Responsive Accurate Mission Module (RAMM)

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NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

STRENGTH THROUGH INDUSTRY & TECHNOLOGY

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FSAC

Responsive Accurate Mission Module (RAMM)

Objective

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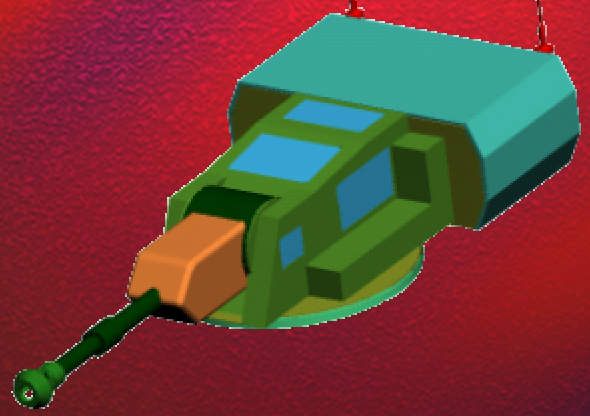
- ***Design/Develop* a lightweight highly responsive automated unmanned indirect fire module that will integrate onto multiple platforms and provide accurate remote (SENSOR-TO-SHOOTER) capability through a digital network to engage *Area of Operation targets*.**



- ***In 1998 FSAC, developed the first unmanned mortar technology demonstrator called Dragon Fire for the MCWL which successfully demonstrated the utility of a remotely controlled indirect fire system.***

Lethality without Soldier Vulnerability

Responsive Accurate Mission Module (RAMM)

Initial Concept Demonstrator

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Demonstrator Characteristics:

- Unmanned/remote controlled after emplacement
- Self-orienting/Self-positioning
- Able to receive digital call for fire and MET data
- Capable of internal ballistic computation for firing solutions
- Automatic gun pointing, ammunition loading and firing
- 360 degree traverse firing
- Transportable in V-22 aircraft

- ***Dragon Fire** was single shot, stationary, remote controlled, with automated fire control and gun pointing*
- ***RAMM** will be multi shot, highly mobile, modular system with high level functionality leveraging Dragon Fire's proven technology*

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Control Network Architecture

