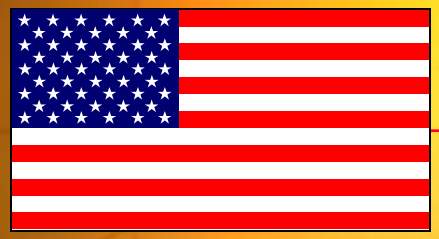


Excalibur - a Successful Swedish/U.S. Development Program

09 October 2003

COL Nate Sledge
Project Manager for Combat Ammunition Systems
(973) 724-2003, sledge@pica.army.mil

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

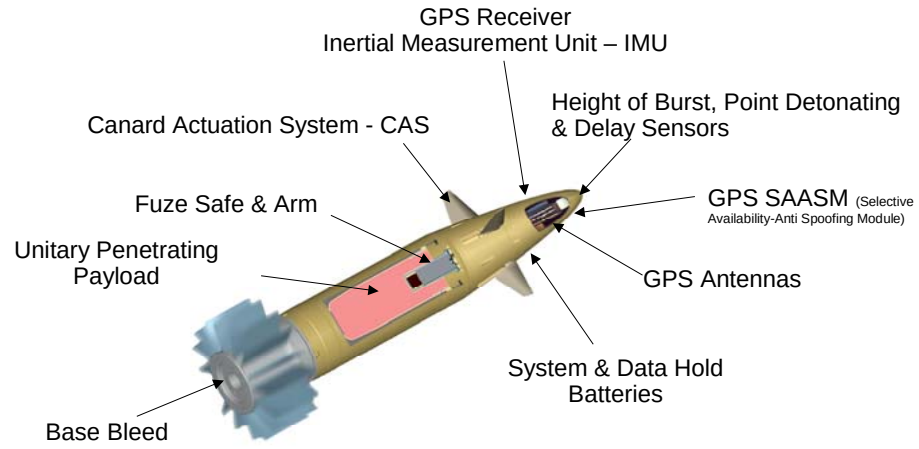
Perform Life-Cycle Management of Tube-Launched Indirect Fire Munitions, Mortar Weapons, and Mortar Fire-Control Systems

VISION

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

PM Combat Ammunition Systems

Excalibur System



UNITARY

Acquisition Phase

- Current: System Development & Demonstration

Contractors

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

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

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

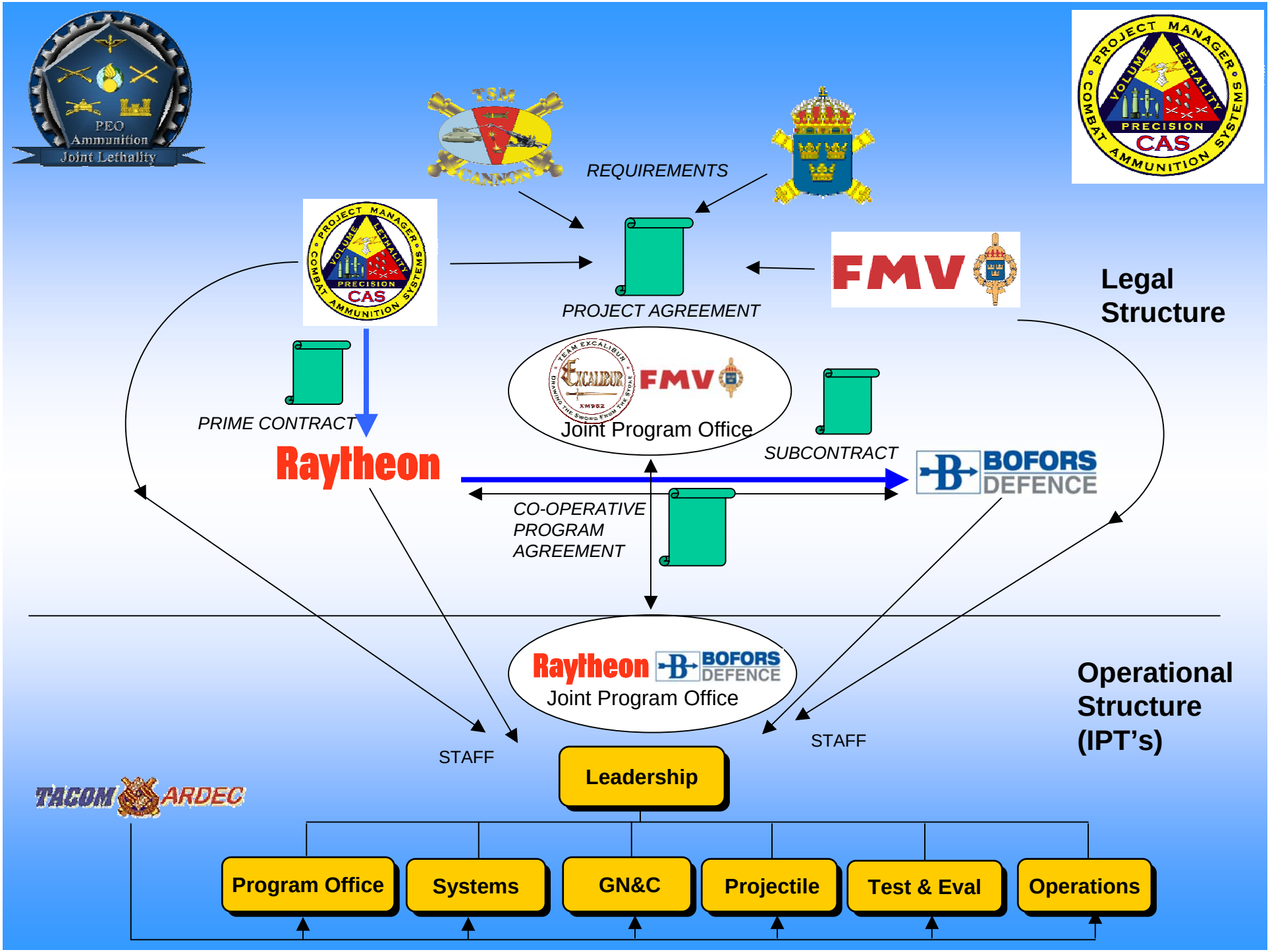
- Seek early Agreement on . . .
  - ✓ Requirements
  - ✓ Work share
  - ✓ Responsibilities
  - ✓ Funding
- Understanding cultural differences
- Responsiveness and Flexibility
- Innovation
- Effective communication
- Leadership Commitment
- Win – Win solutions

