



KDI Precision Products, Inc.

An ISO 9001 Registered Company

Common Precision Munitions Safety & Arming Device

45th Annual Fuze Conference

"The Evolving Nature of Value Added Fuzing"



Presented By: Mr. Richard Dirks

www.kdi-ppi.com



Report Documentation Page

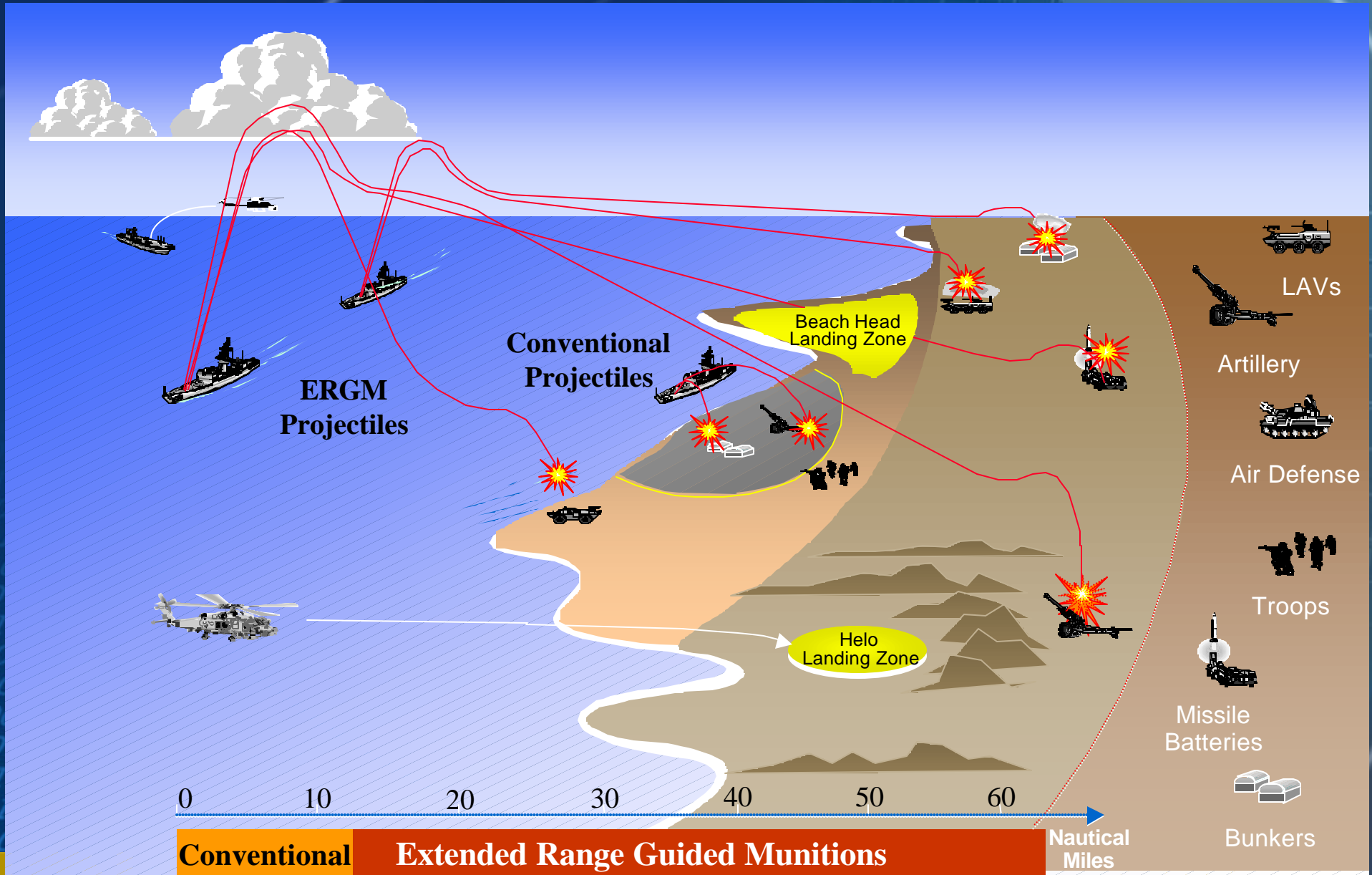
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Abstract		
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OUTLINE

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- S&A Mechanical Design
- S&A Electrical Design
- S&A Integration
- S&A Event Sequence, Outputs, and Capabilities
- Program Test Results / Milestones



