



FCS Multi-role Armament and Ammunition ATD

Secondary Armament System for FCS



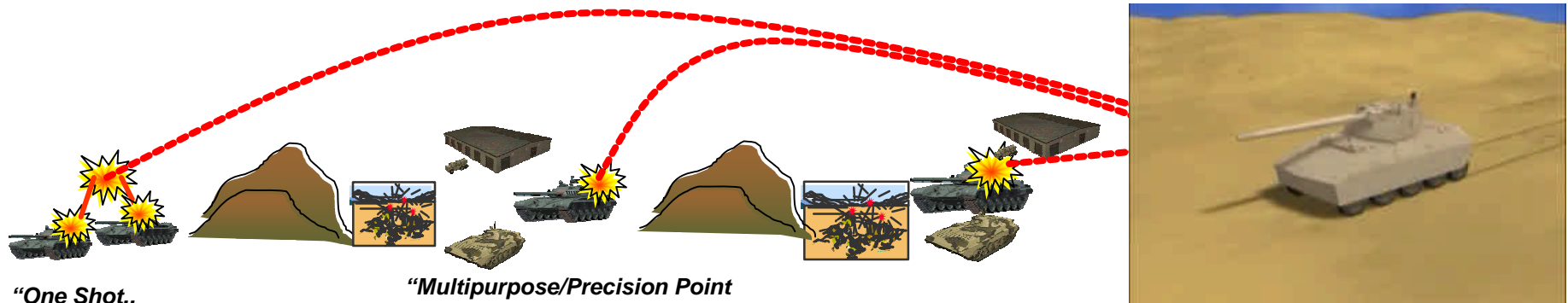
*Richard A. Ciekurs, P.E.
TACOM-ARDEC
Picatinny Arsenal, NJ*



FCS Multi-Role Armament & Ammunition ATD (III.WP.1999.01)



Objective: Demonstrate an integrated multi-role armament system providing lethality overmatch capability in the expanded Close Fight and Tactical Deep Fight, enabling the Objective Force to dominate maneuver throughout the Full Spectrum of Conflict.



*"One Shot..
....At Least One Kill"*

*"Multipurpose/Precision Point
Target Defeat"*

NLOS 4-50KM

BLOS 2-12km

LOS 0-4Km

Pacing Technologies:

Cannon –

- Lightweight Materials
- Recoil Mitigation

Munition -

- Seeker/G&C
- Multi-Mode Warhead
- Electrothermal-Chemical Propulsion

Warfighter Payoffs:

- Heavy Force Lethality
- C130 Transportable Lightweight Vehicle
- Roll Off and Fight
- Reduced Logistics

One Lightweight Armament System Capable of Dominating the Battlefield



Best Technical Approach



- Studied feasibility of conventionally driven and advanced drive technologies
 - Performance
 - Size
 - Weight
- Develop comprehensive matrix of systems and characteristics
 - Small to medium caliber system
 - Expected target set population
 - Kills per lb used as decision metric