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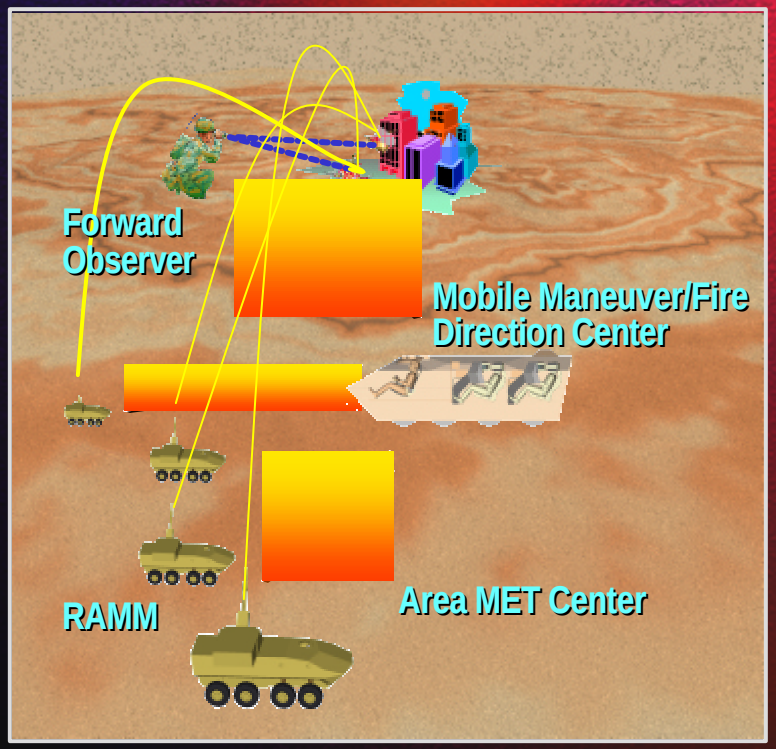
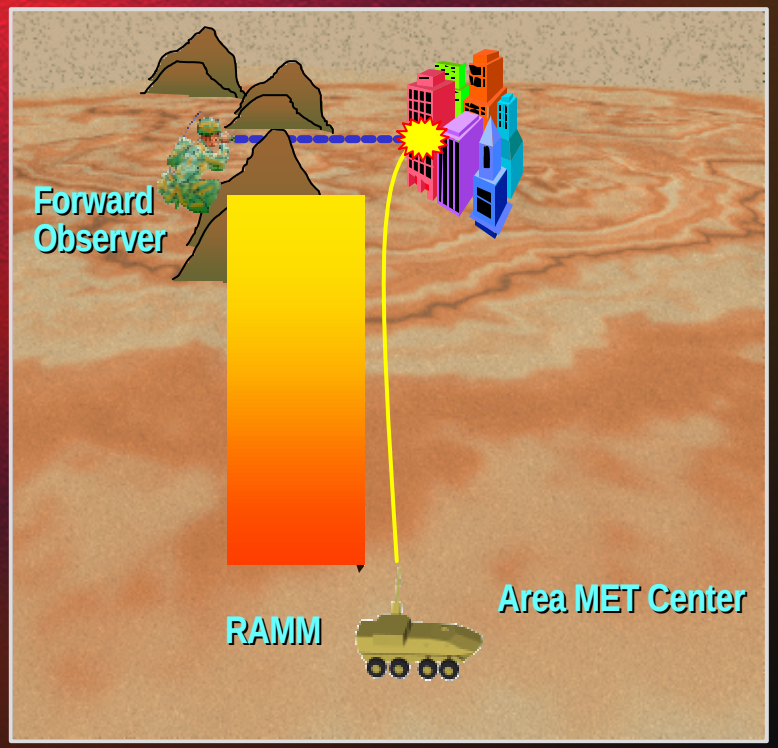
- *Maneuver Direction Center* → *Mobile Platform Control*
- *Area MET Center* → *MET Data*
- *Forward Observer* → *Target Data*
  - *Forward Observer (Optional control)* → *TD/ Fire Mission*
- *Fire Direction Center* → *Fire Mission/Module Management*
- *RAMM Module* → *Fire Mission Processing*



- ***Traditional Control Architecture***



- ***Direct Control from FO***

(Aid in MOUT Combat)

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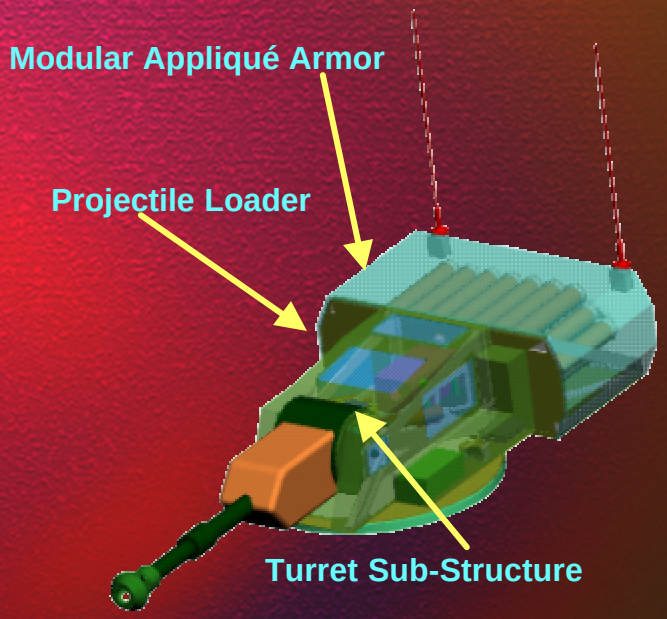
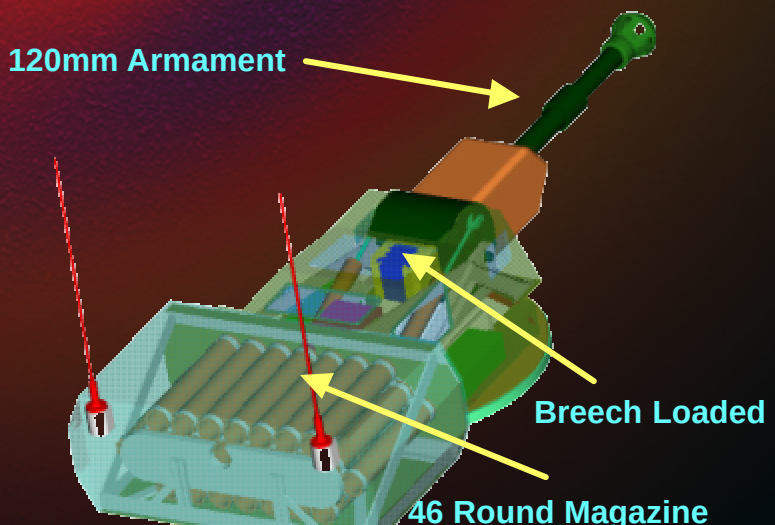
Module Concept