EX171 ERGM OPERATIONAL CONCEPT



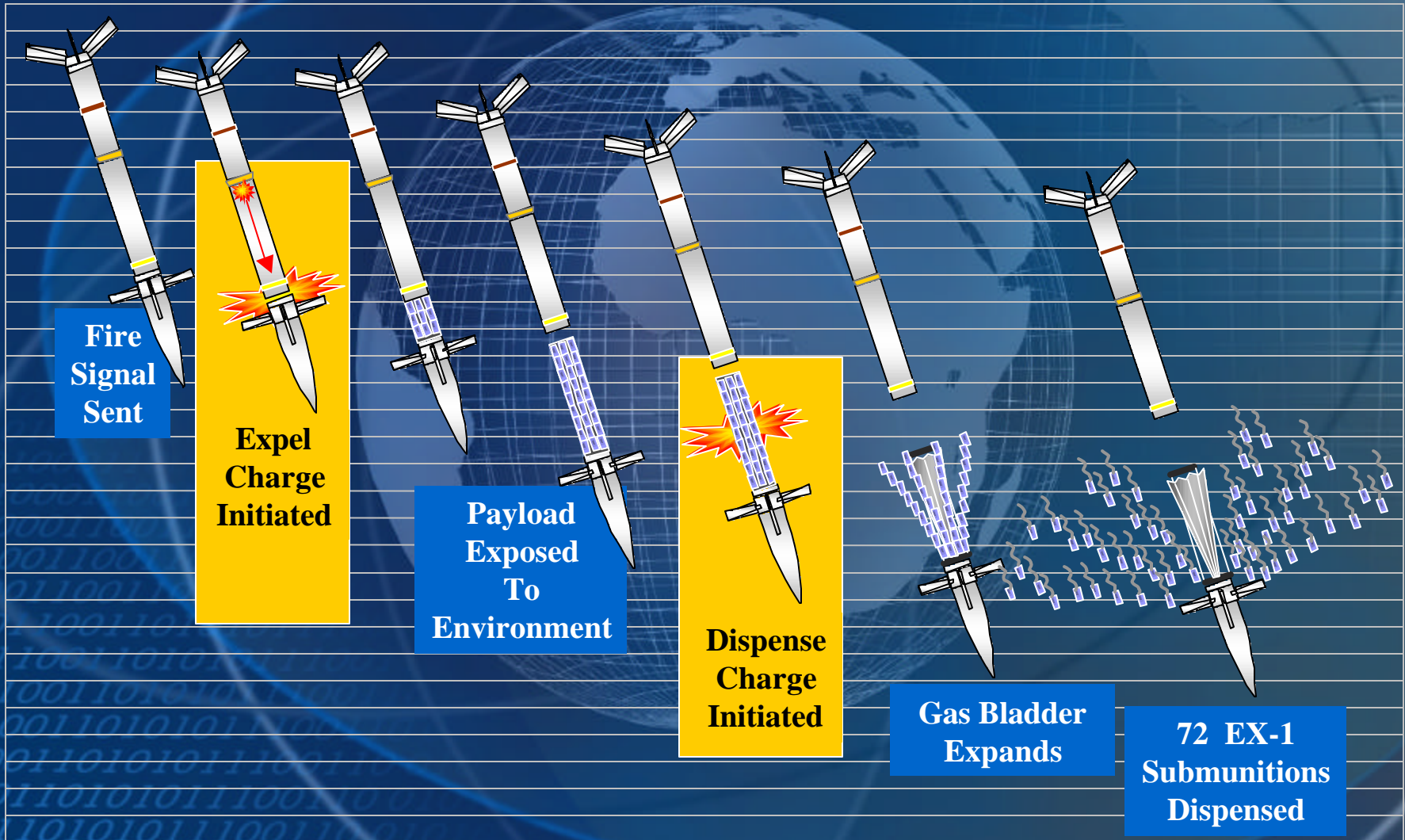
Conventional

Extended Range Guided Munitions