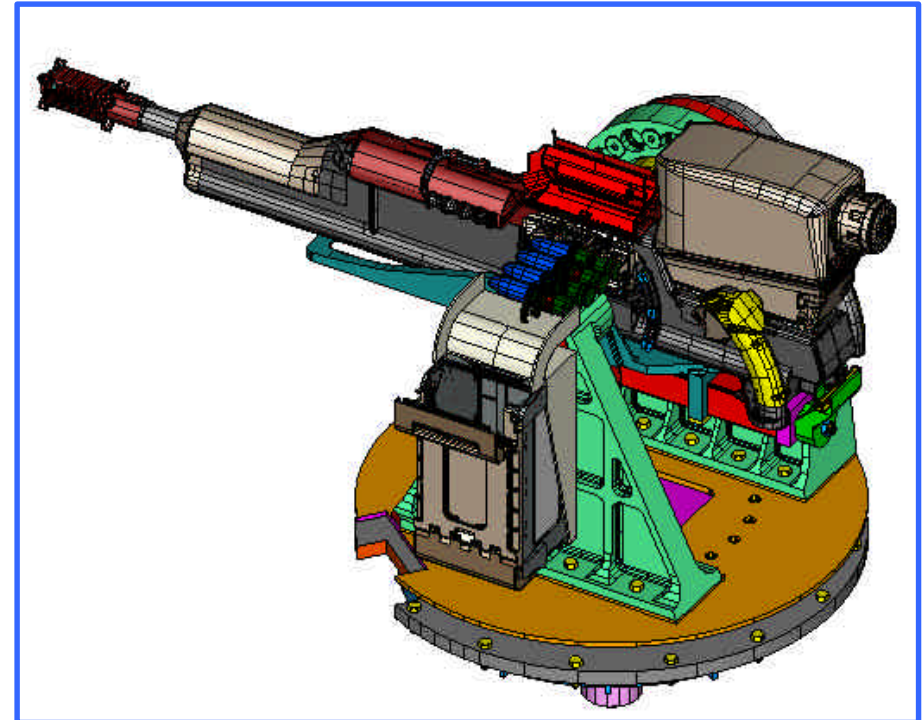
XM307 (OCSW) weapon driven by gearless drives provided most lethality per pound and substantially better performance.



ATD Secondary Armament System (SAS) Design Concept



- Segmented Electro-Magnetic Array (SEMA) elevation and azimuth motors
- XM307 Objective Crew Served Weapon
 - Fire control provides sighting and ballistic solution
- Elevation and depression of +70-deg and -20 deg, respectively
- Meets objective slew and elevation rates of 500 °/sec and 240 °/sec.
- MRAAS crew station controls
- Baseline weight of 480 lb
 - Includes 31 rounds in ready box
- ATD to use OCSW ammo box for proof of concept fire testing



Isometric View

Industry partners include Techno Sciences, Inc., General Dynamics Robotic Systems, General Dynamics Armament Technology Products, and General Dynamics Land Systems



Segmented Electro-Magnetic Array (SEMA) Motors



- Zero backlash/no mechanical wear
- High mechanical stiffness
- High torque achievable at high, low, and zero rpm
- Power efficient with regenerative power capabilities
- High position resolution



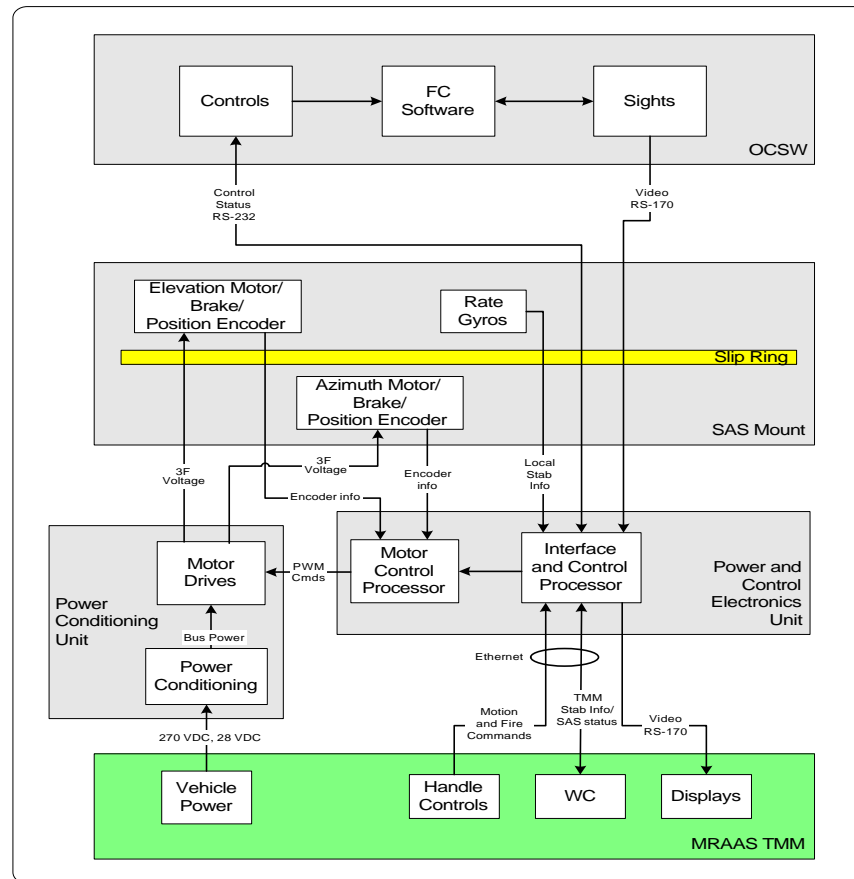
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Drives Lab-tested Under ILIR Program

