NDIA International Infantry & Joint Services Small Arms Systems Symposium

Advanced Remote/Robotic Armament System (ARAS)

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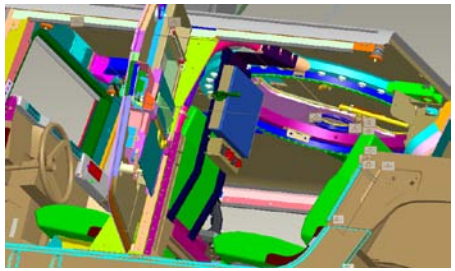
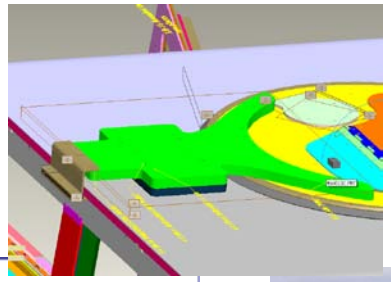
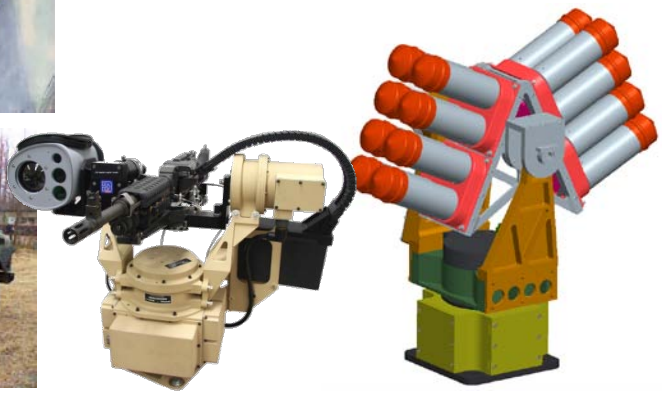
US ARMY RDECOM

ARDEC Remote Weapons







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TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Today's Remote Weapons

What is wrong with this picture?

Mk19 40 mm GMG

.50 Cal M2 MG

M240B, 7.62 mm Medium MG

M249 Squad Automatic Weapon
5.56 mm MG

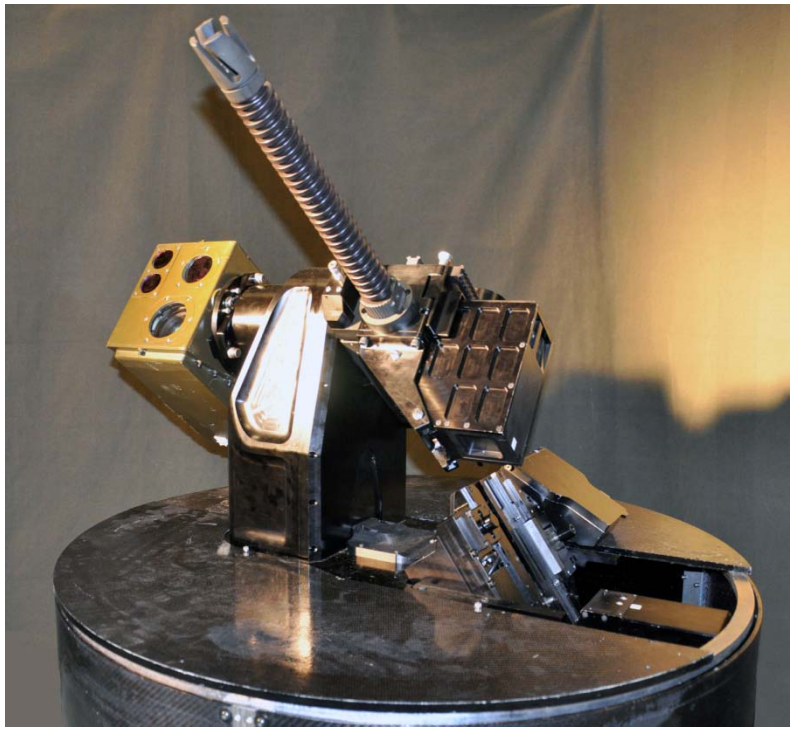
Advanced Remote/Robotic Armament System (ARAS)