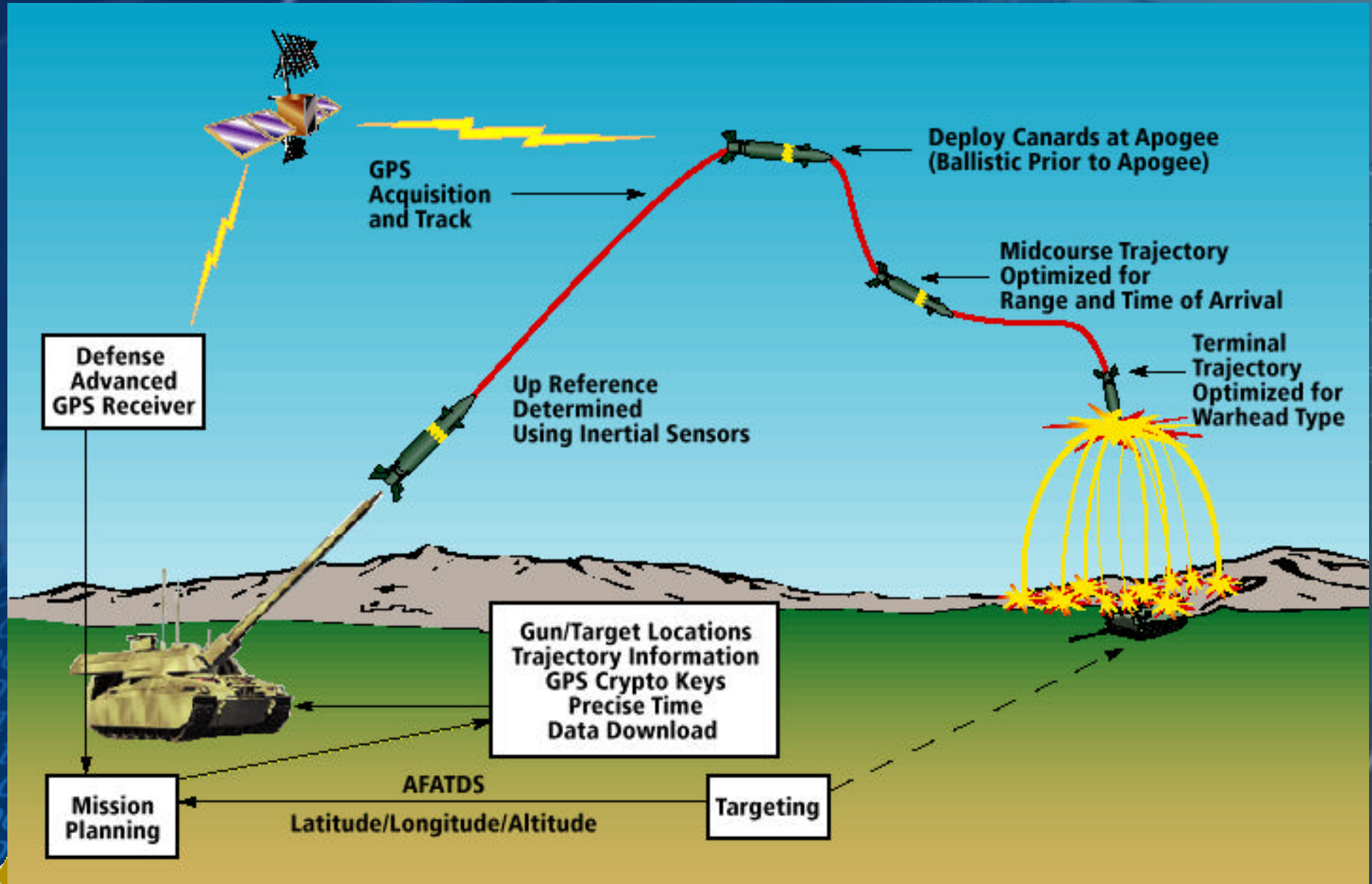
Nautical Miles



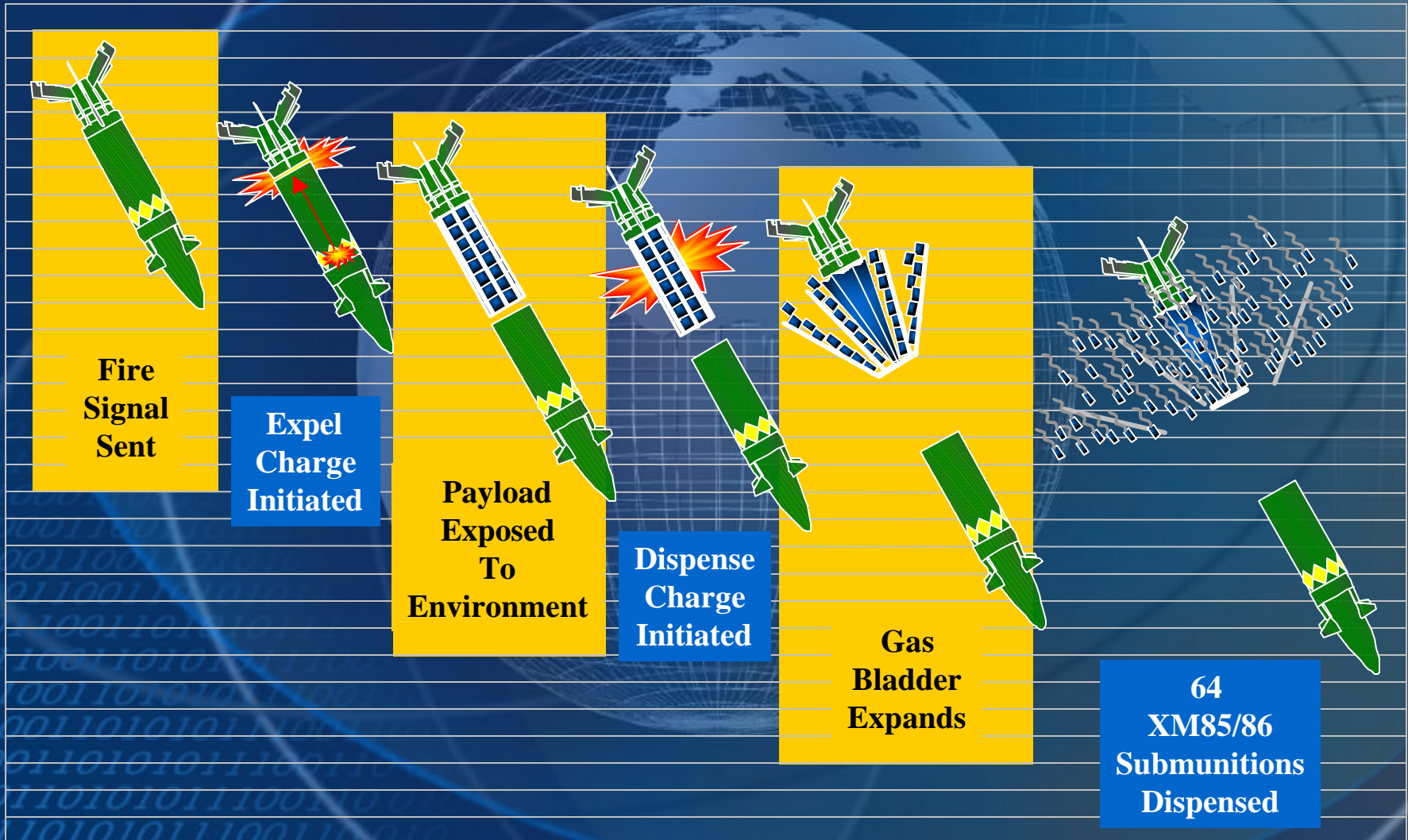
ERGM SUBMUNITION EXPEL & DISPENSE



