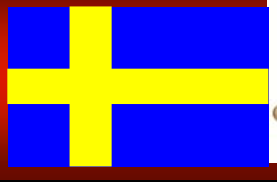
EXCALIBUR

XM982

Precision Fires for the Field Artillery

John Halvey - Raytheon
Stefan Blomgren – Bofors Defence

Excalibur Program



- Joint International Program:
  - Kingdom of Sweden
  - United States

- In theater with US Army by March 2006
  - In Response to Urgent Need Statement
  - 15 months earlier than otherwise planned
- Fields to Swedish Army by 2009

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Team Excalibur

EXCALIBUR XM982

PROJECT MANAGER COMBAT AMMUNITION SYSTEMS — VOLUME LETHALITY PRECISION CAS

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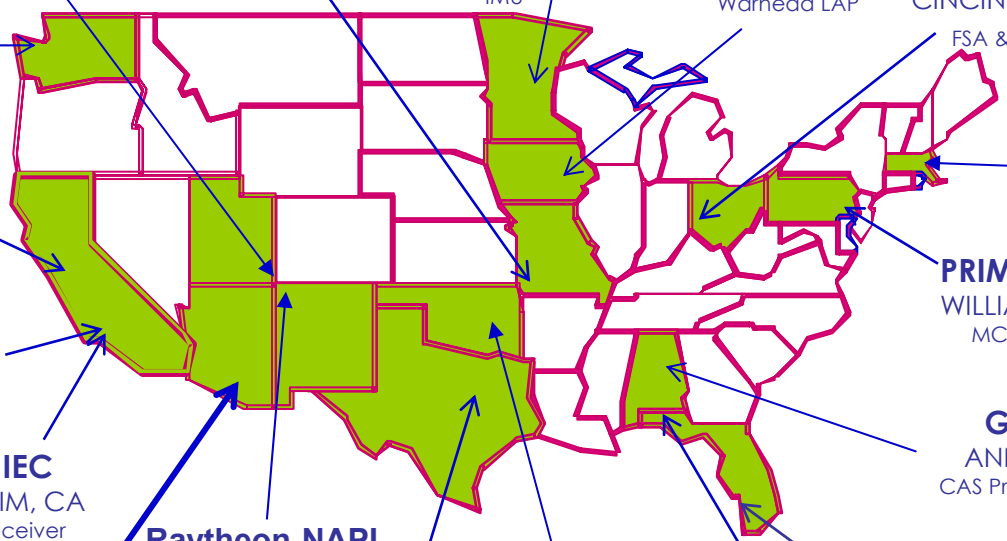
TACOM ARDEC

