GENERAL DYNAMICS
Armament and Technical Products

A new machine gun - the right weapon for today's environment

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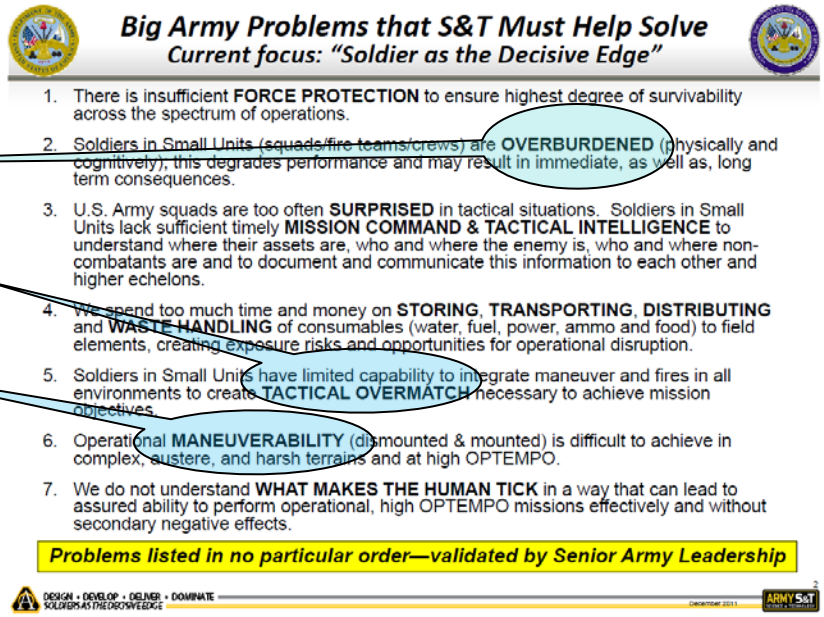
Identified Problem

- 2009 GDATP identified some key deficiencies in current war fighter technology
  - Lack of range and/or lethality in current selection man portable weapon systems.
  - Providing range and lethality requires significant overburden to the war fighter with the current selection of heavier weapons.
- Can we do better for the war fighter?

GDATP started an IR&D initiative to understand and develop a technology that would greatly benefit the war fighter

Identified Problem Confirmed

- In December 2011, 7 major items identified as problems that Army Science and Technology must help solve.
  - Items 2,5 and 6
  - Overburden
  - Tactical Overmatch
  - Maneuverability



Big Army Problems that S&T Must Help Solve
Current focus: "Soldier as the Decisive Edge"

1. There is insufficient **FORCE PROTECTION** to ensure highest degree of survivability across the spectrum of operations.
2. Soldiers in Small Units (squads/fire teams/crews) are **OVERBURDENED** (physically and cognitively); this degrades performance and may result in immediate, as well as, long term consequences.
3. U.S. Army squads are too often **SURPRISED** in tactical situations. Soldiers in Small Units lack sufficient timely **MISSION COMMAND & TACTICAL INTELLIGENCE** to understand where their assets are, who and where the enemy is, who and where non-combatants are and to document and communicate this information to each other and higher echelons.
4. We spend too much time and money on **STORING**, **TRANSPORTING**, **DISTRIBUTING** and **WASTE HANDLING** of consumables (water, fuel, power, ammo and food) to field elements, creating exposure risks and opportunities for operational disruption.
5. Soldiers in Small Units have limited capability to integrate maneuver and fires in all environments to create **TACTICAL OVERMATCH** necessary to achieve mission objectives.
6. Operational **MANEUVERABILITY** (dismounted & mounted) is difficult to achieve in complex, austere, and harsh terrains and at high OPTEMPO.
7. We do not understand **WHAT MAKES THE HUMAN TICK** in a way that can lead to assured ability to perform operational, high OPTEMPO missions effectively and without secondary negative effects.