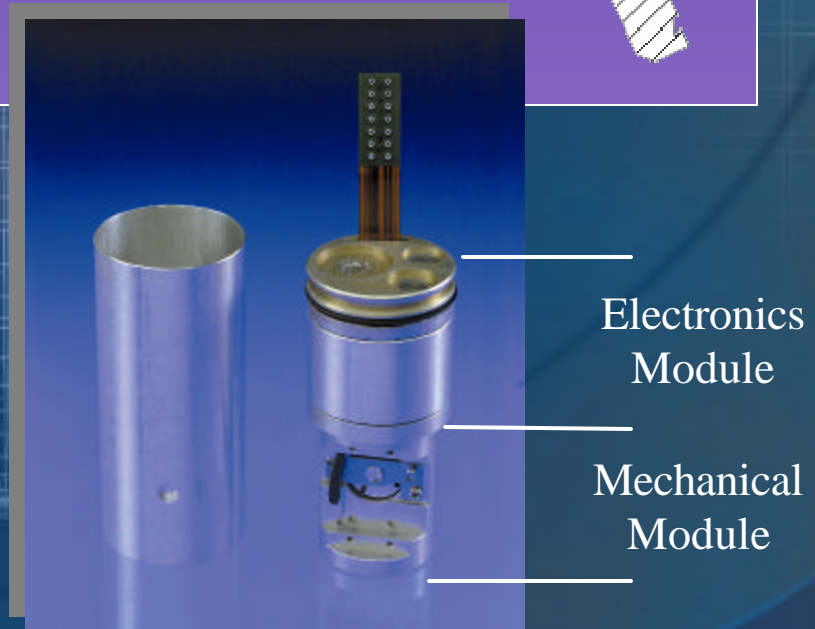
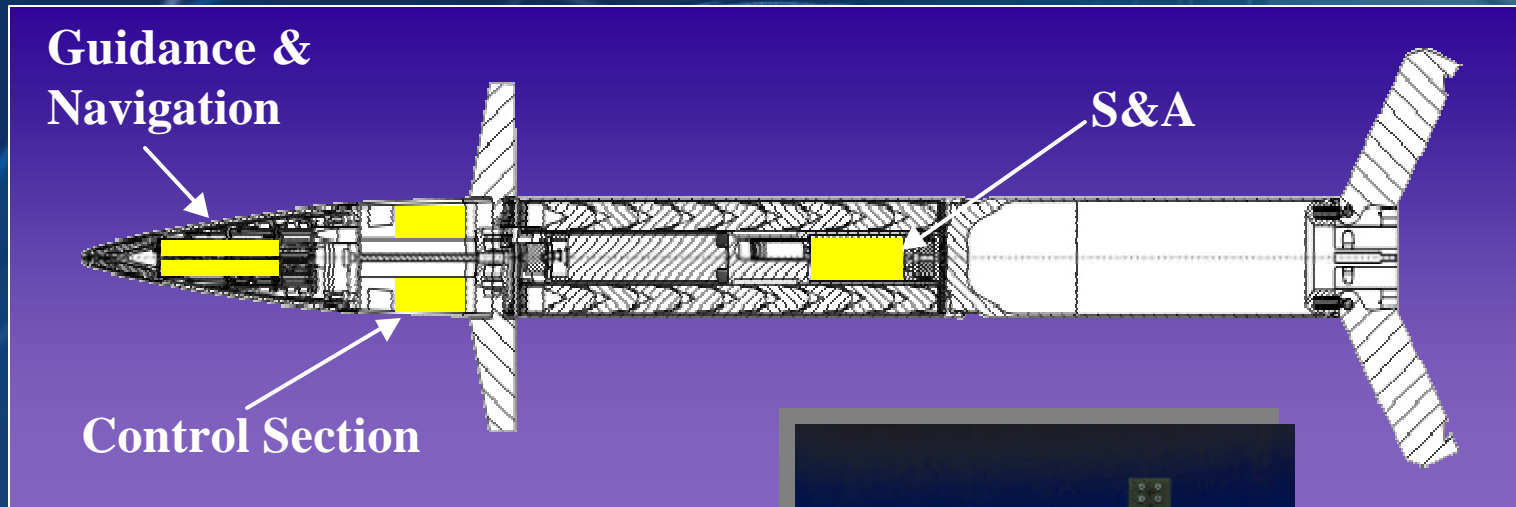
EXCALIBUR OPERATIONAL CONCEPT