TSM CANNON

FMV



KLUNE INDUSTRIES
SPANISH FORK, UT
Metal Parts

EAGLE PICHER
JOPLIN, MO
Batteries

HONEYWELL
MINNEAPOLIS, MN
IMU

American Ordnance
Middletown,IA
Warhead LAP

L3 - KDI
CINCINNATI,OH
FSA & HOB

BOFORS DEFENCE
KARLSKOGA,SWEDEN
Base, Airframe, Warhead

GD - OTS
REDMOND, WA
SRMBA

M/A COM
LOWELL, MA
Antennas, Tac TM

GD-OTS Healdsburg
HEALDSBURG, CA
CAS

NAMMO
RAUFOSS, NORWAY
Basebleed

PRIMUS
WILLIAMSPORT, PA
MC & PCU CCA's

EDO - CCS (ANC)
SIMIVALLEY, CA
Anti Jam

GD - DRI
ANNISTON, AL
CAS Prod/Metal Parts

L3 - IEC
ANAHEIM, CA
GPS Receiver

Raytheon-NAPI
FARMINGTON, NM
GNC Production Line

McAlester AAP
McALESTER, OK
Final Integration

GD - OTS
ST. PETERSBURG, FL

BAE
PLYMOUTH, ENGLAND
IMU

RAYTHEON MISSILE SYSTEMS
TUCSON, AZ

RAYTHEON ELECTRONICS
MC KINNEY, TX
Radome

GD –OTS OTI
NICEVILLE, FL
Warhead

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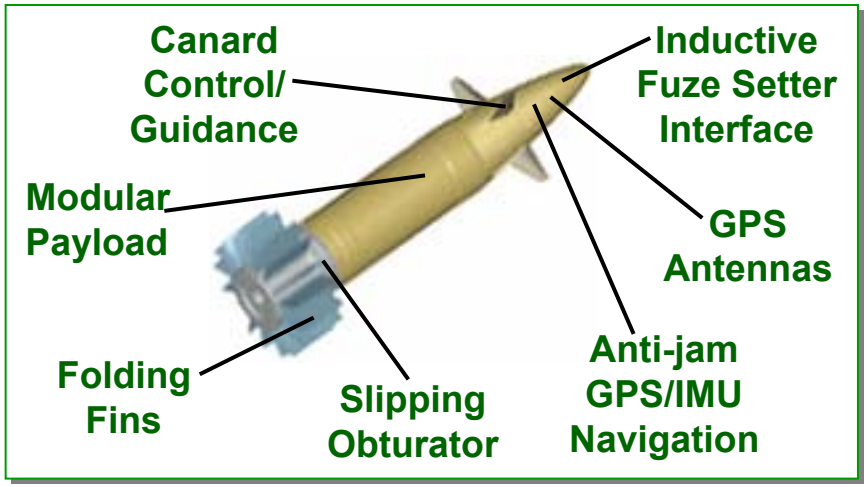
Excalibur System Description

Excalibur:

- Precision Guided, Extended Range 155mm featuring varying payloads and capable of being fired from any 155 mm Howitzer



Block I (Unitary):

- HE Warhead
- GPS/IMU Guidance

Block II (Smart):

- Detect/acquire/engage submunition capability

Block III (Discriminating):

- Terminal Guidance

Required Capabilities:

- 10m CEP accuracy regardless of range
- 35/50 km max range (T); 40/60 km max range (O)
- Retains traditional HE target sets
- Penetrates 4” reinforced concrete
- Almost vertical terminal trajectory for urban terrain (expands artillery target sets)

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The Benefits Of Precision Fires

Target/Environment	Precision Fires Excalibur (< 10 m CEP)	Precision Area (< 50 m CEP)	Area M107
Point CP, ADA, Building, Vehicle	✓		10 - 35 X®
Area Platoon In Open	✓	✓	10 X®
Massed Fires Suppression, Large TLE	✓	✓	✓
Collateral Damage Danger Close	✓	✓	
Range	✓		✓
Urban Terrain	✓	✓	✓
Reduced Logistics/Costs	✓	✓	

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Artillery Precision Vs. Other Precision

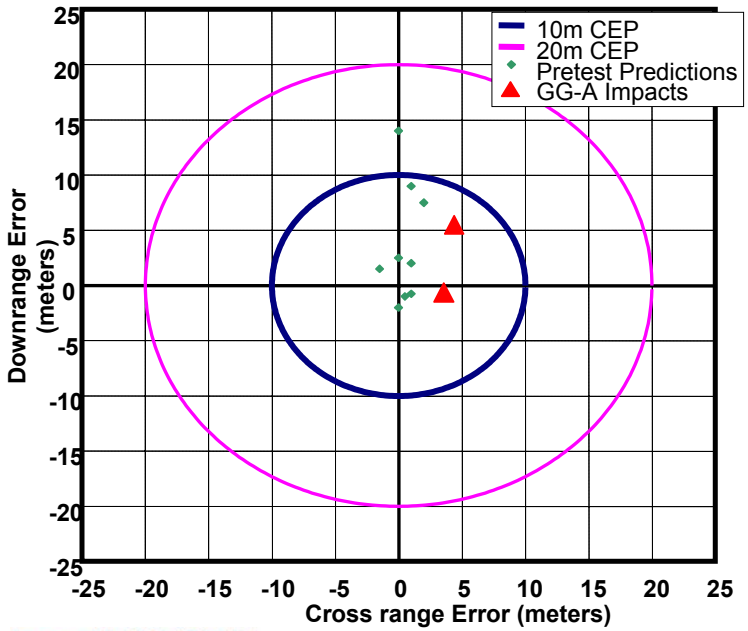
- Immediately Responsive Fires
  - Air Power Superb; But Not 100% Available or Always the Correct Response – Collateral Damage
  - Organic to Modular Brigades
- Fire and Forget Accuracy Not Dependent on SAL
  - Pinpoint Accuracy; Not Always Available, Can Not Always Perform
- All weather
  - If The Close Combat Force Finds the Target, GPS Accuracy Engages
- Low Cost Precision Compared To Aviation Delivered
  - Consider Sustaining The Force In the Field
  - Consider Stowed Kills
  - Consider Required Organic Fires for Close Combat Force