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SAS Block Diagram

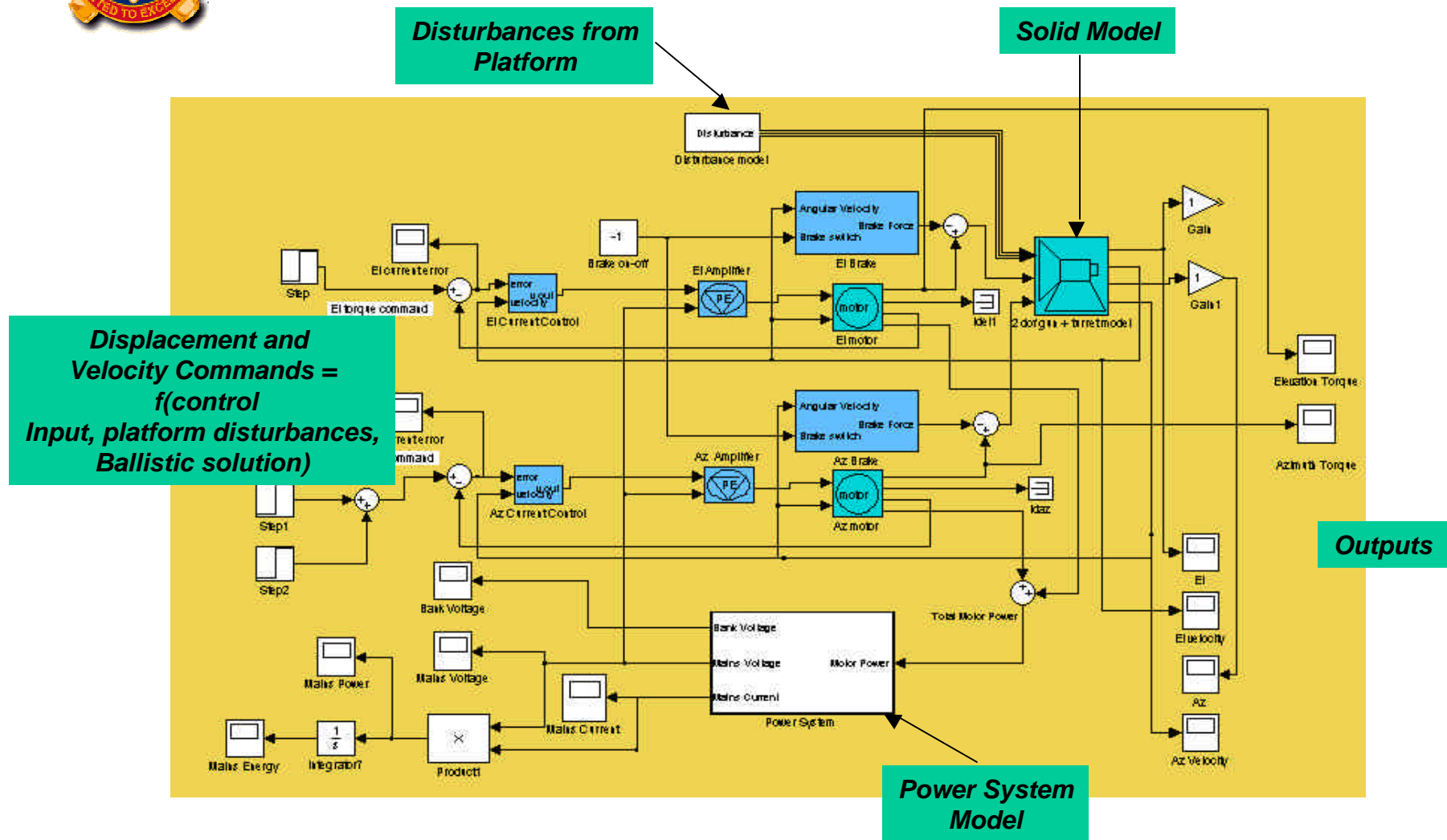


Source: Techno Sciences, Inc.

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Simulink-based System Model for Emulation and Control System Development



Source: Techno Sciences, Inc.



Major Subassemblies

OCSW (XM307)