Performance Baseline

Capability	Current Capability	Threshold	Objective
System Weight	7000lbs (Dragon Fire)	6000lbs (includes 2000lbs in armor)	4000lbs
MV variation	2.5m/s (M120)	1.5 m/s	1 m/s
Pointing accuracy			
Elevation (1 Sigma)	2 mils	1 mil	.5 mil
Deflection (1 Sigma)	4 mils	1 mil	.5 mil
Responsiveness	8-12 min. (M120)	15 sec	11 sec
Crew Size	4 (M120 & M121)	0	0
Elevation Range (Degrees)	40 to 85(M121)	0 to 85	-3 to 85
Traverse Range (Degrees)	90 (M121)	360	360





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FCS and BCT Vehicles

GENERIC FCS VEHICLE/RAMM IN C130 AND RAILWAY TUNNEL GAGE

RAMM ON FDRU Or Robotic follower vehicle

RAMM MOUNTED ON GENERIC FCS VEHICLE

RAMM MOUNTED ON LAV III

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Why 120mm Mortar?

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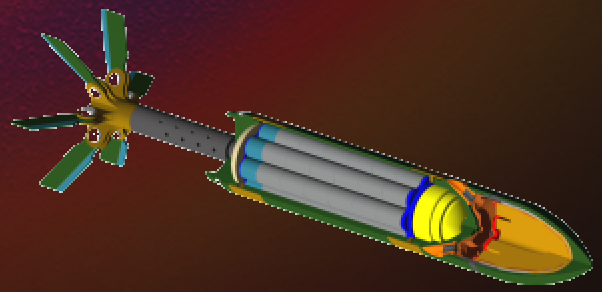
Advantages :

- ***Interoperability*** *many NATO 120mm mortar varieties*
- ***Accuracy*** *pin point accuracy w/ PGMM, automated pointing improves conventional round accuracy*
- ***Lethality*** *120mm HE provides 65-85% lethality of current 155mm HE*
- ***Range*** *300 m (HE) 200m (Smoke/illumination), XM984 and PGMM out to 15Km*
- ***Simplicity for Automation*** *rounds are a unitized package (propellant/primer/etc).*
- ***Relatively Lightweight*** *armament compatible with FCS size platforms*
- ***Economy*** *advanced rounds at end of development cycle, low conventional round cost*