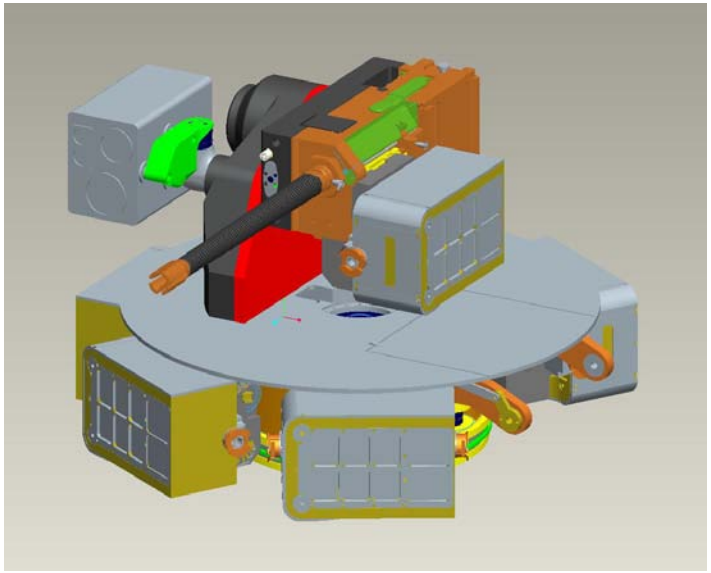
Our development objectives are based on our understanding of the 'problem'

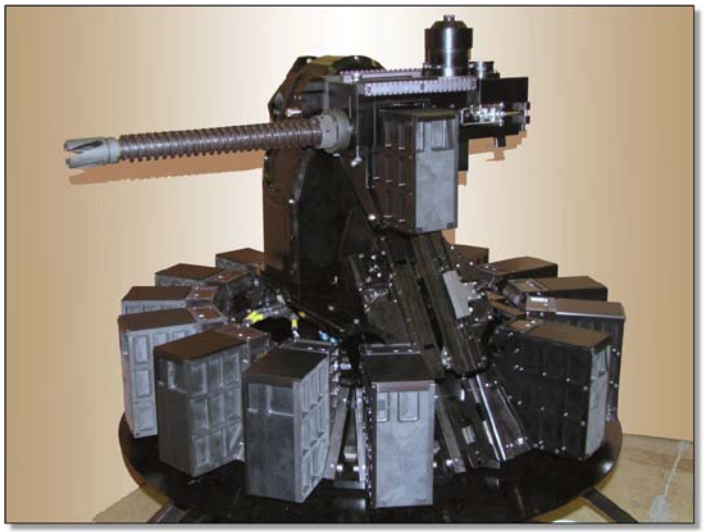
ARAS CAPABILITIES:

- ✓ Electrically actuated weapon firing standard linked ammunition
- ✓ High stabilization and pointing accuracy
- ✓ Reload from UNDER ARMOR
- ✓ Change Ammunition type from UNDER ARMOR
- ✓ Full ammunition inventory
- ✓ Potential Non-lethal capability
- ✓ Real time operating system for critical subsystem performance
- ✓ Minimize reload or ammo type change time: ~6sec
- ✓ Theft/Tamper resistant weapon and ammunition
- ✓ Up to 90 degree elevation from low silhouette mount

Advanced Remote/Robotic Armament System (ARAS)







ARAS Development:

FY05/06 – early concepts and internal marketing
FY07/09 – Baseline 7.62mm development
FY09/10 – Prototype 7.62mm fabrication
FY10/13 – 50cal ARAS development and fabrication