Problems listed in no particular order—validated by Senior Army Leadership

DESIGN • DEVELOP • DELIVER • DOMINATE
SOLDIERS AS THE DECISIVE EDGE

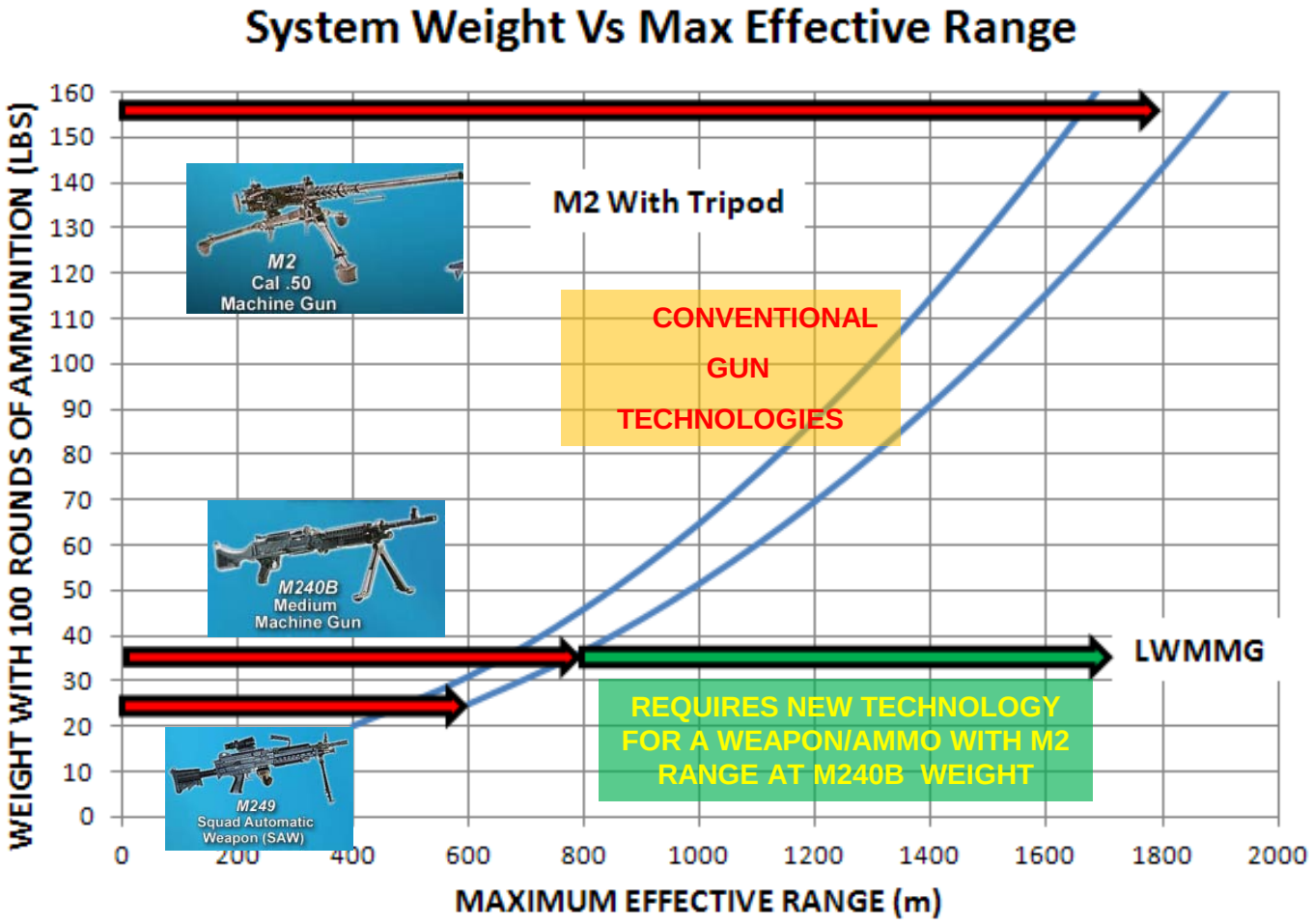
GAP Analysis

CURRENT STATE: EXISTING SOLDIER CARRIED WEAPONS RESTRICT MAXIMUM EFFECTIVE RANGE OR RESTRICTIVE WEIGHT

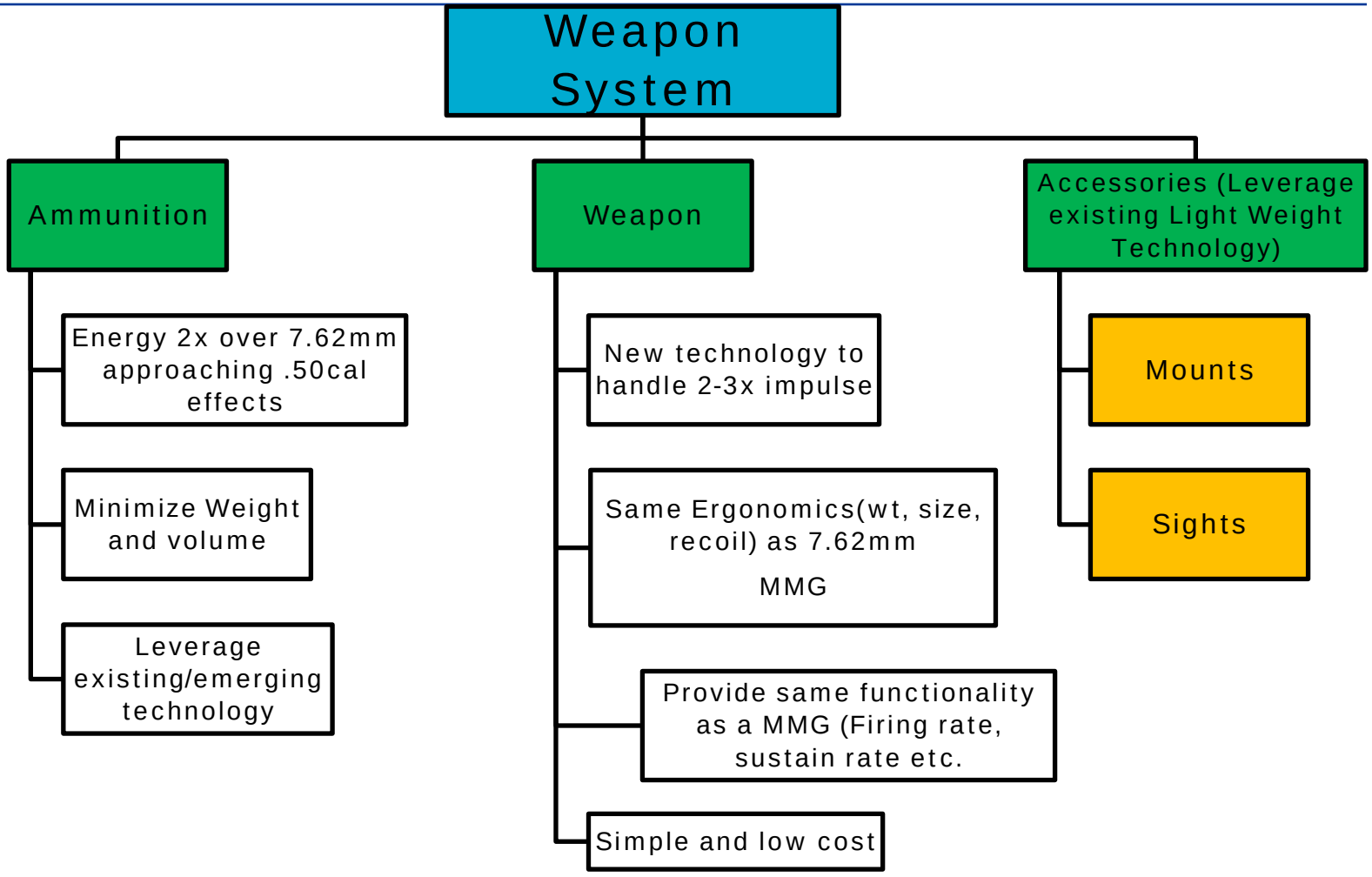
Caliber	Maximum Effective Range	System Weight + 100 Rounds	
7.62 NATO (M80)	M240B 800m (A) M240L 600m(A)	M240B = 33.6 lbs M240L = 28.5 lbs	**Man Portable**
GAP	Longer Range and lethality with Man Portability		
.50 BMG (M33)	1800m (A)	130 lbs	**Stationary or Vehicle Mounted**

SOLUTION: DEVELOP LONG RANGE, HIGHER CALIBER WEAPON AT 7.62 mm SYSTEM WEIGHT

Gap Analysis (Continued)