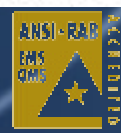
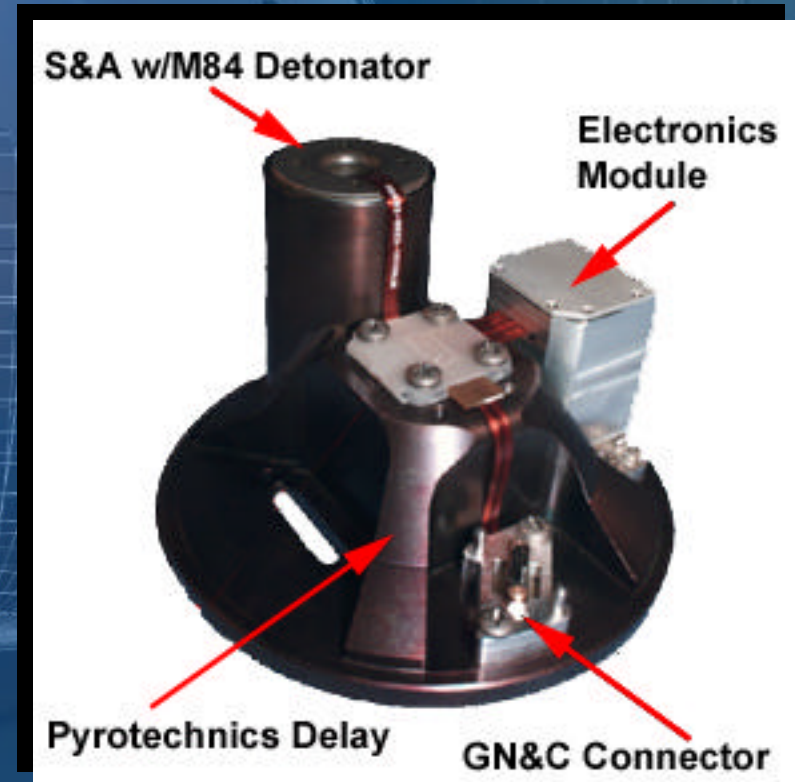
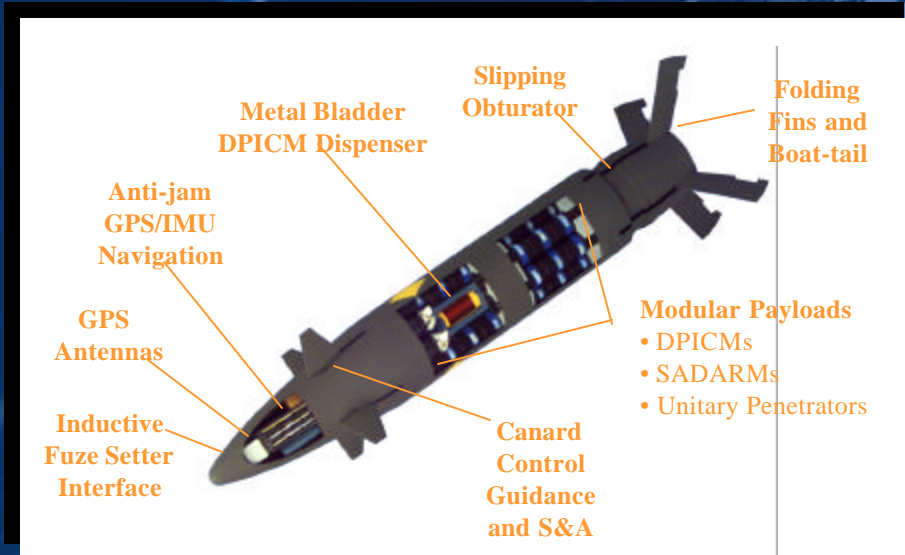
EXCALIBUR SUBMUNITION EXPEL & DISPENSE