User Requirements

- **Harmonized User Requirements is the most important key to success**

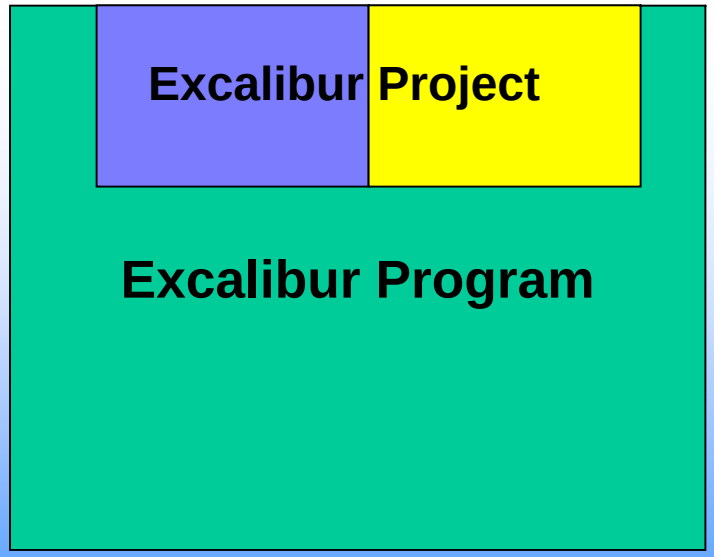
Project Agreement

- 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.


PEO Ammunition
Joint Lethality
TSM CANNON
REQUIREMENTS
PROJECT MANAGER VOLUME LETHALITY PRECISION CAS COMBAT AMMUNITION SYSTEMS
FMV
Legal Structure
PROJECT AGREEMENT
PRIME CONTRACT
Raytheon
TEAM EXCALIBUR EXCALIBUR XM982
FMV
Joint Program Office
SUBCONTRACT
BOFORS DEFENCE
CO-OPERATIVE PROGRAM AGREEMENT
Raytheon
BOFORS DEFENCE
Joint Program Office
STAFF
STAFF
Operational Structure (IPT's)
TACOM ARDEC
Leadership
Program Office
Systems
GN&C
Projectile
Test & Eval
Operations

Cost Share

- 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.

Potential Mortar Cooperation

- 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

SADARM in OIF

- **121 SADARM projectiles fired - destroyed 48 pieces of enemy equipment**

  3rd Infantry Division (Mech) After Action Report : OIF

- **"SADARM exceeded expectations and became the preferred [smart] precision munition for the field artillery battalions and their supported maneuver commanders"** ***3rd ID(Mech) AAR: OIF***
- **SADARM performance led to 3rd ID (Mech) recommendation: "…revisit sense and destroy munitions as a precision killer for the artillery"**

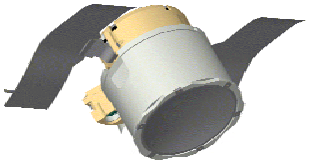
  3rd ID(Mech) AAR: OIF

- **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"**

JBMOU Sensor Fuzed Munition (SFM) Compliance Testing

SMArt 155 – GIWS/ATK

Bonus – Bofors/UDLP



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.

Summary

- 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