-------With patent pending technology-------

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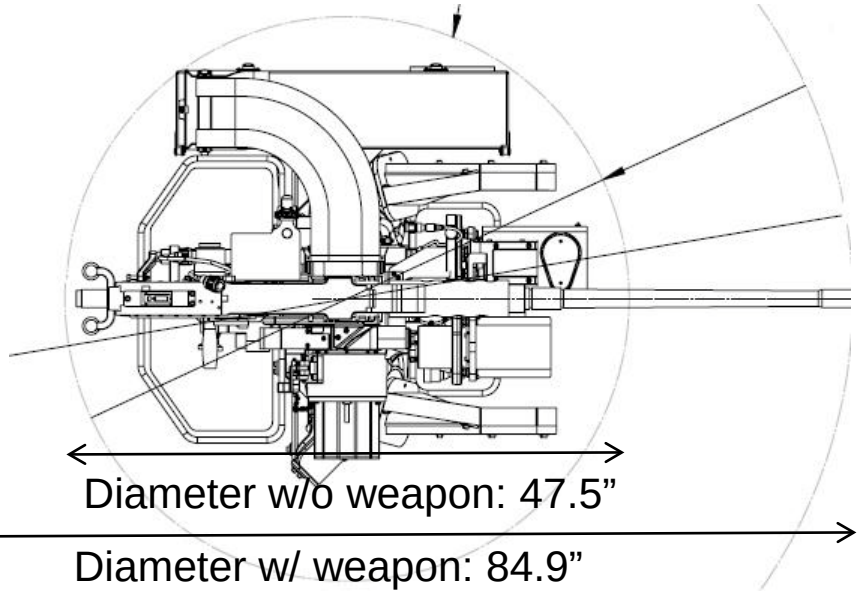
Advanced Remote/Robotic Armament System (ARAS)

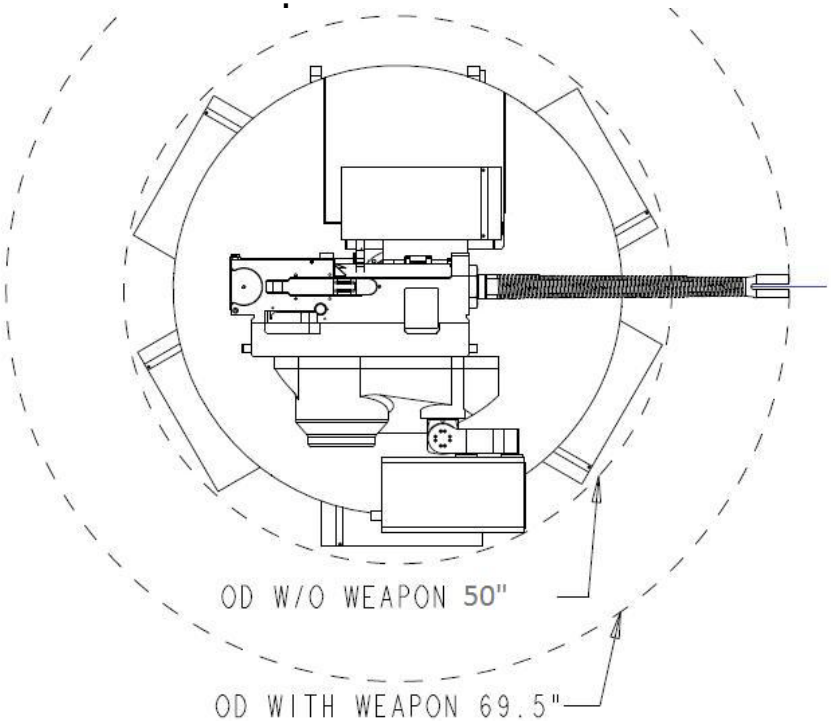
Transition (scale up) from 7.62 x 51mm to .50cal:

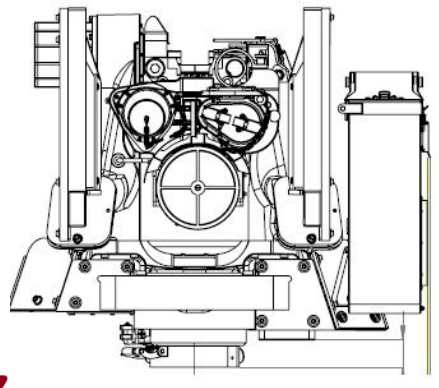
- .50 cal approximately twice the size of 7.62mm rounds
- .50 cal approximately 4.5 times the mass of 7.62x51mm ball rounds
- .50 cal uses closed link where 7.62mm uses open link
- New Weapon to address size and mass of cartridge and use of closed link ammunition
- New ‘active’ magazine design to provide better carousel storage density
- New magazine Transporter (transfer mechanism) to address new carousel configuration and weight of loaded magazine; ~55lbs (40lbs ammo, 15 lbs for Active Magazine) .
- Independent AZ & EL drive for Sight Package
- Modification of turret arm and Az/El drives to handle increased weapon mass and inertia and increased recoil loads

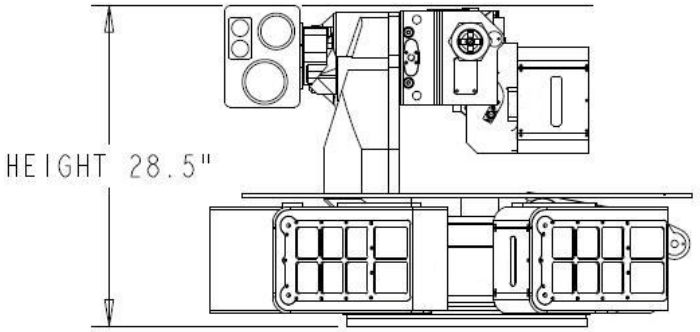
.50 cal ARAS Volume Comparison



50 Cal ARAS







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Advanced Remote/Robotic Armament System (ARAS)

Our Process:

- ARDEC management buy in; allowed us to work behind the curtain
- Leverage opportunities to gather and obtain soldier feedback
- We kept our capability objectives achievable
- We developed a strong multi-organizational ARDEC team
- We understood key capabilities and added new requirements carefully
- We intentionally avoided specific platforms or applications

Advanced Remote/Robotic Armament System (ARAS)

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ARAS Weapon – 7.62x51mm

Externally powered 7.62x51mm NATO

0-600 rds/min variable cyclic rate

35 pounds (without magazine)

32.3 X 5.4 X 13.9 inch envelope

16 inch air cooled heavy barrel

Remotely actuated firing, safe/arm mechanism, ejection port cover, and magazine capture

U.S. and foreign patents pending

Developmental Emphasis

Design verification and testing (laboratory setting)

Over 50K rounds fired so far from a rigid test stand at Picatinny Arsenal indoor ranges

Single receiver, barrel extension, bolt, bolt carrier, and drivetrain utilized during testing (all still fully functional)

Stable headspace and firing pin indent noted throughout testing

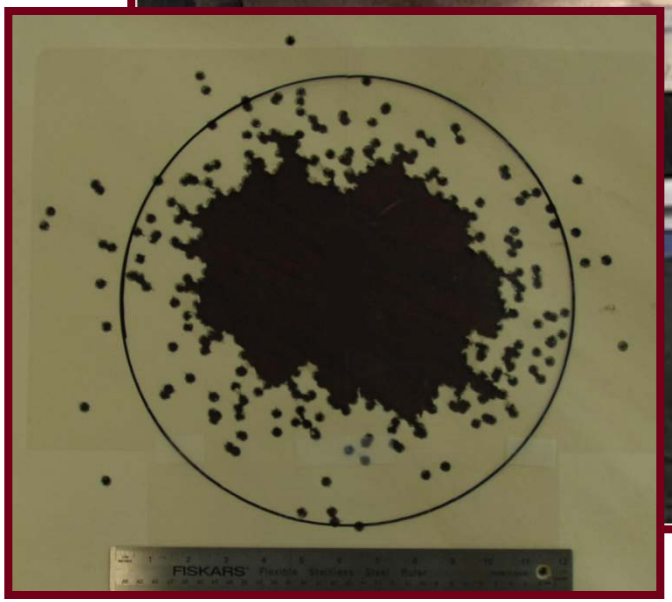
Majority of observed malfunctions attributed to COTS spring related issues and incomplete indexing of the magazine sprocket