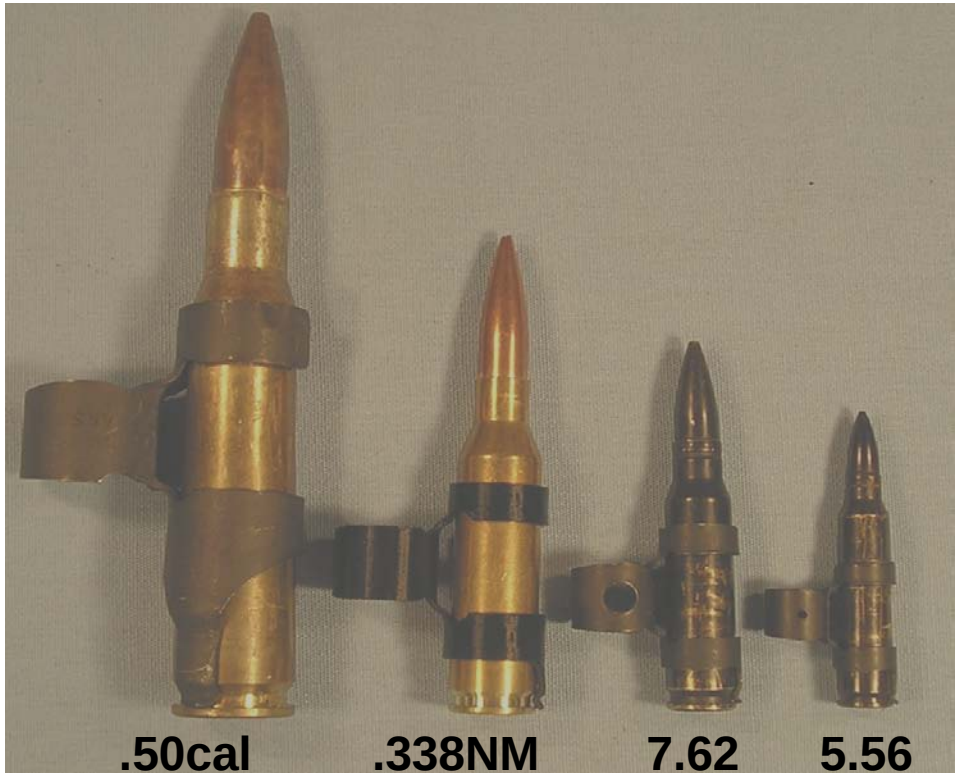


System Architecture



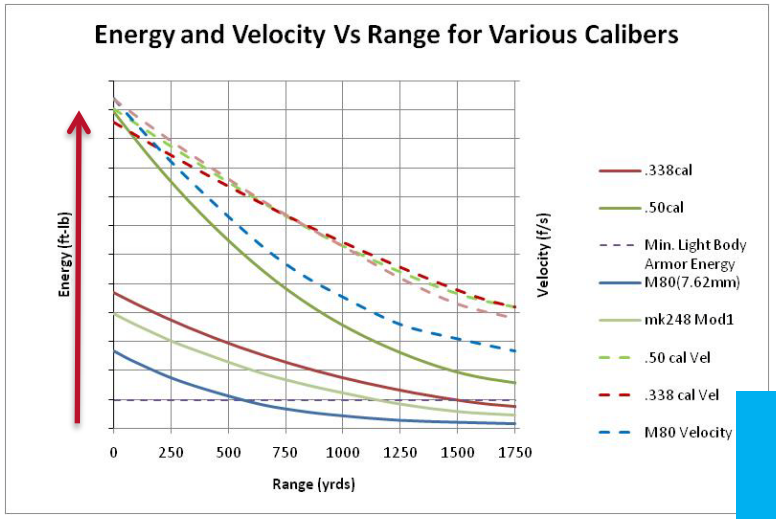
Ammunition

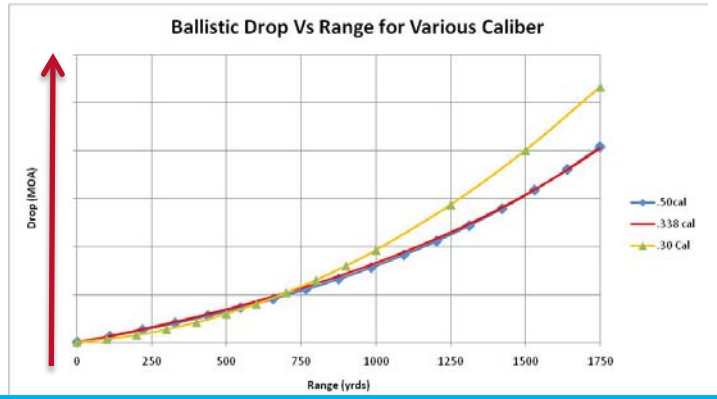
- Leverage Emerging/Existing Technology/Programs
  - Emerging Technology/Program Precision Sniper Rifle Program
    - Energy/Accurcy at 1500 yrds
    - .338, Norma Magnum and Lapua 300 gr.
  - Existing Technology
    - .338 Lapua 300 gr. Family of ammunition
    - Mk248 MOD 1, .300 Winchester Magnum Match Grade (lower performance)



Ammunition (Continued)