ERGM EX87 S&A DEVICE AND LOCATION

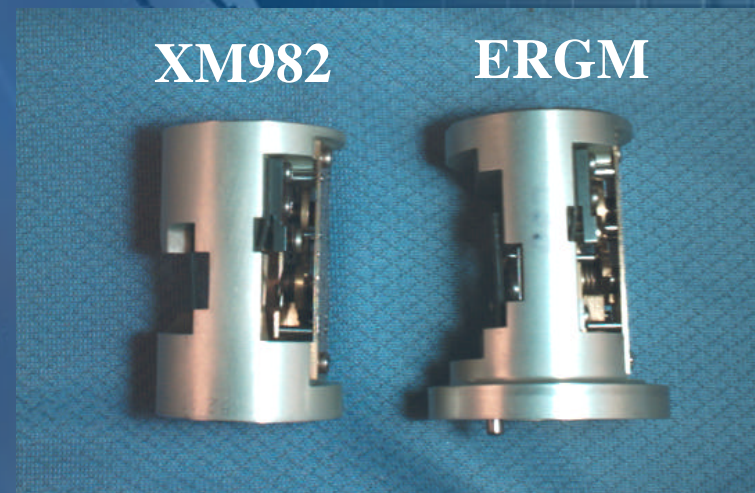


XM982 S&A DEVICE AND LOCATION



S&A REQUIREMENTS

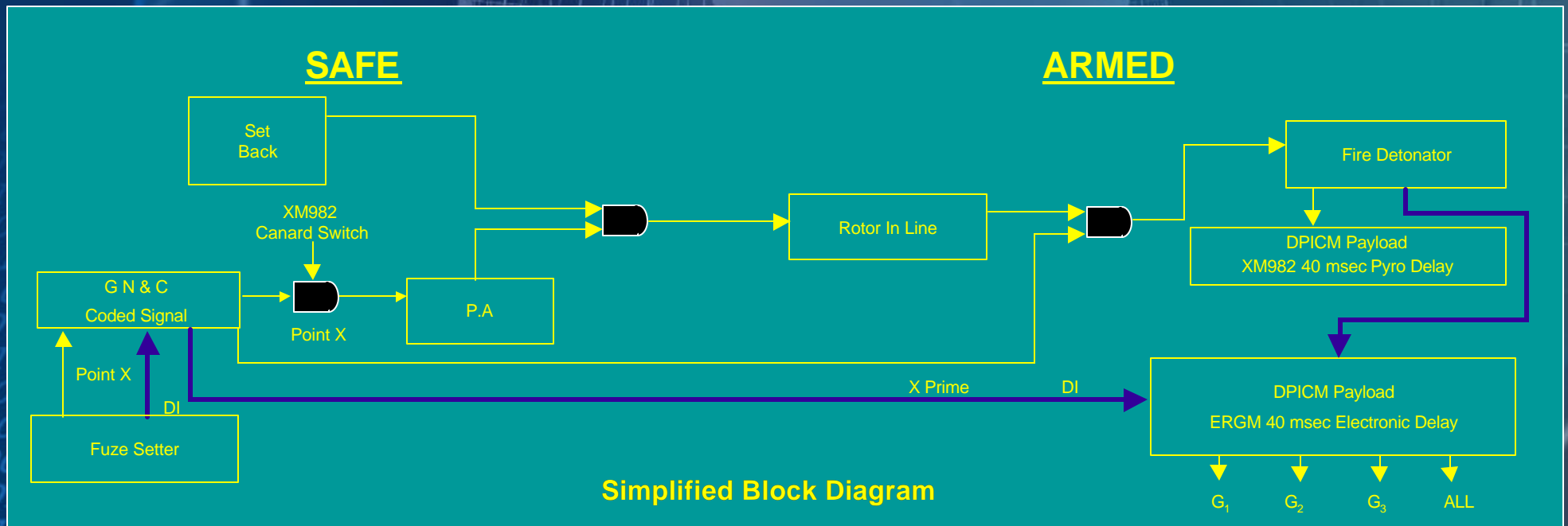
- Projectile Application
 - All Arm - 1,250 G's
 - No Arm - 300 G's
- No Spin
- Interface With GN&C
- MIL-STD-1316D Compliant
- Seal Against “Expel” Pressure
- ERGM Unique
 - Support “Dispense” Forces
 - User Selectable Output
 - Autonomous “End Game” Operation



MIL-STD-1316D COMPLIANT

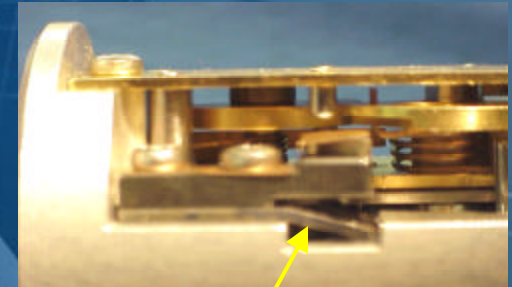
ERGM/XM982

- Two Independent Locks
- Enhanced Overhead Safety
- Set Back
- Anti-Malassembly Feature
- GN&C
- Launch Derived Rotor Drive Energy
- Sequence Dependent
- Selectable Output (ERGM Only)

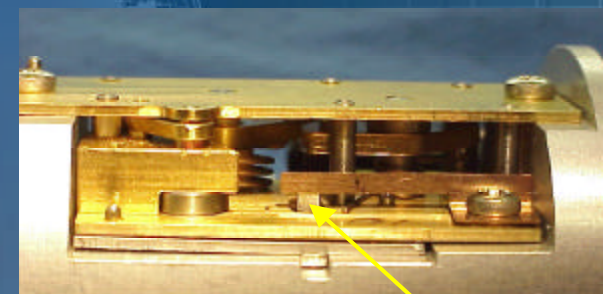


S&A MECHANICAL DESIGN APPROACH

- Mechanical S&A Design Approach
 - Modified MK18 S&A
 - Higher G Loads
 - AFT Detonation Output
 - Switches Indicate Rotor Position
 - Integrated Electronics Control
 - Three (3) Leaf Set Back Mechanism



Second Rotor Lock (Safe)