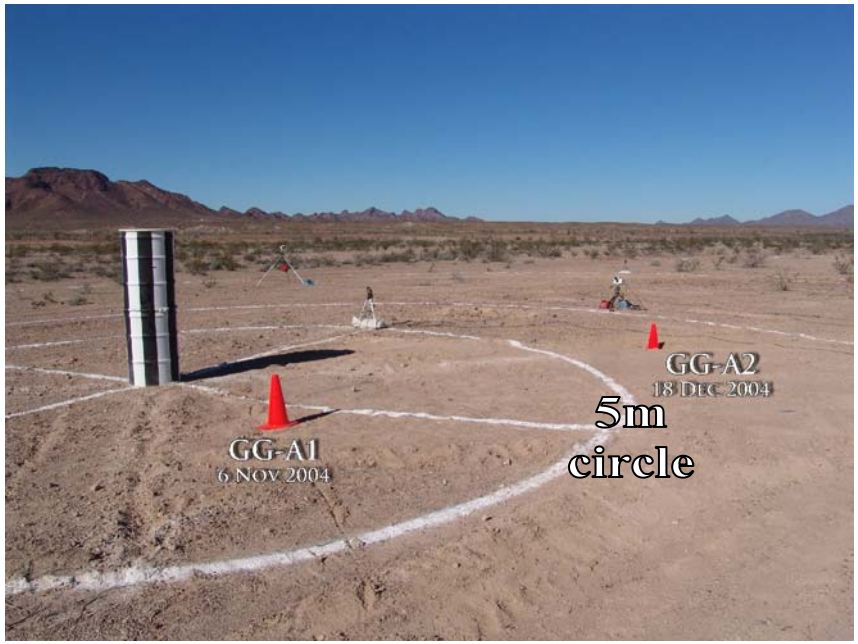
Accuracy Independent of Range

EXCALIBUR XM982

Guided Gunfire A (GG-A) Test (6 Nov & 18 Dec 04)

- **Fired from LW155 & Paladin**
- **Range to Target: 20 Kilometers**
- **Demonstrated Accuracy: 3.4 m & 6.9 m**
  - First Shot Fired in Greater Than 75 mph winds





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System Integration (Level 3)

EXCALIBUR XM982

Setting up the of the Gun and programming of the Projectile is automatically performed as an integral part of the firing cycle.

Automatic Ramming of Projectiles will normally require this fully Integrated System of Systems.

NLOS-C
- **Future US Army**

ARCHER
- **Future Swedish Army L52 Gun**

Full Integration of System of Systems allows for no-man-in-the-loop and sustained firing rate.

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System Integration (Level 2)

Digitally integrated Gun Systems, with manual EPIAFS programming of the Projectile prior to ramming.

The Projectile is programmed thru the EPIAFS which gets its feed from the Gun Integrated Fire Control, which also sets up the gun.

US M777 (JLW155)

Paladin

FH77B

The Intermediate Integration level requires only Manual EPIAFS Programming of the Projectile

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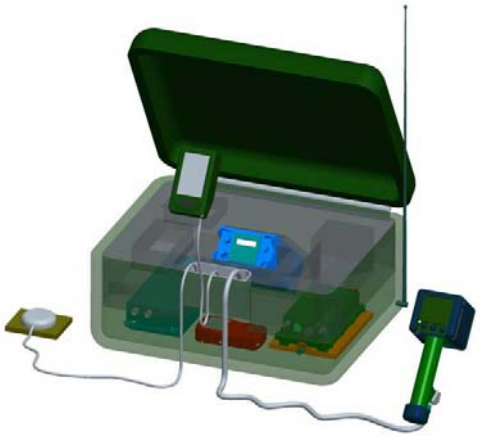
System Integration (Level 1)

The "Ghost Gun" will provide the link between the Projectile and the Fire Control System. It will program the Projectile for firing in any gun, while the gun will be set up independently.



A Stand-Alone "Ghost Gun" will give any 155 mm gun Excalibur capability

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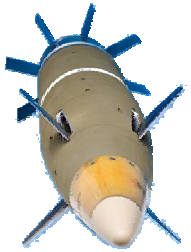
Excalibur Benefits Summary

- **Organic Fires Is the Most Responsive**
- **Flexibility to Execute Traditional and Evolving Missions**
  - **High Accuracy - Minimize Collateral Damage**
  - **Fire and Forget**
  - **All Weather**
- **High Lethality from Impact Angle & Accuracy**
- **Reduced Force Costs**
  - **Existing Ground Based Force Structure / Systems**
  - **Reduced Logistics (Trucks/Drivers/Cooks …)**
  - **As High As 50:1 Excalibur to Less Precise Rounds**
- **Will Integrate Across Current and Future Force Structures**



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