- Energy over 7.62mm approaching .50 cal effects on soft targets (Requirement)
  - 2x the energy at Muzzle
  - Defeat level III Body armor at 1000 yards
  - Defeat light body armor at 1500 yards
  - Ballistic drop equivalent to .50 cal: “decrease error budgets”



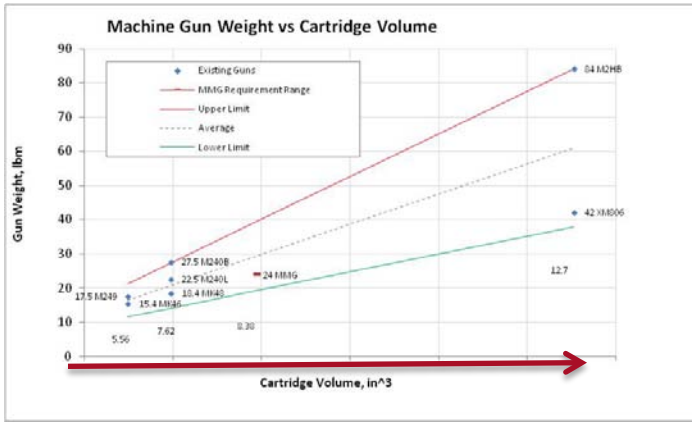


.338 Norma Magnum Meets all the energy requirements

Ammunition (Continued)

- Weight and Size
  - Cartridge Volume (Energy) drives weapon weight
  - .338 Cal (8.38mm) Pushing the limit on maintaining man portability
  - .338 Norma has a slight advantage in size and weight over Lapua

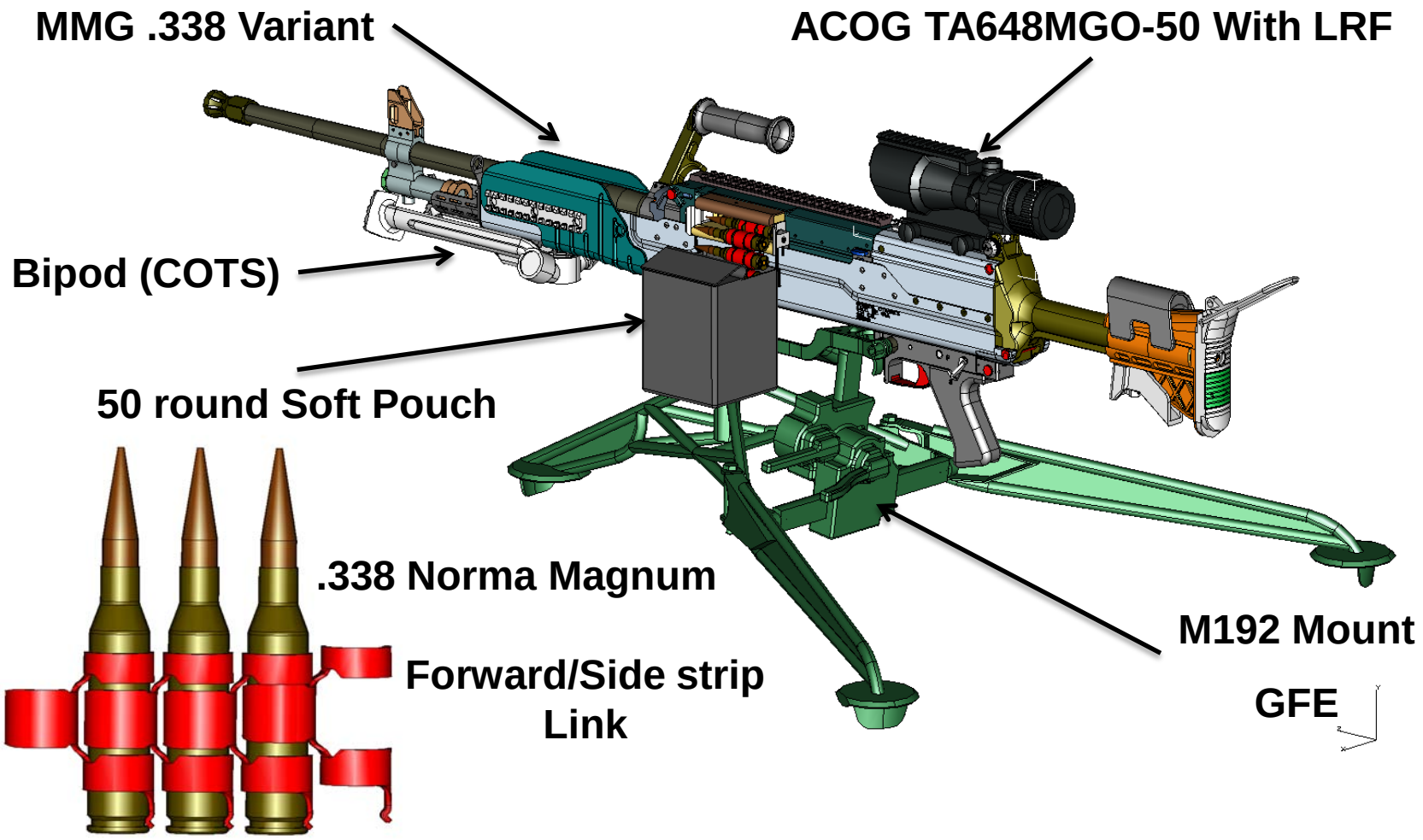
GDATP Baseline Design around the .338 Norma Magnum also compatible with Lapua and Mk248