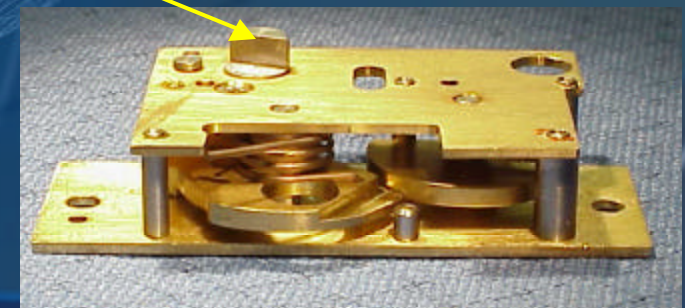
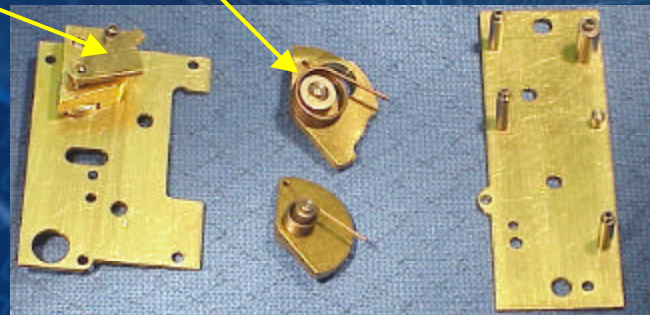


Rotor Lock (Arm)

Leaf Lock

Rotor Drive Spring

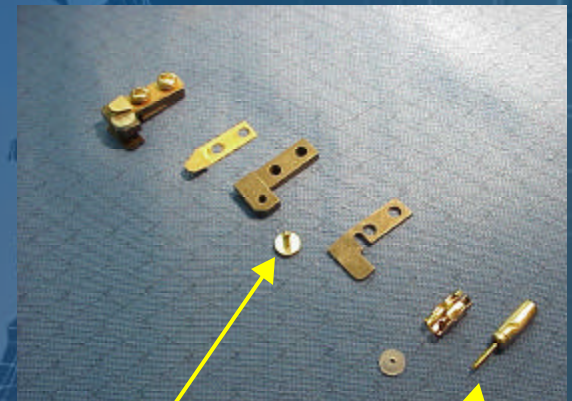
First Rotor Lock (Safe)



S&A ELECTRICAL DESIGN APPROACH

- S&A Electronics
 - RS232 Serial Communication Link
 - Codeword Controls Function