Final Defensive Fire Test

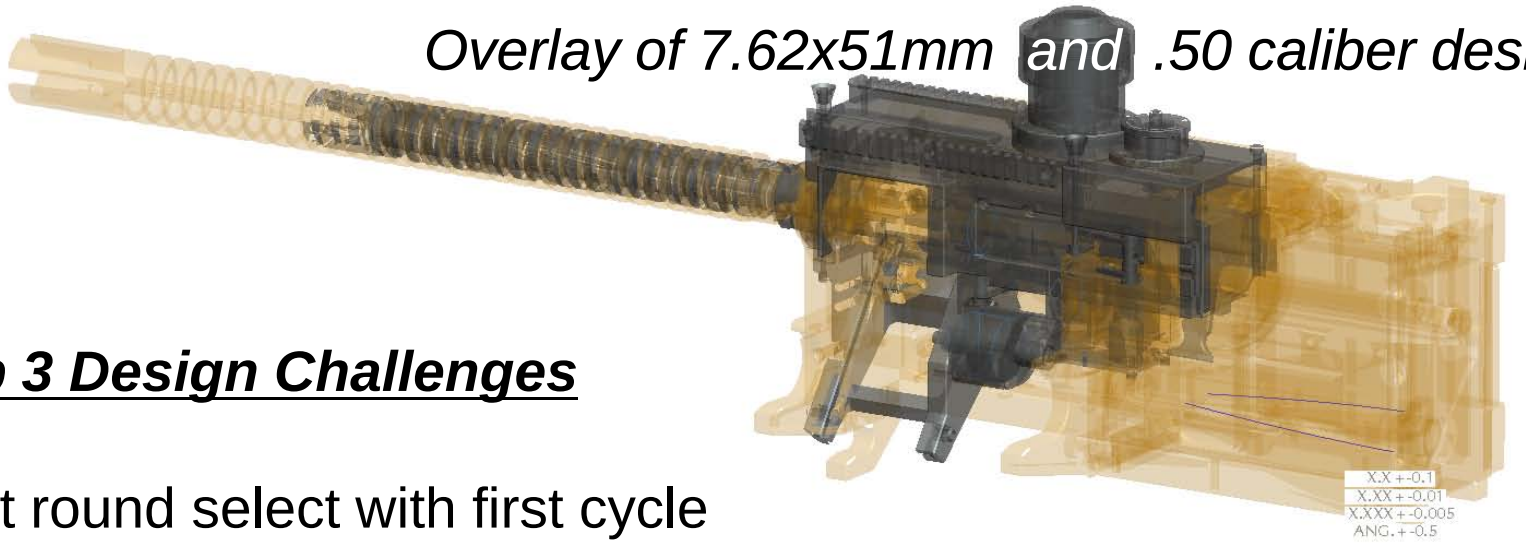
1500 M80/M62(4:1) rounds fired at 450rds/min

Assessed dispersion at 100m and barrel temperature

(Visit the ARDEC booth to see test video)



ARAS Weapon – .50 Caliber



Overlay of 7.62x51mm and .50 caliber designs

Top 3 Design Challenges

First round select with first cycle fire capability while using M9 closed link

KISS field strip and reassembly procedures

Single barrel with no barrel change while being able to withstand the operational demands of a final defensive fire scenario

Additional Design Goals

Adjustable rate of fire (0-500 rds/min) with selectable burst length

Fixed headspace and timing

Favorable ejection path

Internal cabling for all electrical components with transparent connections during installation to turret arm

Functional manual (backup) firing mode

Optimized physical envelope with complimentary inertial properties

Path Forward

<u>7.62x51mm</u>

Support system integration related activities and live fire testing

Continue with in-house verification testing of weapon subsystem

(Optional) Repackage design for multi-caliber system concept

<u>.50 Caliber</u>

Complete technical data package (3QTR FY11)

Fabricate prototype components (4QTR FY11)

Assemble and conduct proof-of-concept live fire test (1QTR FY12)