PGMM

Conventional Rounds



XM984 QUICKLOOK

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Basic Missions Concept

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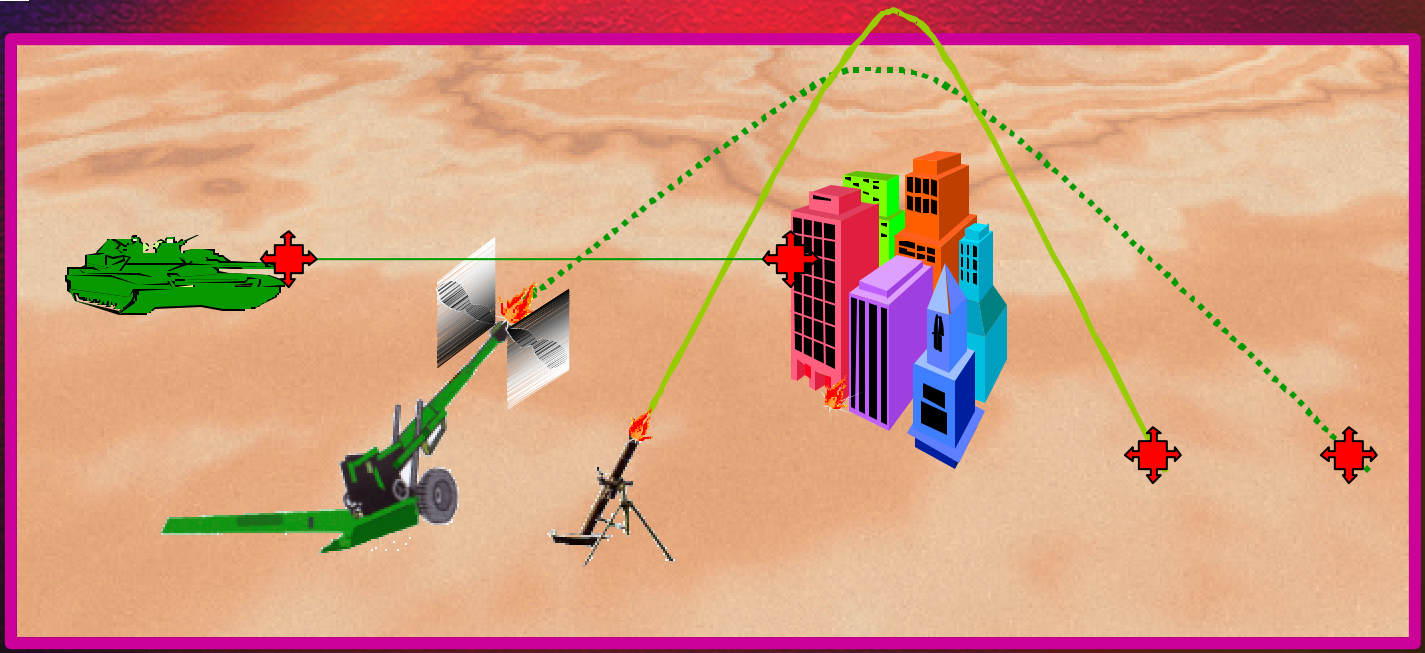
RAMM is a <u>hybrid indirect fire system</u> that combines select capabilities of <u>traditional mortars</u>, <u>artillery</u> and <u>direct fire systems</u>.



- ***Indirect Suppressive Fire***
- ***Indirect Target Degradation***
- ***Indirect Harassment Fire***
- ***Indirect Soft target strikes***
- ***Smoke Screen Fire for obscuration***
- ***Battlefield/Target Illumination***
- ***Very High or Low Angle Fire for MOUT***
- ***Limited Direct Fire Capability***
- ***Precision Strike against earth and timber bunkers, masonry walls and***

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Basic Networked Operation

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Widely dispersed RAMM systems can <u>concentrate fire power on single or multiple targets</u> to be used as a FORCE MULTIPLIER

Utilizing CDAS technology, the Future Warfighter will be able to:

- **Achieve high ROF by cycling multiple RAMM units**
- **Conceal location from enemy fire by firi from multiple locations**
- **Optimize individual magazine inventory firing select rounds from select RAMM systems**

