Excalibur - a Successful Swedish/U.S. Development Program

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Purpose

- Excalibur as a Successful Swedish - U.S. Development Program
- Other cooperative activities
  - Precision Guided Mortar Munitions (PGMM) and Mortar Breech Standard
  - Sensor Fuzed Munition Qualifications
PM CAS: Mission and Vision

MISSION

Perform Life-Cycle Management of Tube-Launched Indirect Fire Munitions, Mortar Weapons, and Mortar Fire-Control Systems

VISION

Deliver Conventional and Leap-Ahead Munitions Combat Power to Warfighters, Giving them the Materiel Edge over Potential Adversaries
PM Combat
Ammunition Systems

Indirect Fire Products

Enhanced Programmable Inductive Artillery Fuze Setter
Mortar ER-DPICM
Conventional Mortar Ammo
Precision Guided Mortar Munition
Mortar Fire Control
M107 HE
M795/M795E1
105mm M915/XM916
M864 Recap
Multi-Option Fuze Artillery & M762
Self-Destruct Fuzes
Course-Correcting Fuzes
Modular Artillery Charge System (MACS)
Excalibur-U
Excalibur-D
Excalibur-S
Excalibur System

Why Excalibur?

- Extended Range Fire Support
- 10m Circular Error Probable (CEP) at all ranges
- Decreased collateral damage
- Decreased volume of fire per engagement
- Greater flexibility and selectivity
- Expansion of fire support missions (MOUT)
- Carrier for future smart and discriminating munitions

System Description

- Precision guided, extended range carrier for a family of 155mm cannon ammunition
- All weather, day/night, fire & forget, urban/complex terrain
- 4-Axis Canard Actuation System
- Spinning Base
- GPS-Inertial navigation system guidance w/anti-jam technology

Acquisition Phase

- Current: System Development & Demonstration

Contractors

- Raytheon Missile Systems (Tucson, AZ)
- Bofors Defence (UDLP) Teamed with Raytheon
- General Dynamics – Ordnance & Tactical Systems
Excalibur’s Role

- Supports engaged forces with an immediately responsive, 24/7, all weather, long range, precise capability to defeat high payoff point and area targets in all environments while minimizing collateral damage to persons and facilities.

- Fills critical shortcomings of US cannon artillery:
  - Range
  - Accuracy at longer ranges
  - Collateral damage
  - Precision in Urban Environment

- Gives the ground commander an organic precision standoff engagement capability that can be employed by any soldier.

- Fulfills FCS concepts of engaging enemy at standoff, developing situations out of contact, acting first, and finishing decisively.
Range and Gun Compatibility

- 155 mm, 39 Caliber
  Range 30 – 40 km
  - US Army
  - 155 JLW
  - FCS NLOS-Cannon

- 155 mm, 52 caliber
  Range 50 – 60 km
  - Swedish Army FH77BD
Keys to Success

- Seek early Agreement on . . .
  - Requirements
  - Work share
  - Responsibilities
  - Funding
- Understanding cultural differences
- Responsiveness and Flexibility
- Innovation
- Effective communication
- Leadership Commitment
- Win – Win solutions
User Requirements

- Harmonized User Requirements is the most important key to success
Project Agreement

- Clearly defines US as the lead nation – but gives Sweden influence through the Leadership IPT and the Steering Committee.
- Gives the PM flexibility to manage the program.
Legal Structure

Requirements

Project Agreement

Prime Contract

Raytheon

Joint Program Office

FMV

Co-operative Program Agreement

Subcontract

Raytheon

BOFORS Defence

Leadership

Staff

Operational Structure (IPT's)

Program Office

Systems

GN&C

Projectile

Test & Eval

Operations
The Project Agreement defines each nation’s contribution.
Communication

- Effective communication essential for success.
- Establish solid relationships face to face
- Leverage information technology

Lesson Learned: Co-location enables Communication
- FMV has the Deputy PM at Picatinny.
- Raytheon has a Systems Engineer at Bofors in Sweden.
- Bofors and Raytheon have personnel at Picatinny.
- Bofors will send one person to Raytheon in Tucson this month.
All Parties Win!

- US Government achieves reduced development cost.
- Swedish Government acquires new capabilities at an affordable cost.
- Contractors engage in a profitable enterprise that also helps meet national defense needs.
- The Combat Developers exchange ideas that inspire future development and interoperability.
- The Warfighters get the capabilities they need.
To explore and develop a roadmap for a potential cooperative develop program between the US and Sweden on the PGMM program

Benefits

- Shared Development costs
- Established starting point for NATO standard
121 SADARM projectiles fired - destroyed 48 pieces of enemy equipment

*SADARM exceeded expectations and became the preferred [smart] precision munition for the field artillery battalions and their supported maneuver commanders*

SADARM performance led to 3rd ID (Mech) recommendation:
"...revisit sense and destroy munitions as a precision killer for the artillery"

Statements from the 3rd ID DIVARTY COMMANDER:
✓ "We could have fired more smart munitions"
✓ "SFMs give the artillery the ability to destroy enemy targets that are positioned near valued assets minimizing the collateral damage"
SYSTEM CHARACTERISTICS:

**SMArt 155**
- Range – 22 Km
- Ballistic similar with M483
- Sensor System – MMW Active/Passive and IR
- Submunition Search area – 35,000 sq M

**Bonus**
- Range – 27 Km (Base Bleed)
- Ballistic similar with M864
- Sensor System – Multi band Passive IR
- Submunition Search area – 32,000 sq M

SYSTEM DESCRIPTION:

SMArt 155 and Bonus - Autonomous fire and forget all weather 155mm projectile containing 2 top attack submunitions. Submunitions are ejected over armored targets, perform a decreasing spiral scan, detect the target, initiate warhead and penetrate the target.
Excalibur is a very successful cooperative program

Keys to success: “We know what works”

We have potential for more cooperation in development programs and other activities