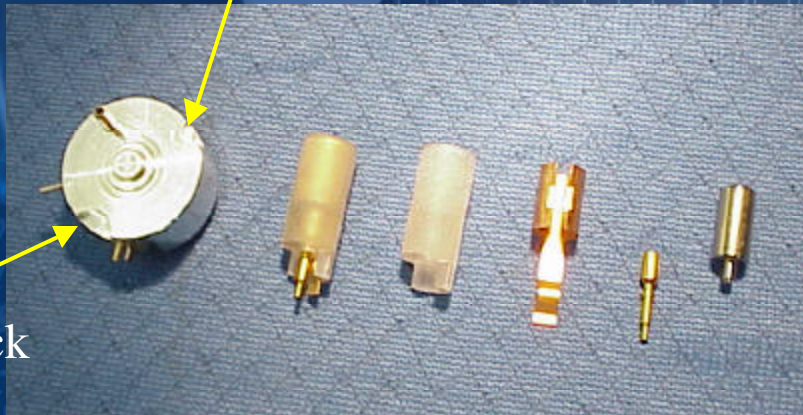
GN&C
Second Rotor Lock W/PA



Safety Button

Piston Actuator

Second Safety & Arm Lock



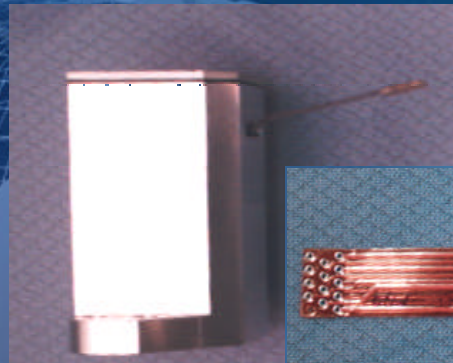
Set Back Lock

Rotor W/Switches & M84 Detonator

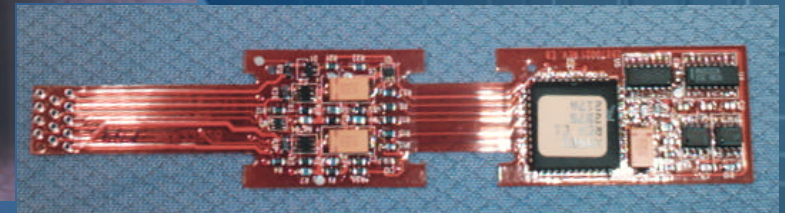


ELECTRONICS PACKAGE

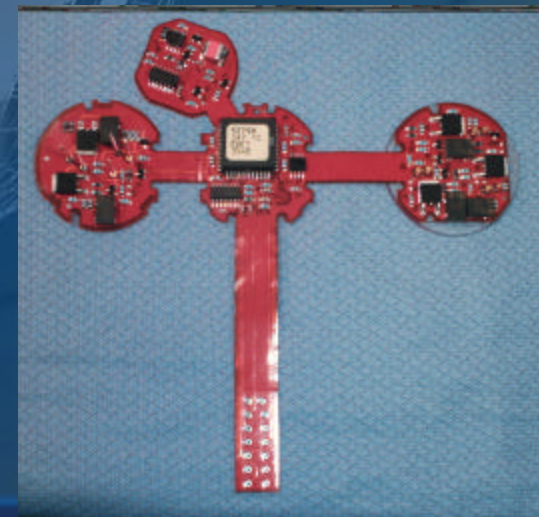
- Electronics Design
 - Flexible PWB
 - SMT
 - Glass Bead Fill
 - Mosfet Circuitry
 - Independent Timer (10 sec)
 - FPGA
 - Energy Storage
 - Autonomous Operation
 - Two Stage Timed Function



XM982



ERGM

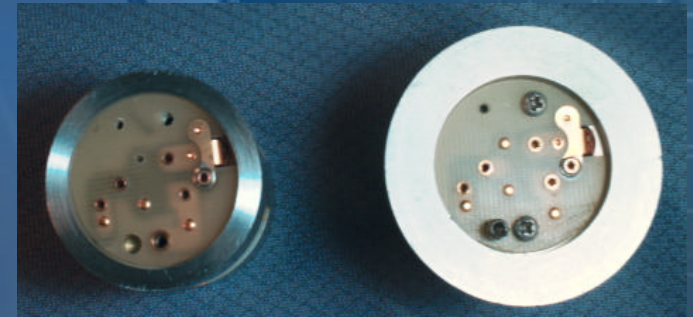


S&A OUTPUTS

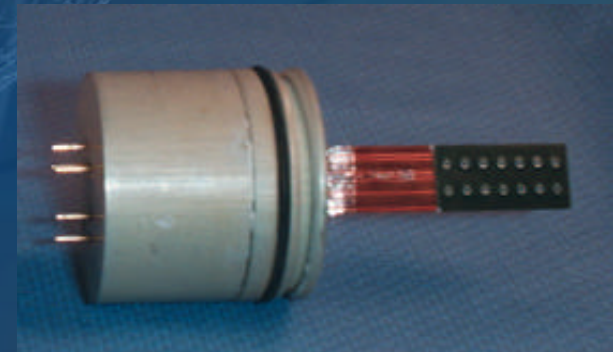
- Energetic
 - M84 Electric Detonator Initiates Expel Charge
 - Solder Sealed Enclosure
 - Platinum Bridgewire
- ERGM Dispense Module
 - Initiate Cartridge Primers (44 magnum, 45-70, and 10 gauge)
- XM982 Dispense Module
 - Pyrotechnic Delay

XM982

ERGM



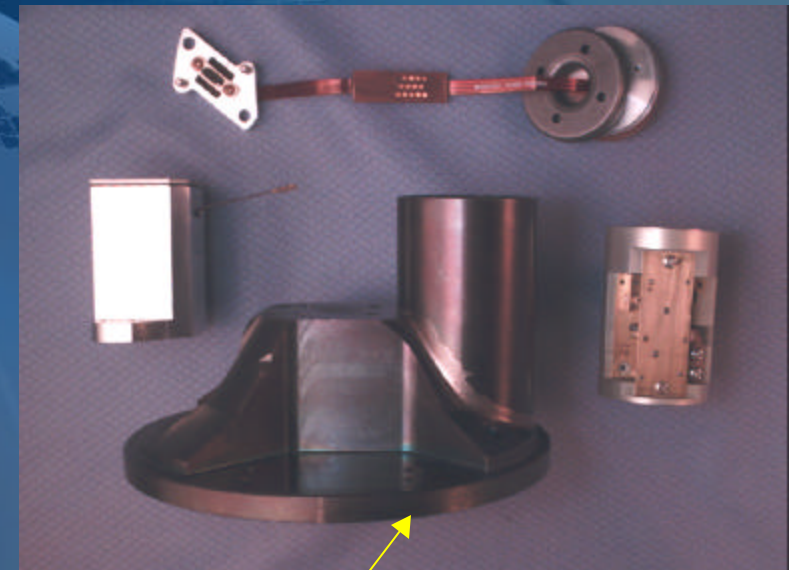
ERGM



S&A INTEGRATION

XM982 S&A

- Centrally Located
 - Seal Against Pressure
 - Support Structural Load
 - S&A weight Less Than 1 Lb. (Less Expel Liner)
 - Integral Cabling To GN&C



Expel Liner



ERGM EX 87 S&A



S&A DESIGN SUMMARY

- Resulting Capabilities
 - Meets MIL-STD-1316D
 - Interactive W/ GN&C
 - Maximized Overhead Safety
 - Independent Timer
 - Arm Command issued Just Prior to Endgame
 - Variable Outputs ERGM Only



ERGM



XM982



S&A PROGRAM MILESTONES

- ERGM EX 87 S&A
 - Piston Actuator Qualification - May & June '01
 - EX87 S&A Qualification - July thru September '01
- XM982 S&A
 - Completed Design Analysis Phase, Ready for Verification Testing
 - At present - On Hold