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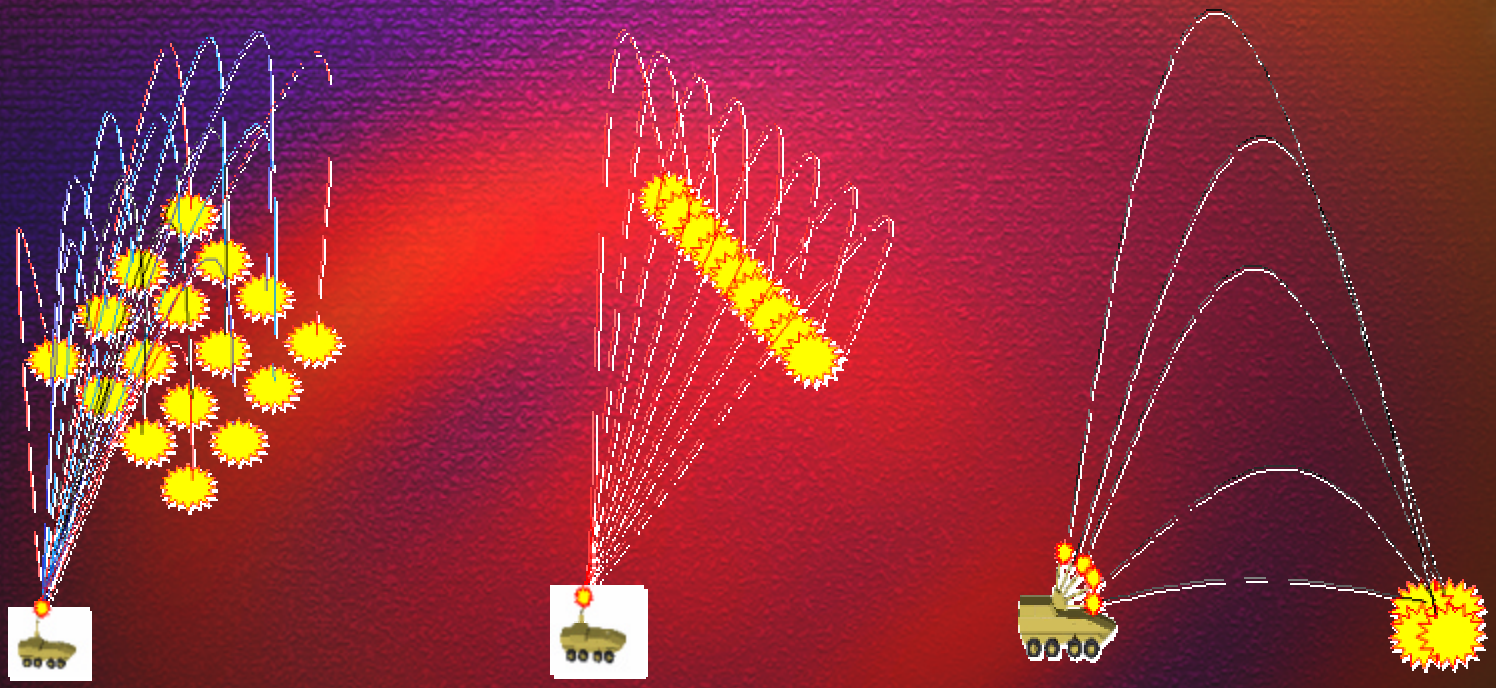

Improved accuracy allows stowed kills to be optimized for:

- ***Pre-programmed patterned or random fire impacts***
  - ***Area saturation/denial coverage***
  - ***Random harassment fire***
  - ***Linear coverage to intersect stationary targets***
  - ***Linear coverage to engage constant velocity moving targets (trains or convoys)***
- ***Multiple round simultaneous impacts (MRSI)***

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Summary

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Potential Industry Partnerships

Inductive Fuze and setting systems

Software Development

Hardware Fabrication

120mm Breech Load Mortar Armament

Robotic Sensors

Projectile Recognition systems

Automated Magazine for 120mm morta

Support Armaments Center