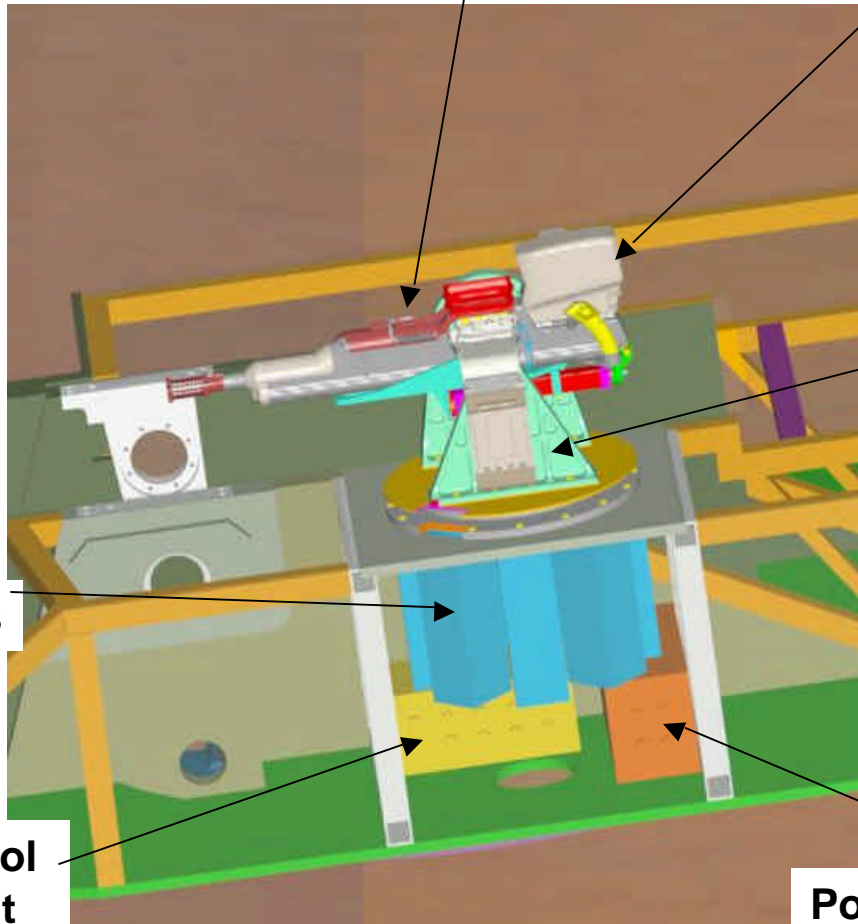
Fire Control System

Mount Assembly

Ammo Magazines

Power and Control
Electronics Unit

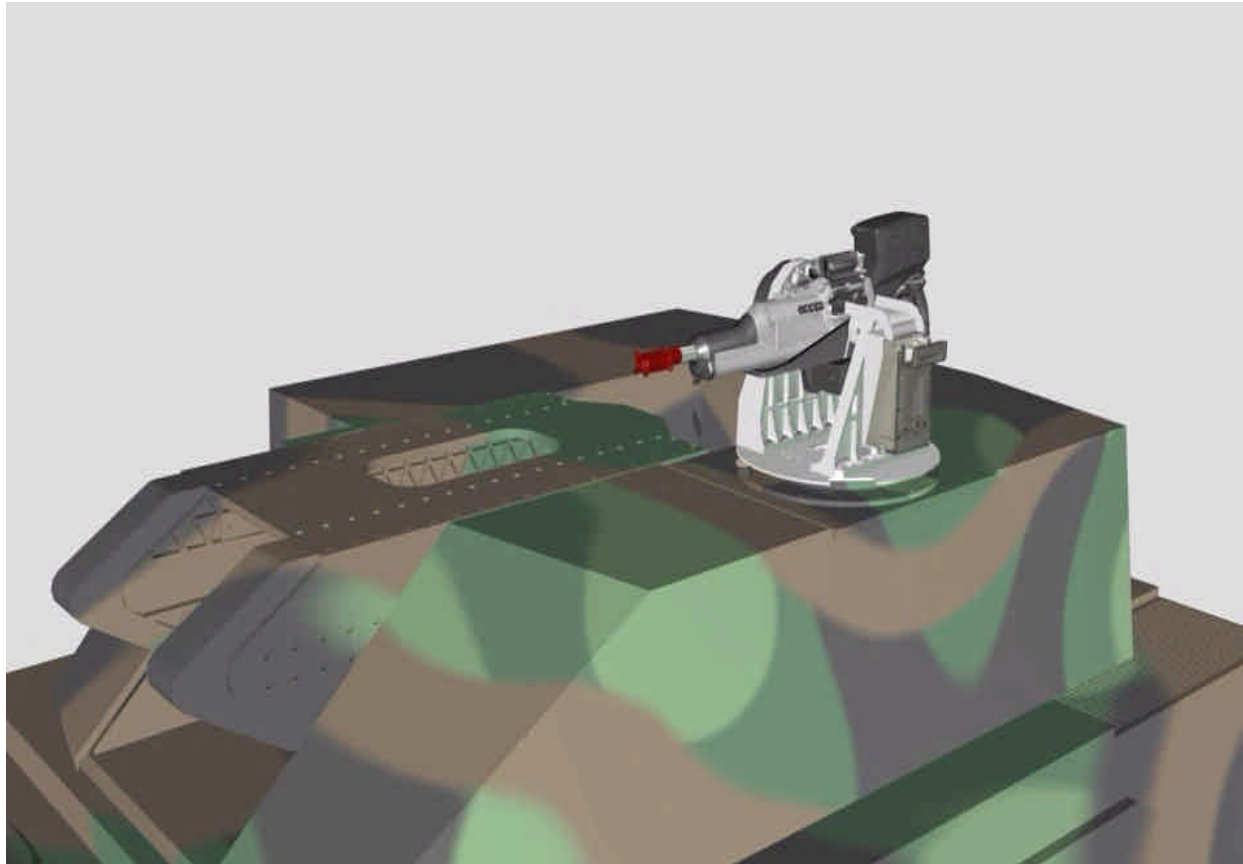
Power Conditioning Unit



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SAS Animation



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Program Plan

FY02	FY03	FY04	FY05	FY06
<ul style="list-style-type: none"> •BTA selection • Concept Development 	<p style="text-align: center;">  Emulators for Sys Integration Lab </p> <ul style="list-style-type: none"> •Complete detail design •Refine Simulink model •Further define mechanical and electrical interfaces 	<p style="text-align: center;">  Hardware Delivery </p> <ul style="list-style-type: none"> •Initiate fabrication •Refine Simulink model •Finalize interface data 	<ul style="list-style-type: none"> •Complete fabrication •Integrate into Turret mission module. 	<p style="text-align: center;">  MRAAS Integrated System Demo </p>

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Summary



- Our goal is to demonstrate a high speed weapon station for FCS and future applications
- Developed design concept
- Mechanical and electrical interfaces being defined
- Modeling tools used to facilitate integration with TMM