEVELOPMENT TESTING



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XM325 CANNON S/N 1 IN PROOF FIRING
WRIGHT MALTA TEST STATION
SEPTEMBER 2004



ON-MT MORTAR CANNON DEVELOPMENT SCHEDULE (cont'd)



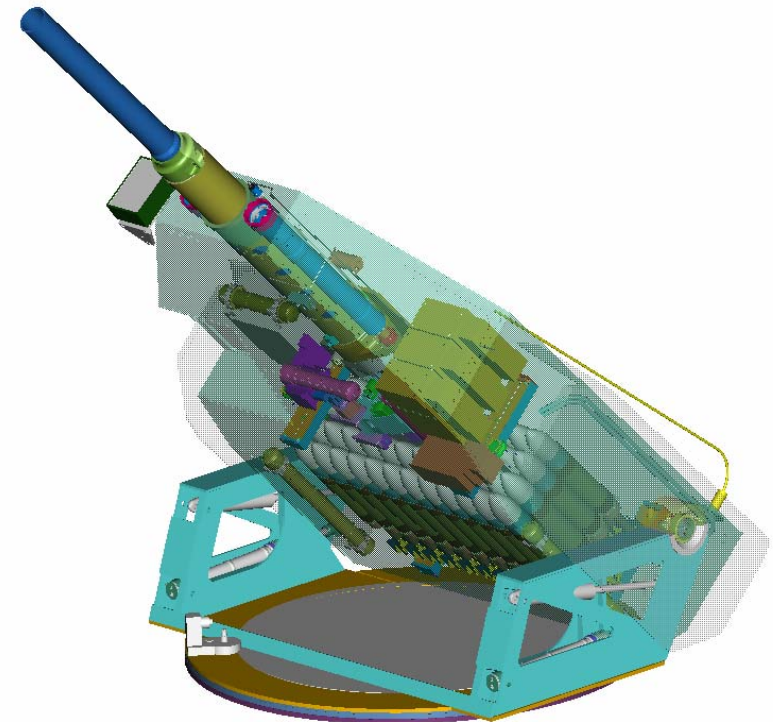
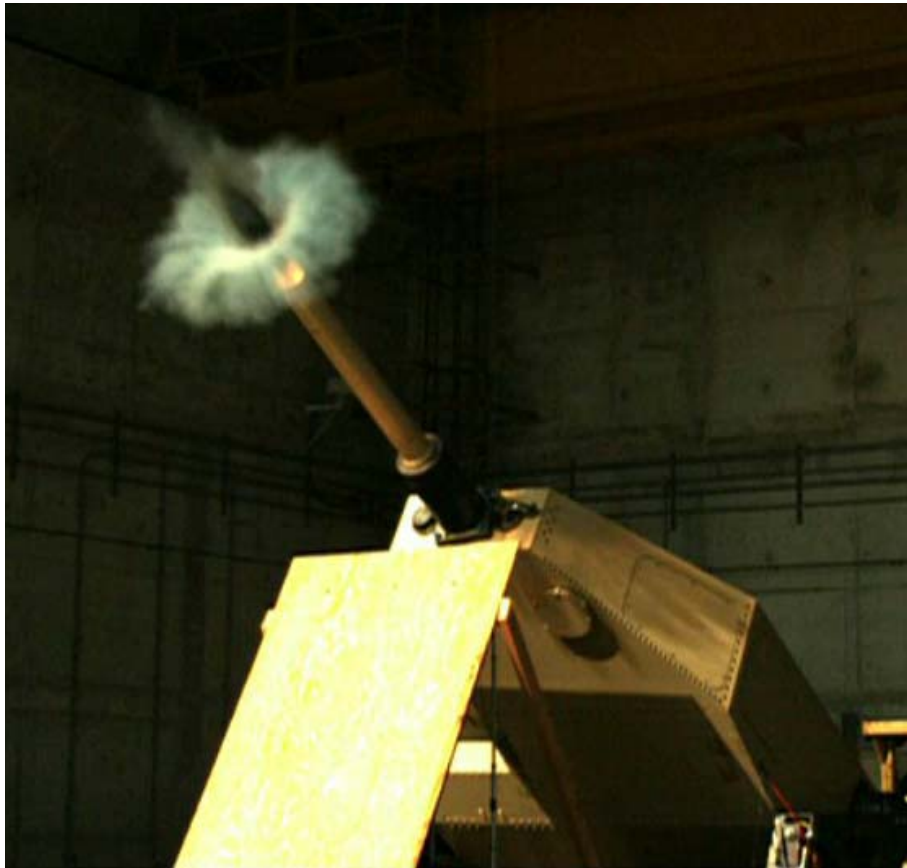
- Systems Integration & Autoloader Tests (Picatinny Arsenal Firing Range)
 - Cannon shipped 02 March 05
 - Integration Complete 15 May 05
 - Firing Test 16 May – 14 June 2005
 - Total Shots Fired: 15 (including Proof Rounds)
- Elevation and High Rate-Of-Fire Testing – Aberdeen Test Center
 - Firing Test: July – August 2005
 - Total Shots Fired: 174 rounds
 - Demonstrated 12 round per minute



ON-MT MORTAR CANNON SYSTEM INTEGRATION & TESTING



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SEPARATE BRIEFING COVERING THE OTHER SUBSYSTEMS AND SYSTEM INTEGRATION – SYSTEM INTEGRATION SESSION



ON-MT MORTAR CANNON SUMMARY



- XM325 CANNON:
 - ALLOWS LOADING OF ALL CURRENT 120 MM MORTAR AMMO WITHOUT MODIFICATION
 - PROVIDES ROUND POSITIONING AND FALLBACK PREVENTION
 - HAS A SAFE, RELIABLE ROBUST IGNITION SYSTEM
 - FEATURES A CAM PLATE FOR COUNTER RECOIL OPENING
 - HAS BEEN TESTED WITH ELECTRICAL ACTUATOR
 - HAS BEEN DESIGNED AND TESTED FOR HIGH RATES OF FIRE



XM325 MORTAR CANNON AND THE ON-MT SYSTEM HAVE BEEN DEMONSTRATED TO MEET ALL FUTURE COMBAT SYSTEM REQUIREMENTS FOR A NON-LINE-OF-SIGHT MORTAR!!

THE XM325 CANNON HAS BEEN SELECTED BY BAE AND FCS LEAD SYSTEM INTEGRATOR TO BE THE PRIMARY WEAPON OF THE NLOS-M MORTAR VEHICLE!!