Weapon System Requirements

- Handle 2.5x round energy but have the same feel as 7.62mm Medium Machine Gun.
- Firing rate 500 SPM
- Provide 10 minutes of continuous suppressive fire at 50-100 SPM without barrel change
- Weapon Ergonomics
  - Same foot print as M240B with weight approaching an M240L
- Weapon cost competitive with existing technology

Weapon System Concept



Weapon System Solution

- Weapon System Characteristics
  - Ammunition :.338 Norma Magnum
  - Projectile 300 gr. Sierra HPBT,FMJ, AP
  - Muzzle velocity: 2650 fps
  - Max Range : 5642 m
  - Max Effective Range : 1700 m
  - Weapon weight 24 lbs:
  - Length: 49” collapsed
  - Height of MMG on M192 Tripod 11.4”
  - Barrel Length 24 in.
  - Mounts: M192, tripod, Vehicle mounts

Completed new design and development to a man safe firing weapon in 14 Months

Weapon System Solution (Continued)

- **Weapon System Characteristics**
  - **The LWMMG features a revolutionary recoil mitigation system known as Short Recoil Impulse Averaging.**
    - **Substantially reduces recoil despite .338NM cartridge which has 2.5x energy of NATO 7.62mm round**
    - **Improves target retention during automatic fire**
    - **The LWMMG recoil profile is similar to a 7.62mm NATO machine gun.**
    - **Eliminates the need for "Soft mounts"**
  - **At 1000 yards the LWMMG is capable of defeating Level III body armor and incapacitating soft skinned vehicles by delivering more than 4x the terminal effects of the 7.62mm NATO cartridge.**

Weapon System Solution (Continued)

- The LWMMG weighs 24 pounds and features a fully collapsible stock and integrated bipod offering superior mobility and portability in both mounted and dismounted operations.

- The LWMMG features a quick change barrel with fixed headspace and timing as well as integrated MIL-STD M1913 rails allowing the use of a variety of optics, lasers and / or accessories within the warfighter' s portfolio.

Weapon System Solution (Cont.)

System Weight Comparison

Min Combat System M240		**Min Combat System MMG**		**Min Combat System M2**	
M240	28. lbs	MMG .338 Variant	25. lbs	M2HB	84 lbs
ACOG Sight	2.5 lbs	ACOG Sight	2.5 lbs	ACOG Sight	2.5 lbs
M192 Tripod	11 lbs	M192 Tripod	11 lbs	M3 Tripod	44 lbs
Spare Barrel	6.6 lbs	Spare Barrel	6.2 lbs	Spare Barrel	25 lbs
800 Linked Rds	53 lbs	500 Linked Rds	60 lbs	500 Linked Rds	145 lbs
Total	100 lbs	Total	104.7 lbs	Total	300 lbs
Load Break Down		**Load Break Down**		**Load Break Down**	
Gunner (wpn, sight 100 rd)	37 lbs	Gunner (wpn, sght 100 rds)	40 lbs	1 HUMMV	
A. Gunner (Trpd, S.Brl 300 rd)	37 lbs	A. Gunner (Trpd, S.Brl 200 rds)	41 lbs		
Ammo Bearer (400 rds)	27 lbs	Ammo Bearer (300 rds)	36 lbs		

LWMMG performance of .50 cal with weight of a M240

Future Work

- Continue LWMMG maturation program
  - Reliability/Durability
- Polymer Case (Reduce weight)
- Lube-less Weapon (Reduce Maintenance)
- Marketing and Partnerships
- Early adopters

THANK YOU

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Weapon System Movie